

November 2019

Promoting Healthy Sleep Practices Among Parents of Young Children: A Preliminary Randomized Controlled Trial

Kristin Lynn Edwards
University of South Florida

Follow this and additional works at: <https://digitalcommons.usf.edu/etd>



Part of the [Developmental Psychology Commons](#), and the [Pre-Elementary, Early Childhood, Kindergarten Teacher Education Commons](#)

Scholar Commons Citation

Edwards, Kristin Lynn, "Promoting Healthy Sleep Practices Among Parents of Young Children: A Preliminary Randomized Controlled Trial" (2019). *USF Tampa Graduate Theses and Dissertations*. <https://digitalcommons.usf.edu/etd/8022>

This Dissertation is brought to you for free and open access by the USF Graduate Theses and Dissertations at Digital Commons @ University of South Florida. It has been accepted for inclusion in USF Tampa Graduate Theses and Dissertations by an authorized administrator of Digital Commons @ University of South Florida. For more information, please contact digitalcommons@usf.edu.

Promoting Healthy Sleep Practices Among Parents of Young Children:

A Preliminary Randomized Controlled Trial

by

Kristin Lynn Edwards

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy in School Psychology
Department of Educational and Psychological Studies
College of Education
University of South Florida

Major Professor: Kathy Bradley-Klug, Ph.D.
Robert Dedrick, Ph.D.
Emily Shaffer-Hudkins, Ph.D.
Kathleen Armstrong, Ph.D.
Jennifer Takagishi, M.D.

Date of Approval:
November 5, 2019

Keywords: sleep hygiene, pediatric sleep intervention, behavioral insomnia, pediatric psychology

Copyright © 2019, Kristin Lynn Edwards

Dedication

This dissertation is dedicated to the loving memories of my grandparents, Claude and Irene Provençal and Jack and Marilyn Edwards, who showed me through words and actions that I can pursue anything I set my mind to.

Acknowledgements

I would like to express my deep appreciation and gratitude for the many individuals who made this dissertation project possible. First, I would like to acknowledge my major professor, Dr. Kathy Bradley-Klug for supporting and encouraging me every step of the way. I feel extremely fortunate to have had the opportunity to work alongside her the last several years. From motivating me to set high goals to dedicating countless hours reviewing this document, her guidance and mentorship have been invaluable to my graduate career at large. I would also like to thank Dr. Kathleen Armstrong for introducing me to the field of pediatric sleep medicine and ultimately inspiring me to pursue a career in pediatric psychology. I am especially grateful for her constructive words of wisdom and confidence in my ability to succeed. Additionally, this research project would not have been possible without the guidance of Dr. Robert Dedrick. I am thankful for his ongoing support and patience in helping me to understand the statistical methods involved in this project. I would also like to extend my deepest gratitude to my committee members, Drs. Emily Shaffer-Hudkins and Jennifer Takagishi for their expert opinion, dedication, and thoughtful contributions to this research project. I would like to thank everyone involved at the university-based clinic and community developmental screening who allowed me to conduct this research study as smooth as possible. In addition, I am extremely grateful for the parents who willingly participated in this study. Thank you to my fellow colleagues and pediatric school psychology research group members, Emily Wingate, David Rubio, Patricia Hanson, Destiny Singleton, and Marcela Galicia for their willingness to assist with this project. A special thank you to Sandra Soca Lozano for going above and beyond to assist with data collection.

Further, I am forever grateful for my family and friends who have supported me throughout this entire journey. Thank you to my loving parents, Jim and Lynn, and sister, Kelsie, for always cheering me on and enabling me to reach my goals. Finally, thank you to my supportive partner and best friend, Justin, for his ongoing love and patience.

Table of Contents

List of Tables	iv
List of Figures.....	v
Abstract.....	vi
Chapter One: Introduction	1
Statement of the Problem	1
Theoretical Framework	6
Purpose of the Study.....	11
Research Questions	12
Research question 1	12
Research question 2	12
Research question 3	13
Research question 4.....	13
Hypotheses	13
Importance of the Study	14
Definition of Key Terms	16
Chapter Two: Literature Review	17
Importance of Pediatric Sleep	17
Prevalence of Pediatric Sleep Problems	18
Behavioral Sleep Problems in Young Children.....	19
Behavioral Insomnia of Childhood/Chronic Insomnia Disorder.....	20
Insomnia Related to Sleep-Onset Associations.....	20
Insomnia Related to Parental Limit Setting.....	20
Transient Sleep Disturbances/Short Term Insomnia Disorder	21
Practices to Promote Healthy Sleep	21
Age Appropriate Sleep Duration and Bedtimes	22
Consistent Bedtime Routines	22
Physical Environment Conducive to Sleep	22
Independence When Falling Asleep	23
Daytime Routines	24
Absence of Electronics Before Bedtime.....	25
Exercise and Diet.....	25
Identification of Behavioral Sleep Problems in Children.....	26
Treatment of Behavioral Sleep Problems in Children.....	29
Parent Education/Prevention	31
Extinction/Graduated Extinction	32
Faded Bedtime.....	33

Positive Routines	33
Scheduled Awakenings	34
Prevention of Pediatric Sleep Problems in Young Children	34
Parent Knowledge of Children’s Sleep	35
Knowledge of Healthy Sleep Practices	36
Knowledge of Children’s Sleep Needs.....	37
Changes in Parent Knowledge and Sleep Outcomes Following Intervention.....	37
Promoting Sleep Health Education in School Settings	39
Promoting Sleep Health Education in Primary Care Settings	40
Current Barriers to Addressing Sleep During Routine Exams	42
Training and Education	42
Lack of Time and Resources	42
Perceived Confidence	42
Sleep Problems Reported by Parents.....	43
Integrating Behavioral Health in Primary Care.....	43
Promoting Sleep Health Education in Early Intervention Program	44
Current Literature on Written Educational Interventions.....	45
Conclusion.....	47
Chapter Three: Methods	49
Research Staff.....	49
Intervention.....	50
Experimental Condition.....	50
Control Condition.....	51
Measures.....	51
Measure Development Process.....	52
Sleep Hygiene Knowledge Test	53
Pediatric Sleep Hygiene Questionnaire	53
Parent Interview Questionnaire	54
Provider Feedback Form	54
Intervention Integrity.....	55
Research Design	56
Independent and Dependent Variables	57
Procedures	57
Intervention and Assessment Procedures	57
Phase 1	57
Phase 2.....	57
Pilot Study	58
Ethical Considerations.....	61
Participant Recruitment and Sampling.....	61
Setting.....	61
Participants	62
Data Analysis Plan	67
Research question 1	68
Research question 2	68
Research question 3	69

Research question 4.....	69
Chapter Four: Results.....	70
Data Screening.....	70
Missing Data.....	70
Participant Flow.....	71
Reliability.....	71
Research Question 1.....	72
Research Question 2.....	75
Research Question 3.....	77
Research Question 4.....	78
Parent Feedback.....	78
Provider Feedback.....	81
Summary.....	83
Chapter Five: Discussion.....	85
Responses to Research Questions.....	85
Parental Sleep Hygiene Knowledge.....	85
Parental Sleep Hygiene Practices.....	87
Parental Intent to Communication with Healthcare Providers.....	88
Parent and Pediatric Provider Feedback.....	89
Implications of Findings.....	90
Implications for Healthcare Settings, Schools, and Communities.....	90
Implications Related to Sleep Hygiene Screening.....	92
Limitations.....	92
Contribution to the Literature and Future Directions.....	94
Conclusion.....	98
References.....	100
Appendices.....	114
Appendix A.....	115
Appendix B.....	116
Appendix C.....	117
Appendix D.....	119
Appendix E.....	127
Appendix F.....	130
Appendix G.....	131
Appendix H.....	132
Appendix I.....	137
Appendix J.....	138
Appendix K.....	139
Appendix L.....	140

List of Tables

Table 1	Behavior Change Techniques Incorporated in the Current Study.....	8
Table 2	Logic Model of Intervention	9
Table 3	Pediatric Sleep Hygiene Questionnaire – Sleep Hygiene Subscale	56
Table 4	Demographic Characteristics of Pilot Study Participants	60
Table 5	Comparison of Demographics for Current Study and Community Screening Participants	63
Table 6	Demographic Characteristics of Study Participants.....	66
Table 7	Chi Square Analyses for Group Differences.....	67
Table 8	Demographic Characteristics of Study Providers	67
Table 9	Descriptive Statistics of Sleep Knowledge Test Total Scores.....	72
Table 10	Mean Difference of Sleep Hygiene Knowledge Total Scores Between Groups.....	73
Table 11	Differences in Sleep Knowledge Test Scores Between Groups.....	75
Table 12	Descriptive Statistics of Total Sleep Hygiene Practices.....	76
Table 13	Mean Difference and Results of <i>t</i> -test of Total Sleep Hygiene Practices Between Groups	76
Table 14	Descriptive Statistics of Item 41 (Parental Intent to Communicate Regarding Sleep).....	77
Table 15	Results of <i>t</i> -test for Item 41(Parental Intent to Communicate Regarding Sleep) Between Groups	78
Table 16	Frequency of Intent to Communicate by Group (Item 41).....	78

List of Figures

Figure 1	Stepped Care Model Adapted for Sleep Health	12
Figure 2	Participant Flow.....	65
Figure 3	Proportion of Parents Correctly Answering Sleep Hygiene Knowledge Items	74
Figure 4	Responses to Parent Interview Question 3	80
Figure 5	Responses to Parent Interview Question 7	82

Abstract

One of the most significant and underrecognized public health concerns in young children is related to the consequences of inadequate sleep. Inadequate sleep may result in problems related to behavioral regulation, executive functioning, and academic performance. ‘Sleep hygiene’, a term that describes consistent daytime and nighttime practices that promote healthy sleep, has been found to significantly increase sleep duration and improve sleep quality in the pediatric population. Researchers have found that many parents have a poor understanding of sleep hygiene. The purpose of this study was to determine if an educational intervention increased parental knowledge and practices of sleep hygiene and encouraged parents to communicate with pediatric healthcare providers regarding sleep. This study evaluated the acceptability of a written sleep intervention among parents and pediatric providers. Employing a two-group, true experimental design with random assignment. Participants included parents of children between the ages of 2 years and 5 years who were recruited from a community developmental screening. A total of 45 parents participated in the study. During Phase One of the study, parents were randomly assigned to a condition. Twenty-one parents were assigned to the experimental group (Healthy Sleep Handout) and 24 were assigned to the control group (Healthy Eating Handout). Following the handout, parents were asked to complete the Sleep Hygiene Knowledge Test, a 12-item true/false test. On average, the experimental and control group obtained total scores of 78% and 71%, respectively. There was no significant difference between group means. Phase Two was completed approximately one week after the first phase. Of the 45 parents who consented and participated in the study, 41 completed both phases of the study yielding a 91%

follow-up rate between phases. During Phase Two, parents were asked to complete the Pediatric Sleep Hygiene Questionnaire. Participants in the experimental group scored statistically significantly higher on the sleep hygiene scale than the control group. Cohen's effect size value suggested a moderate effect. With regard to future parental intent to communicate with pediatric healthcare providers regarding sleep, the experimental group endorsed a slightly higher intent to communicate with pediatric providers; however, there was not a statistically significant difference between group means. The effect size for this analysis suggested a small effect. Of note, 65% of the experimental group and 43% of the control group endorsed that they 'very probably' or 'definitely' plan to talk with their child's healthcare provider in the future regarding sleep concerns. Parents and pediatric providers involved in the study participated in feedback interviews. Taken together, both parents and providers reported the intervention as practical and beneficial to practice. Implications of the findings are discussed in relation to developing strategies for improved dissemination of sleep health knowledge and increasing parental sleep hygiene practices in families of young children including implications for healthcare settings, schools, and communities. Recommendations for future qualitative research include examining the factors associated with parental readiness to make changes regarding their child's sleep behaviors, as well as perceived challenges and barriers.

Chapter One

Introduction

Statement of the Problem

One of the most significant and underrecognized public health concerns in young children is related to the consequences of inadequate sleep. A wealth of empirical evidence suggests that appropriate amounts of sleep are necessary for optimal cognitive, physical, and social-emotional functioning (Mindell & Owens, 2015). Conversely, insufficient sleep may significantly impair daytime functioning across such domains. For example, inadequate sleep may result in problems related to mood disturbance and behavioral regulation (Sadeh, Gruber, & Raviv, 2002), attention, memory, and concentration (Meltzer & Crabtree, 2015), as well as impaired academic performance and learning capacity (Curcio, Ferrara, & De Gennaro, 2006), increased risk-taking behavior and accidental injury (Owens, Fernando, & McGuinn, 2005), and increased risk for obesity, diabetes, allergies, and ear infections (Chen, Beydoun, & Wang, 2008; Rudnicka et al., 2017). Sleep deprivation in children has been found to result in increased parental stress and decreased parenting skills (Hoffman et al., 2005; Mindell & Owens, 2015). Furthermore, sleep problems can intensify the symptoms of nearly every comorbid medical or psychiatric condition (Mindell & Owens, 2015).

Up to 30% of children will experience at least one sleep problem during early childhood (Owens, 2008; Owens, Spirito, McGuinn, & Nobile, 2000). While a small percentage have medically-based sleep concerns (e.g., snoring, leg movements), the most common types of sleep problems in young children are behaviorally-based (Mindell, Kuhn, Lewin, Meltzer, & Sadeh,

2006; Mindell & Owens, 2015). Up to 50% of young children experience *behavioral* sleep problems (Mindell & Owens, 2003). Specifically, 25% to 50% of children over 6 months of age have been found to experience prolonged night wakings. Similarly, bedtime resistance has been found in 10% to 30% of toddlers and preschoolers (Mindell & Owens, 2015). Not only is bedtime resistance common, but it often persists into early childhood. One study found that 84% of children ages 15 to 48 months with sleep problems related to night wakings and bedtime resistance experienced significant sleep problems at 3 years of age (Kataria, Swanson, & Trevathan, 1987). Moreover, children who experience developmental delays have a higher risk of sleep disturbance than typically developing children, with difficulty falling asleep and staying asleep being the most common problems (Bonuck & Grant, 2012). The high rates of sleep problems among young children is concerning given the substantial amount of literature on the negative effects of insufficient sleep. Early intervention could potentially prevent sleep problems from becoming more serious or continuing into adolescence (Gruber, Cassoff, & Knauper, 2011).

Aside from medical and physiological sleep disturbances such as snoring or leg movements, many insomnia-related sleep problems are behavioral and typically stem from a lack of sleep-promoting practices (e.g., irregular sleep-wake schedule). In addition, behavioral sleep problems may develop as a result of adverse sleep onset associations, or only being able to fall asleep under certain conditions (e.g., being rocked by a parent). Insomnia is a sleep disorder which involves difficulty initiating or maintaining sleep (Mindell & Owens, 2015). The *International Classification of Sleep Disorders*, 3rd Edition (ICSD-3; American Academy of Sleep Medicine, 2014) categorizes both pediatric and adult insomnia disorders as “chronic insomnia disorder” and “short-term insomnia disorder”. However, for the purpose of this study,

specific types of behavioral insomnia (e.g., insomnia related to sleep-onset associations) are defined in order to provide a more accurate description of insomnia specific to young children. Further, the term *parents* refer to any person the child legally resides with, including biological and non-biological caregivers. This study aimed to intervene with sleep problems in children either *at-risk of* or *identified as* having a developmental delay. Based on a prevalence study of over 100,000 children between the ages of 3 and 17 years, the most common risk factors for developmental delay include male sex when compared to female, prenatal risk factors (e.g., premature birth), lower maternal education (e.g., less than a college degree), low family income (e.g., under the poverty line), and public health insurance compared to private (Boyle et al., 2011). However, for the purpose of this study, the term “at-risk for developmental delay” refers to any child brought to a community developmental screening as a result of a parent-suspected delay.

Sleep hygiene refers to the daytime and nighttime practices that promote healthy sleep. Sleep hygiene has been found to significantly increase sleep duration and improve sleep quality in the pediatric population. The principles of sleep hygiene include a consistent bedtime routine such as a warm bath and bedtime reading, absence of electronics and caffeine before bed, physical environment that encourages sleep, and consistent wake time (Galland & Mitchell, 2010). The National Sleep Foundation *Sleep in America Poll* found a positive relationship between sleep hygiene practices and sleep duration among children (Mindell, Meltzer, Carskadon, & Chervin., 2009). In fact, research has demonstrated that poor sleep hygiene (e.g., excessive parental involvement and child’s lack of self-soothing skills) is closely linked to difficulty initiating and maintaining sleep (Bauchner, Philipp, Levenson, & Zuckerman, 1991). Additionally, researchers have concluded that sleep ecology (i.e., sleep environment) and

parental behaviors (e.g., rocking a child to sleep) explain a significant portion of differences among children's sleep habits (Sadeh, Mindell, Luedtke, & Wiegand, 2009). Given the present literature, sleep hygiene is often incorporated into behavioral sleep interventions (Vriend, Corkum, Moon, & Smith, 2011). Researchers have found that behavioral sleep interventions are less effective when poor sleep habits are present (Johnson, Giannotti, & Cortesti, 2009). As such, improving sleep hygiene is suggested as the 'first line of treatment' when approaching sleep problems (Jan et al., 2008).

Behavioral sleep interventions have been successful in treating sleep problems in young children (Meltzer & Crabtree, 2015; Mindell et al., 2006;). Such treatments are grounded in learning and behavior theories and aim to promote healthy sleep practices (Moturi & Avis, 2010). Behavioral sleep interventions frequently rely on parent training to facilitate changes in the child's behavior (Mindell et al., 2009). Positive bedtime routines, parent education/training, extinction, faded bedtime, and scheduled awakenings are among those with the most empirical support (Kuhn & Elliot, 2003; Meltzer & Crabtree, 2015; Mindell et al., 2006). Several highly effective behavioral and educational interventions exist for parents of newborns; however, few evidence-based interventions are targeted toward the promotion of healthy sleep in preschool and school-age children. Moreover, behavioral interventions that aim to reduce night waking and bedtime refusal in older children are often complex and time-consuming and are typically only implemented with families of children with recognized sleep disorders. Furthermore, there is little research on the effectiveness of parent education that is independent of more complex behavioral interventions (Allen, Howlett, Coulombe, & Corkum, 2015; Jones, Owens, & Pham, 2012).

Researchers have found that parents are generally unaware of the symptoms of poor sleep (Owens, 2001; Owens & Jones, 2011; Owens, Jones, & Nash, 2011; Owens et al., 2000).

Conversely, parents who are aware of their child's sleep problem may not report it to their child's pediatrician (Blunden et al., 2004). Parents have been found to have a poor understanding of the strategies used to promote healthy sleep, resulting in an increase of negative sleep practices at home (Owens, 2001; Owens & Jones, 2011; Owens et al., 2011; Owens et al., 2000).

Healthcare professionals are in an ideal position to address the need for sleep education given the ongoing access pediatric providers (e.g., pediatricians, nurses, psychologists, early intervention providers) have to parents of young children (Mindell & Owens, 2015). However, the professional guidelines on incorporating sleep hygiene education into primary care settings are currently absent. Despite the lack of guidelines, there is national recognition of the importance of increasing sleep health knowledge among families and pediatric providers. In 2006, the Institute of Medicine emphasized the unmet need for healthcare professionals, medical students, and the general public to increase their knowledge regarding the importance of healthy sleep (Institute of Medicine, 2006). Despite the known benefits of identifying and treating sleep problems in primary care, pediatric healthcare professionals perceive several barriers to engaging in sleep health education during routine examinations such as lack of time and resources, lack of sleep health knowledge and training, and low perceived confidence (Faruqui, Khubchandani, Price, Bolyard, & Reddy, 2011; Mindell, Moline, Zendell, Brown, & Fry, 1994; Owens, 2001). Given the barriers associated with primary care settings, turning to other family-oriented venues is optimal. Pediatric psychologists, school psychologists, and early intervention providers are opportune professionals to either provide preventative sleep hygiene information to parents or reinforce sleep recommendations made by their child's healthcare provider.

Taken together, there is a need for brief educational tools aimed at increasing parent knowledge and practices of healthy sleep that can be widely and easily distributed. Provided that parents may not report sleep concerns with their child's pediatrician (Blunden et al., 2004), there also is a need for sleep health education that raises awareness of common sleep problems and increases parent intent to communicate with healthcare providers on sleep in order to prevent early signs of sleep disturbances from progressing into a sleep disorder. Written educational tools, such as brochures, are affordable and can be widely distributed to families in a reasonable time. Moreover, educational tools have been suggested as an efficient method to overcoming barriers related to time and resources in primary care settings (Gruber et al., 2011). Further, expanding sleep education beyond primary care introduces the possibility of addressing the sleep knowledge gap, and as a result, improving the health and development of young children.

Theoretical Framework

Effectively translating sleep health knowledge into behavior change is grounded in several behavior change theories including the Transtheoretical Model of behavior change, which conceptualizes the process of intentional behavior change: "precontemplation", "contemplation", "preparation", "action", "maintenance", and "termination" (Prochaska, Redding, & Evers, 1997). The Transtheoretical Model of behavior change is of particular relevance to this study because it acknowledges that very few people are ready to take action at any given time. Interventions based on the Transtheoretical Model have been found to result in increased participation in the change process. In addition, the Theory of Planned Behavior is of relevance to this study. The Theory of Planned Behavior proposes that behavior change is influenced by a person's intention, or motivation, to change and the perceived risks and benefits of that change (Ajzen, 1991). Specifically, a person's intentions are determined by their

“attitudes” (i.e., opinions of a behavior), “subjective norm” (i.e., beliefs of how significant others view the behavior and/or need for change), and “perceived behavioral control” (i.e., beliefs of personal control over a behavior). According to Ajzen (1991), intentions are the most proximal predictors of behavior change. Finally, Self-Efficacy Theory also is of relevance. Self-Efficacy Theory proposes that one’s self-efficacy, or beliefs of their own abilities, has influence on life outcomes (Bandura, 1994). Self-efficacy has been found to be a proximal predictor of behavior, given that it is based on perceptions of self-confidence and control.

Taken together, these theories suggest several factors that may influence whether a person is willing to participate in health-promoting behaviors such as sleep hygiene. Moreover, sleep habits are learned behaviors, therefore by definition, amenable to change. Research has suggested that health-promoting interventions are more effective when grounded in theory (Lin et al., 2018; Prestwich et al., 2014; Prestwich, Webb, & Conner, 2015). As such, behavior change techniques were incorporated in this study. Table 1 provides a detailed description of each change component and corresponding mechanism of action. Furthermore, Table 2 outlines the logic model that supports this intervention including anticipated proximal and distal outcomes.

Table 1

Behavior Change Techniques Incorporated in the Current Study

Behavior Change Technique*	Brief Description	Mechanism of Action
BCT 5.1: Information about health consequences	Outline American Academy of Sleep Medicine recommended sleep durations for young children; explain negative health consequences of insufficient sleep, particularly among children with DD	Knowledge and attitude towards sleep hygiene; beliefs about consequences of sleep; intentions to implement healthy sleep habits
BCT 12.1: Restructuring the physical environment	Suggestions for making child's bedroom comfortable for sleep (e.g., cool and quiet)	Perceived behavioral control
BCT 4.1: Instruction on how to perform a behavior	Include specific recommendations to improve sleep hygiene	Behavioral regulation
BCT 1.4: Action planning	Prompt parents to discuss sleep with their child's healthcare provider	Behavioral regulation
BCT 1.2: Problem solving	Discuss whether parents have implemented recommendations	Beliefs about capabilities
BCT 9.1: Credible source	Handout is distributed to families by credible sources who hold influence (e.g., healthcare providers)	General attitudes and beliefs about sleep

*Labels of behavioral change techniques are adapted from Michie et al. (2013) taxonomy.

Table 2

Logic Model of Current Intervention

Purpose	Inputs	Activities	Outputs	Outcomes	
				Short-term	Long-term
To promote healthy sleep practices among parents of young children who are at-risk of or identified as having a developmental delay	Parent/caregiver time	Expose parents to sleep hygiene handout	Number of sleep hygiene practices implemented	Parents improve their understanding of sleep hygiene	Improved sleep for young children
	Clinic/program staff time and space			Regularity of sleep habits improve among children	Reduce negative consequences of insufficient sleep (e.g., social-emotional problems)
	Research assistant time			Providers perceive less barriers to addressing sleep hygiene	Reduce parental stressors related to child sleep
				Sleep hygiene resource will be easily accessible to parents and providers	Quality of life improves for family

The intervention developed in this study also is rooted in Bronfenbrenner’s ecological systems theory to human development (1977), which describes how multiple systems influence a child’s development. Specifically, these systems include the “microsystem” (e.g., a child’s family and peers), the “mesosystem” (i.e., interactions between factors of the microsystem), the “exosystem” (e.g., neighbors, politics, social services), and the “macrosystem” (i.e., attitudes of the child’s culture). When managing sleep problems in young children, it is important to consider ecological systems theory given that sleep habits may be greatly influenced by a child’s individual and socio-cultural factors. At an individual level, genetic predispositions may increase susceptibility of a sleep problem (Sehgal & Mignot, 2011). Moreover, medical problems that

result in symptoms of discomfort, such as gastrointestinal issues, allergies, headaches, and ear infections can disrupt sleep patterns (Bruni, Russo, Violani, & Guidetti, 2004; Kahn et al., 1989, Koinis-Mitchell et al., 2012, Tudor, Walsh, Mulder, & Lerner, 2015). Further, parents and caregivers can, sometimes inadvertently, create certain conditions in a child's environment that promote healthy sleep (e.g., consistent bedtime routine) or contribute to sleep problems (e.g., use of electronic screens before bed; El Sheikh & Sadeh, 2015). More specifically, parental guidelines for healthy sleep hygiene practices such as reduced television and electronics use, and promoting calming activities before bed have been shown to have an effect on children's sleep (Mindell, Sadeh, & Kohyama, 2010; Owens et al., 2011). Conversely, parents who are unfamiliar with healthy sleep recommendations are more likely to report insufficient sleep in their child (Owens et al., 2011). Similarly, school factors including amount of homework, school start times, and extracurricular activities can significantly affect the quality and duration of a child's sleep (Owens, Belon, & Moss, 2010). Furthermore, cultural factors, community norms and expectations, and poverty may influence a child's sleep (El Sheikh & Sadeh, 2015). For instance, sleeping arrangements, such as co-sleeping or sleeping alone, can be influenced by cultural norms (Ball, Hooker, & Kelly, 2000). Similarly, children in poverty may be exposed to an increased amount of neighborhood noise or crowded sleep environments (Moore et al., 2011), which can affect the quality and duration of sleep. These factors highlight the necessity of applying Bronfenbrenner's ecological systems theory to preventative sleep interventions. Researchers have proposed that targeted sleep education programs that have considered Bronfenbrenner's theory may be more effective at translating sleep education into sleep behavior change (Blunden, Benveniste, & Thompson, 2016).

This study also is aligned with a preventative health care model known as stepped care. Espie (2009) proposed an adapted version of the stepped care model for addressing sleep health at a population level (Figure 1). Using a stepped care approach, the dissemination of sleep health information may likely reduce the amount of undetected sleep problems that later progress into more serious disorders. This study examined the impact of a Level 1 preventative sleep intervention. According to Espie (2009), certain sleep problems can be prevented through information-based interventions. Further, preventative sleep education has been suggested to increase accessibility to treatment among patients who experience difficulty obtaining care due to cost or limited availability trained professionals. Despite a rise in the number of trained pediatric sleep providers over the last ten years, the subspecialty of pediatric sleep medicine continues to be one of the lowest certified in the field. Specifically, between 2007 and 2015, less than 280 sleep specialists were certified by the American Board of Pediatrics compared to over 770 developmental-behavioral specialists and 115,000 pediatricians in the United States (American Board of Pediatrics, 2015). Given the increasingly high rate of behavioral sleep problems among young children, as well as the limited number of pediatric sleep specialists, a stepped care model is ideal for preventing and treating sleep problems in primary care settings, as it provides evidence-based information to a large population at a lower cost (Espie, 2009).

Purpose of the Study

The aim of this study was to investigate the impact of an educational intervention on parental knowledge, practices, and intentions of healthy sleep in young children (2 to 5 years of age). Further, this study obtained information on the acceptability of the intervention in a pediatric setting. The educational intervention consisted of a one-page sleep hygiene handout designed by the Principal Investigator (PI) to inform parents of evidence-based sleep hygiene

practices that can be easily implemented at home. This study collected data on parent knowledge and practices of sleep hygiene in young children, parents' intent to communicate with pediatric providers regarding sleep concerns, and parent and provider perceptions and acceptability of the intervention.

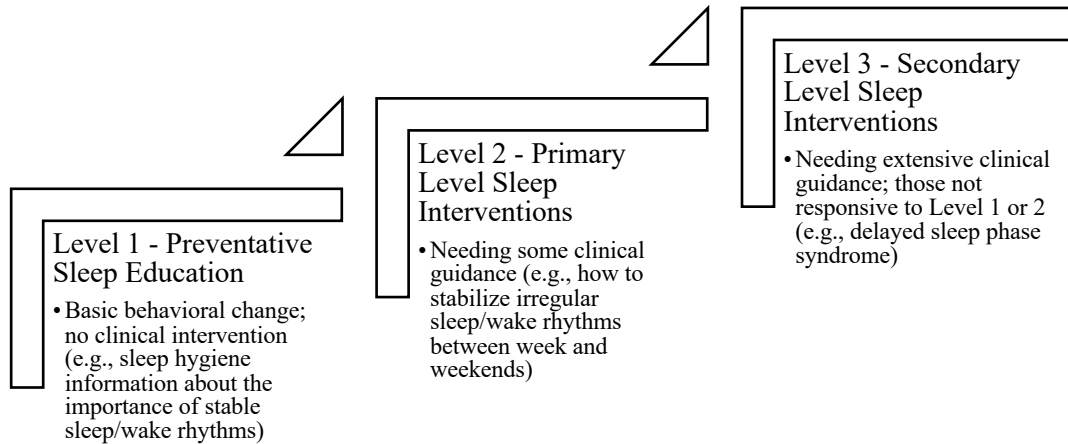


Figure 1. *Stepped Care Model Adapted for Sleep Health by Espie (2009)*

Research Questions

To investigate the impact of a brief educational intervention, the following research questions were addressed.

Research Question 1. Relative to an alternative intervention control group, is participation in a brief, educational sleep hygiene intervention associated with greater parental sleep hygiene knowledge?

Research Question 2. Relative to an alternative intervention control group, is participation in a brief, educational sleep hygiene intervention associated with greater implementation of age-appropriate sleep hygiene practices?

Research Question 3. Relative to an alternative intervention control group, is participation in a brief, educational sleep hygiene intervention associated with greater parental intent to communicate with healthcare providers about sleep in the future?

Research Question 4. To what extent do parents and pediatric providers deem a written educational sleep hygiene intervention to be acceptable for a pediatric setting?

Hypotheses

Regarding research question 1, it was hypothesized that parents of young children participating in the intervention would demonstrate greater sleep hygiene knowledge when compared to the alternative intervention control group. Specifically, it was hypothesized that parents in the experimental group would demonstrate significantly higher sleep hygiene knowledge scores than the control group. These hypotheses were consistent with findings from the professional literature reviewed in Chapter 2, which suggest that parents who participate in educational sleep interventions experience improvements in sleep health knowledge (Eckerberg, 2002; Jones et al., 2012; Seymour, Brock, During, & Poole, 1989). In addition, these hypotheses were consistent with findings that suggest written handouts are effective for increasing parent knowledge of childhood health behaviors (Barlow & Wright, 1998; Kennedy et al., 2003; Maggs, Jubb, & Kemm, 1996; Rune, Mulgrew, Sharman, & Lovell, 2015).

Regarding research question 2, it was hypothesized that parents of young children participating in the intervention would demonstrate greater implementation of sleep hygiene practices when compared to the alternative intervention control group. Specifically, it was hypothesized that parents in the experimental group would report a significantly greater sleep hygiene practice score than the control group. These hypotheses were consistent with findings from the professional literature reviewed in Chapter 2, which suggest that sleep-promoting

practices can be improved through educational intervention (Adair et al., 1991; Hiscock et al., 2007; Stremmer et al., 2006; Taveras et al., 2011; Wolfson & Lacks, 1992).

Regarding research question 3, it was hypothesized that parents of young children participating in the intervention would demonstrate greater intent to communicate with their child's healthcare provider regarding sleep when compared to the alternative intervention control group. These hypotheses were consistent with findings from the professional literature reviewed in Chapter 2, which suggest that brief healthcare handouts may encourage parents to discuss certain topics with their healthcare providers (Donald, Arays, Elliott, & Jordan, 2018).

Regarding research question 4, it was hypothesized that the pediatric providers involved in the study would find the written sleep hygiene intervention useful and feasible for the setting (i.e., acceptable). Similarly, it was hypothesized that parents in the experimental group would report the intervention as useful and feasible. Given that the control group also received a similar educational handout, it was hypothesized that there would not be a significant difference in ratings of acceptability across groups. These hypotheses were based on the findings of similar studies described in Chapter 2, which examined the treatment acceptability of written educational interventions in healthcare settings (Davies, Monaghan, & Hogan, 2016; Donald et al., 2018).

Importance of the Study

It is estimated that up to 40% of young children will experience at least one clinically significant sleep problem (Mindell & Owens, 2015), with rates as high as 75% in children with developmental delay (Cotton & Richdale, 2006; Krakowiak et al., 2008; Richdale & Schreck, 2009). Insufficient sleep has been found to significantly impair behavior regulation, attention, memory, and concentration, as well as academic performance and learning capacity (Meltzer &

Crabtree, 2015; Sadeh et al., 2002). Moreover, sleep problems in children can significantly impact the health and well-being of parents (Hoffman et al., 2005; Mindell & Owens, 2015). Parents who may be unaware of the signs of sleep problems, or have a poor understanding of the practices that promote healthy sleep, may not discuss sleep with their child's pediatrician. According to a report from the Institute of Medicine, "the lack of awareness among the general public that results from the absence of sleep content in public health education programs causes patients to be hesitant about discussing sleep problems with their health care providers" (Institute of Medicine, 2006, p. 175). Likewise, pediatricians may not ask sleep-related questions if parents do not bring up sleep as a problem (Faruqui et al., 2011). Current sleep interventions typically target children with identified sleep disorders. Such interventions often require a significant amount of resources and can be time-consuming and costly. Given that primary care pediatricians report time and resources as a barrier to sleep screening, there is a need for educational interventions that can be more easily implemented. Written educational tools, such as handouts or brochures, are affordable and easily distributed to a wide range of families in a reasonable amount of time. A brief sleep handout provided distributed to parents in family-oriented venues such as pediatric clinics and community developmental screenings could potentially increase sleep health knowledge and awareness, and, in doing so, increase parent intent to engage in positive sleep hygiene practices and discuss sleep with their child's provider. Furthermore, educational tools have been suggested as an efficient method to overcoming barriers related to time and resources in primary care settings (Gruber et al., 2011). As such, written educational interventions have the potential to improve productivity in clinical practice.

Definition of Key Terms

Acceptability: refers to the degree to which the written sleep intervention was accepted by parents of young children, as well as the extent to which the intervention was found feasible among pediatric providers.

At-risk for developmental delay: refers to any child brought to a community developmental screening by their parent or caregiver as a result of a suspected delay or developmental concern, and screened by early childhood developmental specialists including speech language pathologists, school psychologists, school social workers, and school nurses. For the purpose of this study, children considered “at-risk for developmental delay” may or may not actually have a diagnosed developmental delay.

Pediatric Insomnia: a sleep disturbance in children characterized by difficulty initiating and maintaining sleep

Parents: any legal guardian of a child

Pediatric Provider: any professional who works with young children including providers of healthcare (e.g., pediatricians, nurses), behavioral healthcare (e.g., psychologists), and early intervention programs (e.g., early intervention providers, service coordinators).

Chapter Two

Literature Review

This chapter reviews the professional literature relevant to this study. Specifically, this chapter reviews the literature in six primary areas: 1) importance and prevalence of pediatric sleep, 2) behavioral sleep problems in young children, 3) identification and treatment of behavioral sleep problems in children, 4) preventative practices to promote healthy sleep, 5) parent knowledge of healthy sleep practices, and 6) promoting sleep health education in primary care settings. The current study is guided by this review of literature.

Importance of Pediatric Sleep

Sleep is an essential part of early brain development. One of the most significant and underrecognized public health concerns in young children is related to the consequences of inadequate sleep. Sleep is essential for optimal cognitive, physical, and social-emotional functioning. Conversely, disturbed sleep has been shown to significantly impair daytime functioning across a range of domains. For example, inadequate sleep may result in problems related to mood disturbance and behavioral regulation (Sadeh et al., 2002). Children with inadequate sleep may have difficulty regulating emotions. Specifically, sleep problems are often linked to increased tantrums and crying, and other externalizing and internalizing behaviors (Bates, Viken, Alexander, Beyers, & Stockton, 2002; Sadeh et al., 2002). Attention, memory, and concentration, as well as academic performance and learning capacity, may be adversely impacted by inadequate sleep (Curcio et al., 2006; Meltzer & Crabtree, 2015). Further, higher level executive functioning skills such as the ability to reason and think abstractly have been

found to be sensitive to the effect of disturbed sleep (Sadeh et al., 2002; Sadeh et al., 2003). In addition, sleep problems can result in increased risk-taking behavior and accidental injury (Owens et al., 2005). With regard to physical health, there is a significant relationship between sleep and obesity, diabetes, allergies, and ear infections (Chen et al., 2008; Rudnicka et al., 2017). Furthermore, sleep problems have been found to intensify the symptoms of nearly every comorbid medical or psychiatric condition (Mindell & Owens, 2015). Finally, inadequate sleep in young children can impact more than the individual child. Sleep deprivation has been associated with increased parental stress and decreased parenting skills (Hoffman et al., 2005; Mindell & Owens, 2015).

Prevalence of Pediatric Sleep Problems

According to the National Sleep Foundation, preschoolers (i.e., children ages 3 to 5 years) are recommended to sleep 10 to 13 hours every 24 hours, including naps, and school-age children (i.e., children ages 6 to 13 years) are recommended to sleep 9 to 11 hours (National Sleep Foundation, 2004). A study conducted by the National Sleep Foundation of 1,473 parents identified that 22% of preschoolers and 17% of school-age children slept less than 10 and 9 hours, respectively (Mindell et al., 2009). In a recent study of 253 parents, 25% of children slept less than the recommended duration for their age group (Owens et al., 2011). Up to 30% of children will experience at least one sleep problem during early childhood (Owens, 2008; Owens et al., 2000). While medically-based sleep problems (e.g., snoring, leg movements) are prevalent, the most common types of sleep disturbances in young children are behaviorally-based (Mindell et al., 2006; Mindell & Owens, 2015). Up to 50% of young children experience behavioral sleep problems (Mindell & Owens, 2003). Specifically, 25% to 50% of children over 6 months of age have been found to experience prolonged night wakings. Bedtime resistance has been found in

10% to 30% of toddlers and preschoolers (Mindell & Owens, 2015). Not only is bedtime resistance common, but it often persists into childhood. One study found that 84% of children ages 15 to 48 months with sleep problems related to night wakings and bedtime resistance experienced significant sleep problems at the 3 year follow up (Kataria et al., 1987). Moreover, children with developmental delays have a higher risk of experiencing a behavioral sleep problem than typically developing children (Bonuck & Grant, 2012). Approximately 15% of children experience at least one developmental delay (Boyle et al., 2011) and up to 75% of children with developmental delay are affected by at least one sleep problem (Krakowiak, Goodlin-Jones, Hertz-Picciotto, Croen, & Hansen, 2008; Richdale & Schreck, 2009). The high rates of disturbed sleep among young children is concerning given the substantial amount of literature on the negative effects of inadequate sleep on overall health and development. Incorporating sleep health education in primary care settings could potentially prevent sleep problems from becoming more serious, and from persisting into later childhood (Gruber et al., 2011).

Behavioral Sleep Problems in Young Children

Aside from medical and physiological sleep disturbances such as snoring or leg movements, many pediatric sleep problems are behavioral and typically stem from a lack of sleep-promoting practices (e.g., irregular sleep-wake schedule). Other behavioral sleep problems may stem from unhealthy sleep practices or as a result of adverse sleep onset associations such as only being able to fall asleep under certain conditions (e.g., being rocked by a parent). The *International Classification of Sleep Disorders*, 3rd Edition (ICSD-3; American Academy of Sleep Medicine, 2014) categorizes both pediatric and adult insomnia disorders as “chronic insomnia disorder” and “short-term insomnia disorder”. However, for the purpose of this study,

specific types of behavioral insomnia (e.g., insomnia related to parental limit-setting) will be defined and used throughout in order to provide a more accurate description of insomnia specific to young children. The following section outlines such categories.

Behavioral Insomnia of Childhood/Chronic Insomnia Disorder. Behaviorally-based insomnia typically occurs in young children ages birth to 5 years, but can persist as children get older. Behavioral insomnia presents as bedtime resistance or refusal, prolonged night wakings, or delayed sleep onset, and often occurs as a result of poor limit setting around bedtime, negative sleep-onset associations, or both (Mindell & Owens, 2015). To some extent, bedtime refusal is relatively common in young children and may not always indicate a sleep disorder. To be considered an insomnia disorder, symptoms must be frequent and result in significant impairment to daytime functioning (American Academy of Sleep Medicine, 2014).

Insomnia Related to Sleep-Onset Associations. Prolonged night wakings are a common symptom of insomnia in young children. Children who have learned to fall asleep only under certain conditions (e.g., being rocked by a parent), or under specific sleep-onset associations, are often unable to fall back asleep independently (i.e., self-soothe) without the presence of those same conditions. Such behaviors result in the child crying or calling out for their parents until the necessary conditions are provided.

Insomnia Related to Parental Limit Setting. Bedtime problems are often the result of inadequate limit-setting around bedtime. Bedtime resistance or refusal is a common contributor to chronic insomnia in preschool-aged children. This type of behavioral insomnia is often characterized as stalling or dawdling behaviors, verbal protests, and repeated demands that prolong bedtime such as requesting a snack or watching more television. Bedtime refusal also

may involve the child displaying anxiety-like behaviors such as clinging to parent, crying, or seeking out parental reassurance.

Transient Sleep Disturbances/Short Term Insomnia Disorder. Short-term insomnia can occur in children with previously normal sleep and typically lasts a few days to a week. This type of insomnia is most commonly a result of stressful life events, jet lag, irregular sleep schedule, or an illness. Although this type of insomnia is transient, it can become chronic if not addressed appropriately.

Practices to Promote Healthy Sleep

‘Sleep hygiene’, a term that describes consistent daytime and nighttime practices that promote healthy sleep, has been found to significantly increase sleep duration and improve sleep quality in the pediatric population (Mindell et al., 2009). The principles of sleep hygiene include having a regular night routine such as a warm bath and bedtime reading, absence of electronics and caffeine before bed, an environment that promotes sleep such as a dark, quiet bedroom, and having a consistent wake time (Galland & Mitchell, 2010). Several experts in sleep medicine have published guidelines for healthcare professionals aimed at promoting healthy sleep in young children (Allen, Howlett, Coulombe, & Corkum, 2016). The National Sleep Foundation *Sleep in America Poll* found a positive relationship between sleep hygiene practices and duration of sleep among children (Mindell et al., 2009). Moreover, researchers have found that behavioral sleep interventions are less effective when poor sleep habits are present (Johnson et al., 2009). As such, improving sleep hygiene is suggested as a first line of treatment when approaching sleep problems (Jan et al., 2008). The following section outlines the most empirically supported sleep hygiene practices for promoting healthy sleep in young children.

Age appropriate sleep duration and bedtimes. Several studies have consistently identified the relationship between late bedtimes (i.e., 9 pm or later) and reduced sleep quality and duration in young children (Hall, Zubrick, Silburn, Parsons, & Kurinczuk, 2007; Mindell et al., 2009; Owens et al., 2011). In particular, Owens and colleagues (2011) found that children who had late or inconsistent bedtimes were 50% more likely to experience sleep problems than children with early or more consistent bedtimes, suggesting that consistency in bedtime is also important to obtaining adequate sleep. Similarly, Mindell and colleagues (2009) found a significant relationship between bedtimes occurring after 9 pm and increased sleep onset latency and decreased sleep duration.

Consistent bedtime routine. Having a consistent bedtime routine is one of the most recommended strategy to promote healthy sleep in young children (Allen et al., 2016). In particular, a regular bedtime routine consisting of 30-45 minutes of calming activities (e.g., taking a warm bath, reading a book, saying goodnight, singing softly) may significantly improve sleep outcomes in young children (Adams & Rickert, 1989; Henderson & Jordan, 2010; Mindell et al., 2009). Specifically, Henderson and Jordan (2010) found that children who slept well had more consistent bedtime routines than children with poor sleep. Further, children who are provided consistent bedtime routines, but engage in other daytime activities before bed (e.g., snacking, rough-play) were associated with poorer sleep outcomes. Similarly, another study found that children with increased arousal (e.g., excitement, worrying) around bedtime were more likely to experience sleep problems (Fisher, Ross, & Wilson, 1994); thus, bedtime activities should be calm and relaxing.

Physical environment conducive to sleep. Multiple studies have supported the recommendation that a child's physical environment should be conducive to sleep (Brown &

Low, 2008; Calamaro, Liu, Liu, & Wang, 2003; Calamaro, Yang, Ratcliffe, & Chasens, 2012; Meijer, Habekothé, & Van Den Wittenboer, 2001; Mindell et al., 2009; Tan, 2004). Specifically, Calamaro and colleagues (2012) found a positive relationship between immediately turning lights off at bedtime and sleep duration. In addition, one study found that soft background music was associated with greater sleep outcomes (Tan, 2004). Bedtime disruptions related to sociocultural factors, such as neighborhood noise or crowded living environments, have been linked to poorer sleep outcomes (Brown & Low, 2008). Similarly, children exposed to increased levels of family conflict are more likely to have poor sleep outcomes, with sleep problems persisting up to three years later (Byars, Yeomans-Maldonado, & Noll, 2011; Rhoades et al., 2012). With regard to room-sharing, several researchers have found that children who have their own bedroom have longer sleep duration (Meijer et al., 2001), more rapid sleep onset (Mindell et al., 2009), and reduced sleep anxiety (Liu, Liu, & Wang, 2003).

Independence when falling asleep. Current sleep recommendations state that children should be able to self-soothe and fall asleep independently (i.e., without parent assistance) in order to avoid problems related to sleep onset (Allen et al., 2016). Most behavioral sleep interventions promote independence when falling asleep by eliminating negative sleep onset associations, reducing parent presence at bedtime, or minimizing parental reinforcement of attention-seeking behaviors. Many researchers have identified an association between factors related to independence when falling asleep (e.g., eliminating negative sleep onset associations) and positive sleep outcomes (Adams & Rickert, 1989; Blunden, 2011; Eckerberg, 2004; Mindell et al., 2011; Moore, Friman, Fruzzetti, & Macaleese, 2007). Parental presence at bedtime has been found to be associated with shorter sleep durations (Mindell et al., 2009; Touchette, Petit, Paquet, Boivin, & Japel, 2005), late bedtimes (Owens et al., 2011), and increased night wakings

(Mindell et al., 2009; Hayes, Roberts, & Stowe, 1996). Moreover, children who fall asleep in their own bed have been found to experience less night wakings and longer sleep durations (Mindell et al., 2009; Touchette et al., 2005; Hayes et al., 1996). With regard to reactive co-sleeping (i.e., parents who initiate co-sleeping as a strategy to manage night wakings), several studies have identified an association between falling asleep with a parent and increased night wakings (Hayes, Fukumizu, Troese, Sallinen, & Gilles, 2007; Hayes, Parker, Sallinen, & Davare, 2001; Keller & Goldberg, 2004; Kushnir & Sadeh, 2011). More specifically, Hayes and colleagues (2007) found that children who had fallen asleep with a parent present were more likely to go to their parent's bed when they woke up during the night.

Daytime routines. Several researchers have examined the impact of daytime routine on sleep (Adam, Snell, & Pendry, 2007; Ray & Roos, 2012; Zhang, Li, Fok, & Wing, 2010). Taken together, the findings have indicated strong support for ensuring daytime activities do not interfere with sleep schedules. As noted in the articles, when daytime activities are outside parental control, such as early school start times, it is crucial to adjust bedtimes to allow for an appropriate amount of sleep each night (Allen et al., 2016). Interestingly, researchers have found a positive relationship between mealtimes and sleep outcomes (Adam et al., 2007; Ray & Roos, 2012). Specifically, Adam and colleagues (2007) found that children who spent time eating meals with their families had longer sleep duration. Ray and Roos (2012) found that clear parental expectations regarding mealtime were associated with better sleep outcomes at two-year follow-up. Moreover, findings across several studies identified that family involvement in daytime activities is associated with healthy sleep (Adam et al., 2007; Fukuda & Sakashita, 2002; Ray & Roos, 2012).

Absence of electronics before bedtime. Several researchers have identified television-viewing and other electronic media use as a potential contributor to sleep problems in children (Owens et al., 1999). The impact of electronics (e.g., television, video games, computers) on the quality of children's sleep is of particular concern among researchers due to the increasing availability of electronics (Owens et al., 1999; Paavonen, Pennonen, Roine, Valkonen, & Lahikainen, 2006). Specifically, electronic devices have become smaller in size and more portable, thus making it easier for children to access throughout the day and before bedtime (Paavonen et al., 2006). The effect of such increased electronic use on children's sleep has been investigated by several studies (Brockmann et al., 2016; Cain & Gradisar, 2010; Nuutinen, Ray, & Roos, 2013; Owens et al., 1999). In particular, Cain and Gradisar (2010) reviewed 36 studies that explored relationships between use of electronics and sleep in school-age children and adolescents. Results of this analysis indicate that prolonged bedtimes and shorter sleep duration have been mostly related to use of electronics. Furthermore, Brockmann and colleagues (2016) found that children with a television in their bedroom, as well as evening exposure to television, was associated with reduced quality of sleep.

Exercise and diet. Current sleep hygiene recommendations suggest that children should engage in physical activity daily, have opportunities to relax before bedtime, limit or eliminate caffeine consumption, and should not go to bed hungry or too full (Allen et al., 2016). Several studies have investigated the relationships between physical activity and sleep. Interestingly, only one study has identified a positive correlation between physical activity and sleep duration (Padez, Mourao, Moreira, & Rosado, 2009), suggesting there may not be enough evidence to support the current recommendations related to exercise and sleep (Allen et al., 2016). Conversely, several researchers have found that physical activity, occurring during the day or

night, is often associated with shorter sleep duration (Adam et al., 2007; Nixon & Thompson, 2008; Pesonen et al., 2011; Ray & Roos, 2012). Of note, Pesonen and colleagues (2011) found that physical activity occurring in the evening was associated with shorter sleep onset latency, providing some support for exercise being beneficially related to sleep. With regard to diet, two studies have identified a positive correlation between caffeine consumption and reduced sleep duration in children (Calamaro, Yang, Ratcliffe, & Chasens, 2012; Mindell et al., 2009). In contrast, one study found no significant relationship between caffeine consumption and sleep quality in preschool children (Javadi et al., 2014). One study found that consumption of “energy-rich foods” (e.g., foods high in sugar), as opposed to nutrient-dense foods (e.g., fruits and vegetables), were associated with shorter sleep duration (Westerlund, Ray, & Roos, 2009). Taken together, Allen and colleagues (2016) conclude in their review that the beneficial association between exercise, diet, and sleep needs further exploration.

Identification of Behavioral Sleep Problems in Children

Sleep problems can be identified by various subjective and objective measures. Assessments that directly measure sleep quality and sleep-wake activity through the use of technology include polysomnography (PSG) and actigraphy. PSG is referred to as the “gold standard” for diagnosing sleep-related breathing disorders such as obstructive sleep apnea (American Academy of Pediatrics, 2002); however, PSG is ineffective at identifying behavioral sleep problems unless the behavioral concern is related to the presence of an underlying medically-related sleep disorder such as obstructive sleep apnea. Similarly, the usefulness of actigraphy to identify behavioral sleep problems is considered questionable unless the purpose is to simply document night wakings (Moturi & Avis, 2010).

Subjective measures, which use parent report and history-taking to assess sleep symptoms, are an inexpensive and efficient method to identifying both medical and behavioral sleep problems (Armstrong, Rowe, Kohler, 2015). Subjective measures, such as sleep screening tools, have been found to be useful to pediatricians in identifying children with sleep problems during routine examinations (Owens & Dalzell, 2005). For example, the BEARS (Owens and Dalzell, 2005) is a brief sleep tool designed to identify sleep concerns during well child visits. The five subscales on the BEARS are B = “Bedtime Issues”, E = “Excessive Daytime Sleepiness”, A = “Night Awakenings”, R = “Regularity and Duration of Sleep”, S = “Snoring”. In one study, the BEARS screening tool was compared to a standardized examination documentation form to determine if the BEARS was an effective tool for identifying sleep problems in primary care settings. The BEARS screening tool was placed in 195 medical records of children ages 2 to 12 years who were presenting to their pediatrician for a routine exam. A historical control group (pre-BEARS) was used to inspect the documentation form of the child’s prior visit for notes concerning sleep. Sleep problems recorded on the BEARS and pre-BEARS visits were noted. The study found significantly more documentation of sleep concerns when the BEARS screening tool was used compared to pre-BEARS (i.e., the clinic’s usual documentation form). Findings suggest that the use of the BEARS screening tool could result in increased conversations around sleep health in primary care. Similarly, the Children’s Sleep Habits Questionnaire (CSHQ; Owens et al., 2000) is a rating scale used to measure sleep issues in young children between the ages of four and ten years. The CSHQ contains 33 items yielding eight subscales: “Bedtime Resistance”, “Sleep Onset Delay”, “Sleep Duration”, “Sleep Anxiety”, “Night Wakings”, “Parasomnias”, “Sleep Disordered Breathing”, and “Daytime Sleepiness”. The instrument was evaluated with a community and clinical sample of 469 children with diagnosed

sleep disorders (Owens et al., 2000). Results of this study indicated adequate internal consistency, and suggest that the CSHQ may be an efficient tool in identifying sleep problems in young children. Moreover, the CSHQ has been translated and evaluated for several other languages (e.g., Spanish, Chinese, German, Dutch; Li et al., 2007; Lucas-de la Cruz et al., 2016; Schlarb et al., 2010; Waumans et al., 2010) and populations of children (e.g., children with behavioral sleep problems, children with Autism; Bonuck, Goodlin-Jones, Schechter, & Owens, 2017; Katz et al., 2018).

While sleep screening tools are efficient for identifying children with sleep issues, a detailed sleep and medical history is necessary for determining the accurate diagnosis and treatment of the problem (Wise, Glaze, Chervin, & Hoppin, 2018). Wise and colleagues (2018) recommend that the sleep history should gather detailed information from parents on the child's sleep activity including bedtimes, sleep onset, night wakings, and wake times, in addition to information on frequency and durations of naps, diet, intake of caffeine, perceived quality of sleep, and psychological stressors. In addition, the sleep history should identify the duration and frequency of sleep problems, whether the sleep problem varies from night to night, and what interventions have been attempted. For children who experience difficulty falling asleep or staying asleep, a sleep history should identify pre-sleep activities (e.g., viewing of television, video games, late night snacks), bedtime routines, and parent response to awakenings (e.g., staying with the child until they fall back asleep). Given that parents are often asleep when their child experiences a sleep problem, they may not be able to provide an accurate or complete sleep history. Sleep diaries or logs, which involve recording a child's sleep activity hour by hour, can be useful in collecting detailed sleep patterns.

Although subjective sleep measures are user-friendly and inexpensive, they are not without limitation. Researchers have found inconsistent reporting of sleep problems on questionnaires and sleep-history interviews when compared to objective measures of sleep such as PSG and actigraphy (Hodge, Parnell, Hoffman, & Sweeney, 2012). Some researchers suspect that caregivers tend to under- or over-report issues related to sleep based on how problematic they perceive the problem, thus impacting the accuracy of their ratings (Choi, Yoon, Kim, Chung, & Yoo, 2010; Hodge et al., 2012). For example, Choi and colleagues (2010) found that parents of children with Attention Deficit Hyperactivity Disorder (ADHD) were significantly more likely to over-report their child's sleep problem when compared to PSG recordings, suggesting that parent-reported sleep problems of children with ADHD may be related to the problematic behaviors children with ADHD often demonstrate. Moreover, cultural sleep factors (e.g., co-sleeping versus solitary sleep) can greatly influence how a parent defines a sleep problem (Owens, Chervin, & Hoppin, 2018). Despite these limitations, researchers continue to suggest that subjective measures of sleep are appropriate and efficient for identifying sleep problems (Bauer & Blunden, 2008; Hodge et al., 2012). Moreover, information collected from screening tools and sleep history interviews have been identified as invaluable to the process of accurately diagnosing and developing appropriate treatments for sleep problems (Wise et al., 2018).

Treatment of Behavioral Sleep Problems in Children

Timely treatment of sleep problems is critical provided the harmful consequences of poor sleep on overall development. While pharmacological agents such as sedatives and hypnotics are the most *common* treatment for pediatric insomnia (Owens, Rosen, & Mindell, 2003; Owens, Rosen, Mindell, & Kirchner, 2010), behavioral interventions are considered the first line of

treatment (Mindell et al., 2006; Moturi & Avis, 2010; Owens et al., 2005). Although pharmacological agents may have immediate effects on sleep problems, medications do not typically result in positive effects long-term (Mindell et al., 2006). Moreover, the Food and Drug Administration (FDA) have not approved any medication for the treatment of sleep disorders in children, and several experts in the field of pediatric sleep medicine have expressed concerns related to the safety and side effects of such medications (Mindell et al., 2006; Owens et al., 2005). According to a consensus statement developed by the American Academy of Sleep Medicine (Owens et al., 2005), more clinical research is needed to provide an evidence-based rationale for the use of medications to treat pediatric insomnia; thus, the decision to recommend pharmacological agents should be based on the severity of diagnosis and “implemented in conjunction with empirically-based behavioral treatment strategies and adequate sleep hygiene” (pp. 49) . Moreover, the consensus statement identifies children with neurodevelopmental disabilities, chronic health conditions, and psychiatric disorders as priority populations for sleep-related medication use.

Conversely, there is a large body of evidence that suggests that behavioral sleep interventions are effective in treating childhood behavioral sleep problems (Meltzer & Crabtree, 2015; Mindell et al., 2006). Behavioral sleep treatments are grounded in learning and behavior theories and aim to promote healthy sleep practices (Moturi & Avis, 2010). According to a review lead by the American Academy of Sleep Medicine, 94% of 52 behavioral sleep intervention studies were found to be efficacious in the treatment of childhood sleep problems (Mindell et al., 2006). Furthermore, Mindell and colleagues (2006) not only found that the majority of children made clinically significant sleep improvements, but that effects were maintained at 3 to 6 months. In a more recent review, further evidence was found to support the

use of behavioral interventions in treating sleep problems in typically developing children (Meltzer & Mindell, 2014). Specifically, Meltzer and Mindell (2014) found that “behavioral interventions are effective at reducing sleep onset latency, night waking frequency, and night waking duration in young children” (pp. 944–945). Of note, Meltzer and Mindell (2014) found a very low level of evidence for specific populations of children such as children with ADHD, ASD, and psychiatric disorders, as a result of few clinical trials in this area; therefore, conclusions related to the efficacy of behavioral sleep interventions for such populations are limited. Research indicates that behavioral interventions not only result in improved sleep, but also in child behavior and parent well-being (Mindell, Telofski, Wiegand, & Kurtz, 2009).

Behavioral sleep interventions frequently rely on parent training to facilitate changes in the child’s behavior (Mindell et al., 2009). Positive routines, parent education/prevention, extinction, faded bedtime, and scheduled awakenings are among the most common behavioral sleep interventions (Kuhn & Elliot, 2003; Meltzer & Mindell, 2014; Mindell et al., 2006). The following section briefly outlines the purpose and procedure for each treatment, as well as the professional literature on the efficacy of the intervention as measured by Chambless and Hollon (1998) criteria.

Parent education/prevention. Parent education provides information to parents on normal sleep, including healthy sleep hygiene, positive habits that promote healthy sleep, the consequences of inadequate sleep, and developmentally appropriate sleep-wake times in order to prevent the occurrence of sleep problems (Mindell et al., 2006). In addition, parents are taught the importance of bedtime routines and consistency in sleep schedule, how to initiate sleep in young children, and how to respond to children during night wakings. Parent sleep education can be implemented in the format of large workshops, small group sessions, individual sessions, or

as written booklets. Further, parent education is often incorporated in other behavioral sleep interventions and may be customized to meet the needs of families and children. According to a review lead by the American Academy of Sleep Medicine (Mindell et al., 2006), parent education is considered the most time efficient and cost-effective approach to addressing behavioral sleep problems in infants. Moreover, parent education has been classified as a “well-established” intervention for the treatment of behavioral insomnia (Kuhn & Elliot, 2003). However, there is a dearth of empirical literature on the efficacy of parent sleep education after the infant years. Of note, school-based sleep education programs are effective in reducing sleep problems and improving achievement in school-age students (Gruber, Somerville, Bergmame, Fonti, & Paquin, 2016).

Extinction/graduated extinction. Unmodified standard extinction for sleep problems involves having parents implement a scheduled bedtime routine and ignoring all behaviors that occur after the child is put to bed (Mindell et al., 2006), also known as the “cry it out’ approach (Ferber, 1986). The purpose of extinction is to enable children to self-soothe independently without undesirable sleep associations such as parent comfort. Examples of night waking behaviors include crying, whining, calling for parents, and tantrums. Exceptions to this procedure include any concerns related to illness, injury, or danger. Given that standard extinction is often very challenging for parents, graduated extinction can be implemented. Graduated extinction requires parents to ignore unwanted behaviors for specific periods of time. Rather than ignoring the child completely, caregivers are instructed to check-in with their child at set intervals, often based on child age and temperament (Mindell et al., 2006). During this check-in, parents are advised to minimize interactions with their child (i.e., minimal eye contact and physical touch) to avoid reinforcing their child’s attention-seeking behavior. Both standard

extinction and graduated extinction are highly effective in reducing night wakings (Adams & Rickert, 1989; Hiscock & Wake, 2002; Reid, Walter, & O’Leary, 1999; Sadeh, Gruber, & Raviv, 2002; Scott & Richards, 1990) and are classified as “well-established” interventions for the treatment of behavioral insomnia (Kuhn & Elliot, 2003).

Faded bedtime. Faded bedtime requires parents to systematically delay bedtime until their child becomes sleepy (e.g. yawning, heavy eyelids) to ensure quick sleep initiation. Once the child is accustomed to the routine, the child is placed in bed earlier every night while the wake time stays the same. Faded bedtime has been found effective in treating problems related to sleep-onset latency (Cooney, Short, & Gradisar, 2018). Cooney and colleagues (2018) investigated the efficacy of faded bedtime to reduce sleep problems in 21 preschool children. Results of this study indicate that faded bedtime may be a promising intervention for decreasing sleep latency. Furthermore, faded bedtime has been considered a “promising” intervention for the treatment of bedtime resistance (Kuhn & Elliot, 2003).

Positive routines. Positive routines include strategies that involve stimulus control as an agent of behavior change (Kuhn & Elliot, 2003). Specifically, positive routines involve teaching children appropriate bedtime behaviors. This intervention requires parents to delay bedtime until the child becomes naturally sleepy, then implementing a consistent pre-bedtime routine that encourages sleep onset (e.g., warm bath, being read to by a parent). Once the child becomes familiar with the routine, the child is placed in bed earlier each night until an appropriate bedtime is attained. Positive routines have been found to be as effective as standard extinction in reducing night waking (Adams & Rickert, 1989). In addition, Adams and Rickert (1989) found that positive routines resulted in a significant increase in marital satisfaction. Moreover, positive

routines have been considered a “promising” intervention for the treatment of bedtime resistance and frequent night waking (Kuhn & Elliot, 2003).

Scheduled awakenings. Scheduled awakenings require parents to wake up and console a child approximately 15 to 30 minutes prior to an anticipated awakening. In order to implement this intervention, parents are asked to collect a time and frequency baseline of their child’s spontaneous night wakings. The time between scheduled awakenings is increased slowly until the child is sleeping through the night (Kuhn & Elliot, 2003; Mindell et al., 2006). Scheduled awakenings may improve sleep duration in young children and are often used to treat night terrors (Durand & Mindell, 1999). Moreover, scheduled awakenings have been considered a “probably efficacious” intervention for the treatment of frequent night wakings (Kuhn & Elliot, 2003).

Prevention of Pediatric Sleep Problems in Young Children

Although many highly effective behavioral and educational interventions exist for parents of newborns, few evidence-based interventions are targeted toward the prevention of sleep problems and promotion of healthy sleep in preschool and school-age children. Moreover, behavioral interventions that aim to reduce night waking and bedtime refusal in older children are often complex and time-consuming and are typically only implemented with families of children with recognized sleep disorders. Furthermore, there are very few efficacy studies on sleep-related parent education interventions that are independent of behavioral interventions (Allen, Howlett, Coulombe, & Corkum, 2015; Jones, Owens, & Pham, 2012). Many large-scale studies have shown that educational interventions are effective at promoting healthy sleep in infants (Adair, Bauchner, Philipp, Levenson, & Zuckerman, 1991; Hiscock et al., 2007; Stremmler et al., 2006; Taveras et al., 2011; Wolfson, Lacks, & Futterman, 1992); however, educational

efforts to promote healthy sleep beyond infant years are lacking in the professional literature. Given that sleep problems during infancy often persist into early childhood (Kataria et al., 1987), it is particularly important to address this gap in the literature. Of significance, Mindell and colleagues (2009) found that an educational intervention for parents of toddlers consisting of specific recommendations for bedtime routines resulted in a significant reduction in night wakings and a significant improvement in sleep onset. This study suggests that parent education of consistent bedtime routines may be beneficial in improving sleep in young children.

Parent Knowledge of Children's Sleep

Although healthy sleep habits are often incorporated into behavioral sleep interventions, the dissemination of appropriate sleep hygiene knowledge to parents of young children is limited (Institute of Medicine, 2006). According to a recent systematic review, parents generally have insufficient knowledge of children's sleep (McDowall, Galland, Campbell, & Elder, 2017). Specifically, McDowall and colleagues (2017) found that parents' knowledge of child sleep, parents' estimations of children's sleep needs, and parents' ability to recognize sleep problems in children were poor. Further, parents often have an inadequate understanding of the strategies used to promote healthy sleep, resulting in an increase of negative sleep practices at home (Owens, 2001; Owens & Jones, 2011; Owens et al., 2011). The following section outlines the professional and academic literature as it relates to parent knowledge of children's sleep.

Knowledge of healthy sleep practices. Despite empirical research supporting the association between sleep hygiene and sleep (Hall & Nethery, 2018), many parents may be unaware of the basic knowledge of healthy sleep practices in children. Two studies by Owens and colleagues examined the sleep health knowledge and beliefs of parents of young children using the same 10-item questionnaire (Owens & Jones, 2011; Owens et al., 2011). The study by

Owens and Jones (2011) collected information from 184 parents of children ages 3 months to 12 years in the waiting room of a hospital-based pediatric primary care clinic. Results of this study indicated that less than 50% of parents correctly answered at least 5 out of 10 questions correctly. Further, there were no parents who correctly answered all 10 items. The majority of parents in the sample underestimated the average sleep needs of preschoolers and school-age children. Of note, parents with higher levels of education answered more questions correctly. In a second study by Owens et al. (2011), sleep health knowledge was examined in 253 “generally well-educated” parents of children ages 3 months to 12 years visiting a children’s museum over two consecutive weekends. Results of this study indicated that less than 5% of parents were reported to answer all 10 sleep knowledge questions correctly. Moreover, 35% of parents answered half or less of the questions correctly. Similar to the findings of Owens and Jones (2011), the majority of parents incorrectly answered questions pertaining to the average sleep needs of children; more than 65% and 80% of parents responded incorrectly to these questions. Of note, parents who correctly answered sleep knowledge questions were significantly more likely to report age-appropriate sleep hygiene practices and better sleep outcomes.

Similarly, Schreck and Richdale (2011) investigated the sleep health knowledge of 170 parents of children ages 2 to 17 years with a 62-item sleep questionnaire. Results were consistent with the findings of Owens and colleagues (2011). The majority of parents incorrectly answered questions on children’s developmental sleep habits and sleep problems. Out of a maximum possible score of 62, parents’ knowledge ranged from a score of 1 to 39, with less than 10% of the sample answering at least half of the questions correctly. Of note, a greater number of parents correctly answered questions pertaining to infants than preschoolers, school-age children, or adolescents.

In another study, Jones and colleagues (2012) identified the sleep health knowledge of parents prior to implementing an educational intervention. Of the 95 parents of children ages 3 months to 12 years, slightly more than half scored 50% or less out of 100%. There were no parents that correctly responded to all 10 items.

Knowledge of children's sleep needs. In addition, researchers have found that parents may underestimate the amount of sleep their child needs (Owens et al., 2011; Owens & Jones, 2011). Specifically, Owens and colleagues (2011) found that, in a sample of 253 parents, more than half underestimated age-appropriate sleep durations. Similarly, Owens and Jones (2011) found that, in a sample of 184 parents, slightly more than three-quarters underestimated age-appropriate sleep durations. As expected, parents in both samples who underestimated sleep durations were more likely to report that their child's sleep duration was inadequate. This finding suggests an association between parental knowledge of sleep needs and child sleep duration. In addition, Screck and Richdale (2011) found that 35% of parents correctly answered questions related to normal sleep patterns, and approximately 20% of parents did not know the recommended duration of sleep for young children.

Changes in parent knowledge and sleep outcomes following intervention. Several researchers have investigated the sleep health knowledge of parents after implementing a parent-based sleep intervention (Jones et al., 2012; Stores & Stores, 2004; Wilson, Miller, Bonuck, Lumeng, & Chervin, 2013). Specifically, Jones and colleagues (2012) investigated the effect of a brief educational handout on increasing parent knowledge of sleep. Ninety-five parents of children ages 3 months to 12 years completed a 10-item questionnaire prior to and after receiving an educational brochure on pediatric sleep. The majority of parents (83%) responded to the knowledge questions correctly after reading the brochure. Specifically, the mean number of

questions answered correctly from pre-intervention to post-intervention was 4.33 to 6.72. Several limitations of this study are noted. Specifically, a one-group pretest-posttest design was used in this study, which may limit the generalizability and accuracy of the findings. Moreover, information on the reliability of the 10-item measure or the acceptability of the intervention was not reported.

In another study, Wilson and colleagues (2013) evaluated a sleep education program for low-income families of preschool children. One hundred fifty-two parents were randomized to participate in the intervention or assigned to a control group (i.e., delayed intervention). The intervention was a 45-minute parent-based sleep education program. In addition, preschoolers received two weeks of a classroom sleep curriculum. Results of this study indicated that parent knowledge had increased slightly from pre-intervention to post-intervention; however, improvements were not sustained at one month follow up. Moreover, at one month follow up, child duration of sleep had increased by 30 minutes for the experimental group; however, it was noted that such increase in sleep duration was not related to increased parent knowledge.

Taken together, the two studies by Owens and colleagues identified that parents who reported engaging in unhealthy sleep practices (e.g., use of electronics before bed, lack of consistent bedtime and night routines, etc.) were found to have less knowledge of the potential negative impact of sleep problems and underestimated the sleep needs of their child. Limitations of these studies included a number of potential biases. First, it is possible that parents reported socially desirable responses. In addition, Owens and colleagues noted that some questions may have been unclear or ambiguous to parents, despite pilot testing. Nonetheless, the results of these studies were consistent and suggest a clear gap in parent knowledge of healthy sleep practices. The study by Schreck and Richdale (2011) has implications for parent education with regard to

children's sleep. Specifically, this study supports the need for preventative sleep education aimed at parents of preschool and school-age children. Jones and colleagues (2012) found that parents' sleep health knowledge significantly increased following a brief handout on children's sleep. Several limitations may have impacted the outcomes of this study. Specifically, parent knowledge was not assessed over time; therefore, conclusions regarding retention of knowledge could not be made. Additionally, this study did not use a control group to compare intervention results. Furthermore, intervention acceptability was not reported; therefore, conclusions regarding whether the written handout was perceived as useful among parents could not be made. Despite these limitations, Jones and colleagues' study was the first population-based intervention aimed at increasing parent knowledge of children's sleep and suggests that a brief educational intervention may be useful in promoting healthy sleep habits among parents of young children. Finally, findings from the Wilson and colleagues (2013) study suggest that educational interventions can be useful for improving parent knowledge of healthy sleep practices, but that repeated exposure to new information may be necessary for knowledge retention.

Promoting Sleep Health Education in School Settings

In order to increase community awareness of the importance of sleep, several researchers have examined the impact of sleep education delivered in school settings (Blunden, S. L., Chapman, J., & Rigney, 2012; Brown et al., 2006; Cain et al., 2011). According to a systematic review of 13 studies, sleep knowledge increased in almost all of the studies; however, there were no studies that resulted in increased sleep duration or improved sleep hygiene practices (Blunden & Rigney, 2015). This review suggests that sleep education in schools is likely to result in increased knowledge of sleep, but not necessarily result in behavior change regarding sleep

practices. Blunden and Rigney (2015) hypothesize the reason for these outcomes is related to the theoretical underpinnings of providing sleep education in schools. For example, most school-based sleep education programs strive to increase sleep knowledge among children; however, children are not entirely responsible for their own sleep behaviors. The authors explain the importance of considering the external influences and broader socio-cultural context of a child's sleep, such as parent sleep knowledge and socioeconomic and cultural factors that impact sleep. Blunden and colleagues hypothesize that sleep behavior change may be possible when educational programs are guided by integrative models such as Bronfenbrenner's Ecological Systems Theory; however, empirical research is needed to evaluate this hypothesis. Moreover, sleep education delivered in school settings has only been found to be somewhat useful for improving sleep knowledge in older children and adolescents. Thus, school-based sleep education is less ideal for improving sleep in young children, as toddlers and preschoolers are not fully capable of changing their own sleep behaviors without the assistance of a parent.

Promoting Sleep Health Education in Primary Care Settings

Pediatric professionals working in primary care settings have a unique opportunity to address sleep education. Pediatricians are viewed as “authorities on issues associated with health”, suggesting that caregivers are more likely to comply with recommendations provided by their child's pediatrician (Gruber et al., p. 737, 2011). The American Academy of Pediatrics (AAP) advocates for snoring screenings during all routine examinations in an effort to improve the recognition of pediatric obstructive sleep apnea (Marcus et al., 2012). However, the professional guidelines on incorporating sleep hygiene education into primary care settings are currently absent. Despite the lack of guidelines, there is national recognition of the importance of increasing sleep health knowledge among families and pediatric providers. In 2006, the Institute

of Medicine emphasized the unmet need for healthcare professionals, medical students, and the general public to increase their knowledge regarding the importance of healthy sleep (Institute of Medicine, 2006). Between the years 2013 and 2018, the American Academy of Sleep Medicine, in collaboration with the Sleep Research Society and funded by the Centers for Disease Control and Prevention (CDC), led the National Healthy Sleep Awareness Project, a campaign that provided primary care providers with resources to promote healthy sleep, as well as tools to screen for obstructive sleep apnea. Results of this campaign are said to be published in the near future.

According to Gruber and colleagues (2011), sleep education can be delivered in primary care settings using principles of a stepped care model (see Chapter One, Figure 1) and implemented at the primary, secondary, and tertiary levels. The primary level includes interventions designed to prevent insufficient sleep by disseminating knowledge of healthy sleep practices and providing tools and strategies that prevent sleep problems from occurring, such as simple educational handouts as the one proposed in this study. The secondary level encompasses the strategies used by pediatric healthcare providers to identify and address sleep problems at early stages in order to prevent significant consequences of sleep loss from occurring. Secondary prevention strategies also may include targeted interventions for children at high risk for sleep disorders such as children with ASD. Last, the tertiary level aims to decrease symptoms of sleep disorders through implementation of clinical interventions. Given the increasingly high rates of unidentified sleep problems among young children and the significant sleep knowledge gap among parents, cost-effective and timely interventions aimed at reducing the likelihood of sleep disorders and increasing awareness of positive sleep practices are necessary.

Current barriers to addressing sleep during routine exams. Despite the known benefits to identifying and treating sleep problems in primary care, pediatric healthcare professionals perceive several barriers to engaging in sleep health education during routine examinations. The following section outlines the research on the current barriers to managing sleep problems during routine examinations with a general pediatrician.

Training and Education. According to the professional literature, pediatricians may not receive sufficient training and education in sleep medicine (Faruqui et al., 2011; Mindell & Colleagues, 1994; Owens, 2001). Moreover, formal sleep training is limited during medical and resident training. Specifically, Faruqui and colleagues (2011) found that 1 in 5 general pediatricians experienced formal training on sleep. Similarly, Mindell and colleagues (1994) found that across 156 medical residency programs, the average amount of sleep-related training was 4.8 hours. Mindell and colleagues find this concerning because it suggests that formal training on sleep medicine has made little improvement over the last two decades.

Lack of Time and Resources. In addition to inadequate training, pediatricians often lack the time and resources needed to appropriately prevent, identify, and treat sleep problems during routine exams (Edwards, 2019; Faruqui et al., 2011; Gruber et al., 2011; Owens, 2001). Even when the health benefits to patients and providers are known, pediatricians have been found to “simply not have enough time or resources” to acquire necessary knowledge, prepare educational tools for patients, and discuss that information with patients within the context of a single wellness check visit (Gruber et al., 2011).

Perceived Confidence. Although pediatricians generally report ‘giving advice on sleep hygiene’ as a job responsibility, several researchers have found that pediatricians are only somewhat confident in their ability to do so (Edwards, 2019; Faruqui et al., 2011; Owens, 2001;

Papp, Penrod, & Strohl, 2002). More specifically, Owens and colleagues (2001) examined the perceptions of 828 pediatricians. As a result, slightly less than half endorsed being “confident in their ability to *screen* for sleep problems”, whereas a third felt “confident in their ability to *evaluate* sleep problems” and a quarter felt “confident in their ability to *treat* sleep disorders” (p.6).

Sleep Problems Reported by Parents. One barrier that pediatric providers frequently report is that parents may underreport sleep problems (Blunden et al., 2004; Faruqui et al., 2011; Owens, 2001; Stein et al., 2001). For example, in a study of 361 children ages 4 to 16 years, Blunden and colleagues (2004) found that a quarter of children met criteria for a sleep disorder, yet 4% of caregivers had ever spoken to their child’s pediatrician regarding a sleep concern. Of the 25% of parents whose children were identified as having a symptom of a sleep disorder, 14% communicated this to their child’s pediatric provider within the last year. The results of this study are concerning in that they suggest caregivers may underreport sleep concerns to pediatric providers resulting in sleep disorders remaining unidentified. Moreover, the results suggest the potential need for increased sleep education among parents of young children.

Integrating behavioral health in primary care. Given the reported barriers to identifying sleep problems, it is not surprising that the most common treatment for pediatric insomnia includes pharmacological agents (Owens, Rosen, & Mindell, 2003; Owens, Rosen, Mindell, & Kirchner, 2010). Provided that behavioral interventions are considered the first line of treatment for pediatric insomnia (Mindell et al., 2006; Moturi & Avis, 2010; Owens et al., 2005), along with the known impact of sleep on cognitive, physical, and emotional functioning, there is a clear connection between sleep and the practice of psychology. Pediatric psychologists have expertise in the psychological aspects of medical conditions and work to promote health

behaviors among children and families (Genik, Yen, & McMurtry, 2015). Specifically, pediatric psychologists and other professionals working in an integrated behavioral healthcare system (i.e., an interdisciplinary team of professionals who work together such as primary care and behavioral health providers; Peek & the National Integration Academy Council, 2013) have the unique opportunity to identify and treat sleep problems using evidence-based interventions in primary care. Specifically, all of the previously mentioned behavioral interventions (e.g., parent education, stimulus control, etc.) are able to be delivered in integrated care settings (Falloon, Elley, Fernando, Lee, & Arroll, 2015; Fernando, Arroll, & Falloon, 2013).

Promoting Sleep Health Education in Early Intervention Programs

The Early Intervention Program and Preschool Special Education Program, Part C and Part B, respectively, of the Individuals with Disabilities Act (IDEA, 2004; Public Law 94-142) were designed to evaluate and serve young children with developmental delays. Specifically, Part C regulates early intervention programs for young children (birth through 36 months) and Part B provides guidelines to states and schools regarding eligibility and services of school-age children with disabilities (ages 3 to 21 years), including a preschool special needs section serving children ages 3 to 5 years (U.S. Department of Education, 2007). Studies have identified a significant rise in conditions related to sleep disturbance, namely, developmental delay and autism, from preschool to school-age years (Blanchard, Gurka, & Blackman, 2006). Few early intervention programs address sleep problems; however, recent literature has called for early intervention programs to formally assess for sleep disorders as part of a multidisciplinary evaluation, given the significant impact sleep has on later development (Bonuck & Grant, 2012; Yau et al., 2019). Specifically, Bonuck and Grant (2012) identify IDEA programs as a “key portal” for identifying sleep problems. Early intervention providers are ideally positioned to

distribute preventative sleep hygiene information in these settings and reinforce sleep recommendations made by healthcare providers. Eliciting information regarding sleep during multidisciplinary evaluations could not only increase access to supportive services (e.g., referral to medical or behavioral-health care), but doing so also would further the mission behind early intervention of supporting families.

Current Literature on Written Educational Interventions

Given the perceived barriers to addressing sleep in pediatric settings, it is clear that brief educational tools aimed at increasing parent knowledge and practices of healthy sleep, that can be widely and easily distributed, are needed. Provided that parents may not report sleep concerns with their child's pediatrician (Blunden et al., 2004), there also is a need for sleep health education that raises awareness of common sleep problems and increases parent intent to communicate with healthcare providers on sleep in order to prevent problems from progressing into disorders. Written educational tools (e.g., handouts on sleep hygiene) are affordable and easily distributable to families in a reasonable time. Of particular importance, written booklets have been found to be as effective as other methods of information dissemination such as face-to-face and group intervention (Isaacman, Purvis, Gyuro, Anderson, & Smith, 1992; Kruger & Rawlins, 1984). Moreover, educational tools prepared ahead of time have been suggested as an efficient method to overcoming barriers related to time and resources in primary care settings (Gruber et al., 2011). Of note, Wicke, Lorge, Coppin, and Jones (1994) have suggested that written educational information is most effective when a personalized approach to learning is used (e.g., written information with follow-up contact by healthcare provider), when compared to more general methods (e.g., leaving handouts in the waiting room).

Currently, only one study could be found that investigated the efficacy of a sleep-related preventative handout distributed to parents in a primary care setting. Jones and colleagues (2012) examined if a brief educational intervention (i.e., two-page handout) provided to 95 parents of children ages 3 months to 12 years in a primary care center waiting room resulted in increased sleep health knowledge and improved sleep practices. Following the intervention, parents' knowledge of sleep health had significantly increased, as well as their intentions to make positive changes to their child's sleep routine. Limitations of this study included the absence of a control group for comparison and information on whether parent behavior change was sustained over time. Although there is limited evidence to make conclusions on the usefulness of targeting parents in primary care settings, similar interventions have been found to be effective at promoting awareness and increasing knowledge of other medical health issues (Barlow & Wright, 1998; Kennedy et al., 2003; Maggs et al., 1996; Rune et al., 2015). For example, Perrin and colleagues (2010) examined the effects of a brief toolkit delivered to 115 parents of children ages 4 to 12 years that communicated information on weight status and healthy weight behaviors during routine examinations. The use of a toolkit resulted in more parents accurately indicating their child's "weight category", such as whether they were overweight or at their ideal weight. Additionally, parents were more likely to maintain their child's improved diet and increased physical activity at 1-month and 3-month follow-ups. Further, parents were more likely to discuss their child's weight/BMI with providers following the study. Limitations of this study include the lack of a control group for comparison and information on whether parent behavior change was sustained for longer than three months. Similarly, researchers found that a brief educational pamphlet may be a useful tool in increasing parent knowledge of risk factors for childhood obesity (Rune et al., 2015). In addition, Maggs and colleagues (1996) found that an

educational booklet on chronic arthritis was equally effective at increasing knowledge of arthritis as an educational booklet plus instruction from a health professional. Although preliminary, the results of these studies provide some support for the usefulness of universal educational interventions in pediatric healthcare settings.

Conclusion

Taken together, it is evident that a “translation gap” exists between the wealth of evidence on the importance of sleep, and the ability to widely disseminate that knowledge to families and communities (Gruber et al., 2011). Up to 40% of young children will develop at least one clinically significant sleep problem (Mindell & Owens, 2015). Insufficient sleep has been found to significantly impair behavior regulation, attention, memory, and concentration, as well as academic performance and learning capacity (Meltzer & Crabtree, 2015; Sadeh et al., 2002). Moreover, sleep problems in children can significantly impact the health and wellbeing of parents (Hoffman et al., 2005; Mindell & Owens, 2015). Parents who may be unaware of the signs of sleep problems or have an inadequate understanding of the practices that promote healthy sleep, may not discuss sleep with their child’s pediatrician. Likewise, pediatricians may not ask sleep-related questions if parents do not bring up sleep as a problem. Current sleep intervention typically address children with identified sleep disorders. Such interventions often require a significant amount of resources (e.g., trained professionals, physical space) and can be time-consuming and costly. Given that ‘lack of time and resources’ is one of the most significant pediatrician-reported barriers to sleep screening, there is a need for educational interventions that can be more easily implemented. Written educational tools are cost-effective and can be easily distributed to communities in a reasonable time. Educational tools have been suggested as an efficient method to overcoming barriers related to time and resources in primary care settings

(Gruber et al., 2011). A brief sleep handout provided distributed to parents in family-oriented venues such as pediatric clinics and community developmental screenings could potentially increase sleep health knowledge and awareness, and, in doing so, increase parent intent to engage in positive sleep hygiene practices and discuss sleep with their child's provider.

Expanding sleep education beyond primary care introduces the possibility of addressing the sleep knowledge gap among parents, and as a result, improving the health and development of young children.

Chapter Three

Methods

The aim of this study was to assess the educational value of a handout designed for parents of young children on appropriate sleep hygiene practices. It was hypothesized that, after reading the educational handout, participants would demonstrate (1) greater knowledge of age-appropriate sleep hygiene practices, (2) greater implementation of sleep hygiene practices at home, and (3) greater intention to discuss sleep with their child's healthcare provider when compared to parents who participated in the alternative intervention. Further, it was hypothesized that the providers involved in the study, as well as study participants, would find the intervention acceptable and useful for a pediatric setting. The methods used to collect and analyze data are described in this chapter and outlined as follows: (1) description of the intervention materials and measures; (2) presentation of the research design and data collection procedures; (3) discussion of the study participants and setting; and (4) review of the data analysis plan.

Research Staff

This study utilized two individuals to carry out the procedures. The PI served as the study coordinator and was the author of this dissertation. The study coordinator was responsible for organizing the pilot study and main study, training the research assistant on study procedures and data collection methods, directly collecting data from study sites, and conducting post-study phone interviews with participants. The Research Assistant (RA) was a graduate level school psychology student. Responsibilities of the RA included implementing study procedures and

collecting data from participants during Phase 1 of the main study. The RA received training on the study procedures and data collection methods prior to the start of the study.

Intervention

Experimental condition. The intervention consisted of a single-page, educational sleep hygiene handout referred to as the Healthy Sleep Handout (Appendix A). The handout was developed by the PI using the National Sleep Foundation guidelines for sleep hygiene in young children. The purpose of the handout was to promote sleep as a health behavior and provide basic steps to implementing sleep hygiene practices at home. Key objectives of the intervention handout were to: (1) educate parents of basic sleep hygiene and knowledge, (2) inform parents of the importance of childhood sleep and developmentally appropriate sleep amounts, and (3) encourage parents to discuss sleep concerns with their pediatric provider. The final objective of the intervention was to develop a tool that increased parental access to sleep hygiene information while addressing common barriers to discussing sleep in healthcare settings (e.g., lack of time and resources). Current research on parental knowledge of pediatric sleep hygiene was reviewed to identify any gaps in the literature. Particularly, researchers have found that caregivers be uninformed of the negative consequences of insufficient sleep (Owens, 2001; Owens & Jones, 2011; Owens et al., 2011; Owens et al., 2000). Conversely, parents who are aware of their child's sleep problem may not discuss it with their child's pediatrician for a variety of reasons, including the assumption that young children will 'grow out' of sleep problems (Blunden et al., 2004); however, sleep experts have noted that such problems rarely lessen with age (Kataria et al., 1987; Zuckerman et al., 1987). As such, the Healthy Sleep Handout intervention was designed to address these gaps. The Healthy Sleep Handout was designed to be visually appealing to parents of young children. In addition, the handout was evaluated by an expert team consisting of

pediatricians, pediatric school psychology faculty, and an early childhood intervention program director. Feedback from this expert panel was used to improve the handout. Readability of the handout was determined by the Flesch–Kincaid grade level readability formula (Flesch, 1948). Specifically, the handout was designed to have a readability level of third grade, which is the recommended level for pediatric healthcare brochures. The goal of grade 3 was achieved as measured by the Flesch-Kincaid readability formula.

Control condition. This study used an alternative educational intervention (i.e., Healthy Eating Handout; see Appendix B) control group. Participants randomly assigned to the control condition received a brief handout on age-appropriate healthy eating habits. The handout was developed by the PI for this study and was based on the American Academy of Pediatrics (AAP) guidelines regarding infant and toddler nutrition. The Healthy Eating Handout was designed to have a similar appearance, length, and number of graphics as the experimental handout. In addition, readability of the handout was determined by the Flesch–Kincaid grade level readability formula (Flesch, 1948). Specifically, the handout was designed to have a readability level of third grade. The goal of grade 3 was achieved as measured by the Flesch-Kincaid readability formula.

Measures

Four questionnaires were created by the PI for this study. For the purpose of this study, all measures were administered by an electronic, password-protected Qualtrics survey, with the exception of one measure that was administered during a telephone interview. The following section describes the measurement development process and provides a description and purpose of each measure.

Measure development process. Based on a comprehensive review of the professional and academic literature in the area of pediatric sleep, few studies have investigated the impact and acceptability of a cost-effective sleep hygiene intervention on parental sleep health knowledge and practices (McDowell et al., 2017; Mindell et al., 2009; Owens & Jones, 2011; Owens et al., 2011). Several measures were developed to address this gap in the literature. The instruments were created under the guidelines of Robert DeVellis (2017) in *Scale Development*. DeVellis (2017) recommends seven principles to developing instruments including: “(1) determine clearly what it is you want to measure, (2) generate an item pool, (3) determine the format for measurement, (4) have the initial item pool reviewed by experts, (5) consider inclusion of validation items, (6) administer items to a development sample, and (7) evaluate the items” (p. 105-151). Two cognitive interviews were conducted with parents of young children during the development of the Sleep Hygiene Knowledge Test and Pediatric Sleep Hygiene Questionnaire. Specifically, two parents of children ages three and five years were asked to “think-aloud”, or verbalize their thoughts as they reviewed each measure. Both parents were interviewed on the same day, at two separate times, in order to evaluate the clarity and coherence of items, question order, and rate of completion. Minor changes were made to each questionnaire following the interviews such as rewording items. In addition, the measures were reviewed by dissertation committee members with survey research experience.

Items on each measure also were designed following the recommendations of Dillman, Smyth, and Christian (2014). Measures developed for this study contained closed-ended questions, which may enhance the internal consistency of instruments (Fowler, 2009). Ordinal closed-ended questions were utilized in order to quantify varying opinions and behaviors (Dillman et al., 2014). Such items were written following the recommendations of Dillman and

colleagues (2014). For example, item responses were limited to five categories so that participants could place themselves on the scale without being too ambiguous or losing item meaning.

Sleep Hygiene Knowledge Test. The Sleep Hygiene Knowledge Test (Appendix C) was developed to measure parental sleep hygiene knowledge. Specifically, this test was used to measure the degree to which the educational intervention resulted in greater parental sleep hygiene knowledge when compared to the alternative control group. The test consisted of 12 true/false questions, which collected information regarding sleep hygiene knowledge. Items on the measure reflected the information provided in the intervention handout, developed using the National Sleep Foundation guidelines for healthy sleep in children. For example, the handout stated, “Kids sleep better when they go to bed at the same time each night”. The corresponding item on the Sleep Hygiene Knowledge Test asked “True/False: Kids sleep better when they go to bed at the same time each night”. Additionally, four questions related to healthy eating habits were embedded into the scale to disguise the control group and purpose of the study. Reliability of this measure was calculated using Cronbach’s alpha. Results are reported in Chapter Four.

Pediatric Sleep Hygiene Questionnaire. The Pediatric Sleep Hygiene Questionnaire (Appendix D) was developed to measure sleep hygiene practices in parents of young children. Specifically, this questionnaire was used to measure the degree to which the sleep intervention resulted in greater implementation of age-appropriate sleep hygiene practices (e.g., having a consistent bedtime routine) compared to the alternative intervention control group. In addition, the Pediatric Sleep Hygiene Questionnaire was used to determine the degree to which the educational intervention promoted awareness of the need to communicate with healthcare providers regarding sleep. The Pediatric Sleep Hygiene Questionnaire is comprised of two

subscales: sleep hygiene and sleep habits. For the purpose of this study, only the sleep hygiene scale was used. The sleep hygiene scale contained 13 items that used a five-point response scale to determine the frequency (e.g., Never, Rarely, Sometimes, Often, Always) of parental implementation of age-appropriate sleep hygiene practices (see Table 3). The sleep hygiene scale was developed based on the National Sleep Foundation guidelines for healthy sleep in children. For example, the National Sleep Foundation recommends that children have consistent bedtime routines. On the scale, parents were asked how often their child has a consistent bedtime routine. Six questions related to healthy eating habits were embedded into the questionnaire to disguise the purpose of the study. In addition, the Pediatric Sleep Hygiene Questionnaire included two questions related to parental intent to communicate with providers regarding sleep and healthy eating (e.g., “In the future, do you plan to talk with your child’s pediatric provider about sleep concerns”). The last section contained seven demographic questions related to the parent and child such as relationship to child, gender, age, race/ethnicity, and education level. Reliability of this measure was calculated using Cronbach’s alpha. Results are reported in Chapter Four.

Parent Interview Questionnaire (phone interview). A brief, structured telephone interview was attempted with all participants at the end of the study. Parents who participated in the interview were asked questions from the Parent Interview Questionnaire (Appendix E). The interview consisted of five open-ended questions and four closed questions. The purpose of the interview was to obtain information on parents’ thoughts and experiences related to the intervention. All participants were administered the same questions in the same manner.

Provider Feedback Form. Providers associated with the study were asked to complete the Provider Feedback Form (Appendix F) which collected qualitative information on the aspects of the intervention providers liked best and least, including any suggested improvements, as well

as information related to the usefulness of the intervention to the pediatric program. The Provider Feedback form consisted of five open-ended questions (e.g., What barriers would prevent you from distributing this handout”) and one closed-ended Likert-type question (e.g., “How likely are you to distribute this handout to parents”).

Table 3

Pediatric Sleep Hygiene Questionnaire – Sleep Hygiene Subscale

Item	Response Type
1 My child needs my help to fall asleep.	A O S R N
2 My child goes to bed at a different time every night.	A O S R N
3 My child has a consistent bedtime routine (take a bath, read a book, etc.).*	A O S R N
4 My child engages in rough-play (running, jumping, etc.) before bed.	A O S R N
5 My child has caffeine (soda, chocolate, tea, etc.) in the late afternoon or evening.	A O S R N
6 My child’s room is cool and comfortable.*	A O S R N
7 My child sleeps with a bottle or sippy cup.	A O S R N
8 My child’s room is quiet at bedtime.*	A O S R N
9 My child falls asleep in places other than their bed (couch, car, etc).	A O S R N
10 My child’s bedroom is also used for timeout.	A O S R N
11 My child has electronics in their bedroom (iPad, tablet, etc.).	A O S R N
12 My child uses electronics before bed (computer, TV, tablet, etc.).	A O S R N
13 My child does calming activities before bed (read a book, lullaby, yoga, etc.).*	A O S R N

Note. A = Always (every day/night), O = Often (4-5 times per week), S = Sometimes (3-4 times per week), R = Rarely (1-2 times per week), N = Never (0 times per week).

Intervention integrity. Intervention integrity, or how much of or how accurately an intervention is completed, was documented in the data collection. The primary measure of integrity in this study was intervention adherence, which was measured by an Intervention Procedures Checklist (Appendix G) developed by the PI for this study. The PI and RA utilized the intervention procedures checklist as a guide to ensure each component of the intervention

was administered in the same manner. Specifically, the PI and RA reviewed the checklist while implementing the intervention and obtaining study data. Information related to the fidelity of the intervention procedures checklist (e.g., percentage of checklist completed) was not collected during this study. A secondary measure of integrity was documented in the data collection. Specifically, during the phone interview, parents were asked several questions to ensure that the content of the handout was reviewed (e.g., “Which recommendation from the handout did you find most useful?”).

Research Design

This study employed a two-group, true experimental design with random assignment. The experimental condition consisted of the brief educational intervention (Healthy Sleep Handout) and the control condition consisted of the brief educational intervention on childhood healthy eating habits (Healthy Eating Handout). Participants were randomly assigned to a condition. Random assignment was chosen as the research design for this study given that random assignment is suggested to “create two or more groups of units that are probabilistically similar to each other on the average” (Shadish, Cook, & Campbell, 2002, p. 12). As such, pre- and post-test data were not obtained. The random assignment sequence was identified prior to the start of data collection and was determined by picking cards ‘E’ (i.e., experiment) or ‘C’ (i.e., control) out of a jar. Once the sequence was created (e.g., ECEECCCE), it was repeated until data collection was complete. Statistical analyses were run to determine any significant differences in demographics between groups prior to the start of the study. Results are reported in Chapter Four.

Independent and dependent variables. The independent variable of this study was the intervention (i.e., handout). Parental sleep hygiene knowledge, sleep hygiene practices, self-reported future intentions, and treatment acceptability were evaluated as the dependent variables.

Procedures

Intervention and assessment procedures. This study was completed in two phases.

Phase 1. Informed consent (see Appendix H) was obtained and participants were randomly assigned to condition. Participants were asked to read a one-page handout focused on enhancing parental knowledge of sleep hygiene (experimental group) or nutrition (control group). After reading the assigned handout, participants were asked to complete the Sleep Hygiene Knowledge Test on a provided iPad in front of the PI or RA. Participants were not allowed to refer to the handout while taking the test. After completing the test, parents were asked to provide contact information and informed that they would be sent Phase 2 of the study within the next week. Also, parents were provided a reminder slip with their preferred date and time of contact (Appendix I).

Phase 2. Participants were contacted by the PI via their preferred method of contact (i.e., phone, email, or text) within the following week to complete Phase 2. Participants were asked to complete the electronic Pediatric Sleep Hygiene Questionnaire and participate in a 5-minute phone interview. Some participants preferred to take the questionnaire over the phone. Reminders to complete Phase 2 were sent daily throughout the week or until participants completed the questionnaire and phone interview. Following the completion of the study, the control group participants were provided a debriefing statement (Appendix J) that explained the purpose of the experimental and control group. The debriefing statement was delivered via email and included a copy of the intervention.

Pilot study. Prior to data collection, a pilot test was conducted by the PI to evaluate the feasibility of the research design and procedures. Pilot study participants included parents of children between the ages of 2 and 5 years who attended a university-based clinic for either a developmental evaluation or routine examination. Participants were approached by the PI while sitting in the triage area of the clinic. In addition, parents in the laboratory waiting area were offered to participate while they waited for lab results. Written informed consent was obtained from participants prior to delivering the intervention.

Thirty-nine parents participated in the pilot study. Demographic characteristics are listed in Table 4. The sample was comprised of relatively well-educated parents (79% mothers) between the ages of 20 to 40 years. The majority of participants indicated they were White/Caucasian (44%) or Hispanic/Latino (31%). Nearly half of the sample reported having a child with a disability, specifically Autism Spectrum Disorder (46%). The duration of Phase 1 ranged from 4 minutes to 12 minutes, with the majority of participants completing the questionnaire in less than 8 minutes.

The Sleep Hygiene Knowledge Test and Pediatric Sleep Hygiene Questionnaire, as well as the Healthy Sleep Handout and Healthy Eating Handout, were assessed for face validity and content-related validity during the pilot study. More specifically, participants were asked to complete four additional questions related to the validity of the survey (Appendix K). For example, participants were asked if there were any words on the questionnaire or handout that they did not understand, and if there was anything on the questionnaire that they felt should have been included and was not. In addition, the handouts and questionnaire were reviewed by an expert committee. Feedback obtained from pilot study participants, as well as the expert

committee, was used to improve the structure, clarity, and ease of completion of the study materials and procedures.

Several changes were made to the Pediatric Sleep Hygiene Questionnaire and study procedures following the pilot study. Specifically, the demographics section was moved from the first assessment phase to the second phase in order to reduce the amount of time it took participants to complete the first phase on site. Additionally, several items were deleted from the Pediatric Sleep Hygiene Questionnaire following the pilot study. Specifically, two items which stated, “My child sleeps less than 10 hours in a 24-hour period (including daytime naps)” and “My child goes to bed at the same time every night” were deleted from the questionnaire due to redundancy with other items. One item was split into two items (e.g., “My child’s room is cool, quiet, and comfortable” was converted to “My child’s room is cool and comfortable” and “My child’s room is quiet”) in order to measure both environmental factors separately. In addition, a question regarding participants’ preferred method of contact was added to the Sleep Hygiene Knowledge Test. This change was made as a result of very few participants completing the second phase during the pilot study (18%). Given this low response rate, an item concerning what day and time participants preferred to be contacted for Phase 2 also was added. Furthermore, a moderately high rate of parents of children with a severe medical condition participated in the pilot study (38%). Given the significant differences in symptoms and sequelae across medical and neurodevelopmental conditions, including the various impact each condition has on sleep, it was decided that this study would only recruit parents of children at-risk of, or identified as having, a developmental disability (e.g., Developmental Delay, Autism Spectrum Disorder). More specifically, it was determined that participants would only be recruited from the early childhood program within the clinic; participants attending the clinic for other reasons

Table 4

Demographic Characteristics of Pilot Study Participants (N = 39)

Variable	Pilot Study Participants (Experimental and Control Group Combined)	
	N	%
Parent Age		
20 – 30 years	17	44%
31 – 40 years	18	46%
41 – 50 years	4	10%
> 50 years	0	0%
Parent Race/Ethnicity		
American Indian/Alaska Native	0	0%
Asian	3	7%
Black/African American	7	18%
Hispanic or Latino	12	31%
Multiracial	0	0%
Native Hawaiian/Pacific	0	0%
White/Caucasian	17	44%
Other	0	0%
Parent Relationship to Child		
Mother	31	79%
Father	5	13%
Grandmother	2	5%
Grandfather	0	0%
Foster	1	3%
Parent Highest Level of Education		
Less than High School	0	0%
High School	7	18%
More than High School	32	82%
Child's Gender		
Female	17	44%
Male	22	56%
Child's Age		
2 years	17	45%
3 years	9	24%
4 years	8	21%
5 years	4	10%
Does your child have any medical or psychiatric diagnoses?		
No	21	54%
Yes	18	46%
Asthma	1	6%
Autism Spectrum Disorder	8	44%
Hyperthyroidism	1	6%
Epilepsy	1	6%
Medically Complex (Sickle Cell, Chronic Kidney Disease)	7	38%

would not intentionally be recruited. Further, based on the results of the pilot study, it was determined that Phase 1 would only consist of the Sleep Hygiene Knowledge Test and Phase 2 would consist of the Pediatric Sleep Hygiene Questionnaire. This change was made in order to allow parents an appropriate amount of time to implement the practices at home. All changes made to the Pediatric Sleep Hygiene Questionnaire and handouts were re-tested with a small group of parents and reviewed by the expert committee to ensure accuracy and clarity prior to the main study.

Ethical considerations. Prior to data collection of the pilot study and main study, approval to conduct the research was obtained from the Institutional Review Board (IRB) at the University of South Florida (Pro00040239; see Appendix L). The research assistant also was approved by the IRB. In addition, consent to conduct the study at specific sites was obtained prior to data collection. Participants were provided a consent letter (see Appendix H) that outlined the study's research questions, objectives, and risks and benefits of participation in the study. Informed consent was obtained before the intervention was implemented. Information gathered from this study was immediately kept in an electronic password protected database and/or locked file cabinet.

Participant Recruitment and Sampling

Setting. The main study took place in conjunction with an early childhood community developmental screening program located in west central Florida. This screening program is affiliated with a private, non-profit organization that focuses on prevention and early intervention of developmental disabilities in young children. The community developmental screening program provides early identification and intervention services to young children with developmental concerns in the community. The program screens approximately 70 children per

month. Children who are identified as having a developmental concern are referred to the early intervention program where the pilot study took place. As such, the community screening provided a unique opportunity to collect data with the intended study population of children “at-risk” or identified as having a developmental delay. The organization’s population demographics from October 2017 to October 2018 were examined in order to determine the representativeness of the study sample. Due to the small sample size of the current study, sample representativeness (i.e., whether specific sample demographic characteristics matched the percentage in the population served by the community screening program) was unable to be analyzed using statistical analyses. Rather, proportions of demographic items were visually compared. Results are reported in Table 5. Child age was determined based on date of birth and date of the last data collection, not necessarily the age of the child at the time of their screening. Of note, proportions were visually similar (i.e., difference of 25% or less) for child age (4 to 5 years), gender, and ethnicity. The current study consisted of 50% more children between the ages of 2 to 3 years when compared to the community screening population. Notably, demographic information was not available for 350 children that registered or participated in the community screenings in 2017-2018. It was noted by the program director that the missing data may be a result of parents registering for the screening, but not following up after the initial contact.

Participants. Parents of children who attended a community developmental screening in west central Florida in April 2019 were recruited for participation in this study. In order to take part in the study, participants were required to be the legal guardian of at least one child between the ages of 2 and 5 years and currently reside with the child. Other caregivers whom the child did not live with were not included. Parents were required to be fluent in speaking and reading English to participate. Participants were asked to complete a maximum of one survey (i.e.,

parents with more than one child were asked to choose only one child to consider while participating in the study).

Table 5

Comparison of Demographics for Current Study and Community Screening Participants

Variable	Study Participants (<i>N</i> = 41)		Community Screening Participants (<i>N</i> = 1,500)	
	<i>N</i>	%	<i>N</i>	%
Child Age				
2 – 3 years	23	56%	85	6%
4 – 5 years	18	44%	729	49%
6 years or older	0	0%	335	23%
Not Available	-	-	350	23%
Child Gender				
Female	14	34%	634	42%
Male	27	66%	866	58%
Hispanic or Latino	4	10%	453	30%
Not Hispanic or Latino	37	90%	508	34%
Black or African American	8	20%	173	12%
White	29	71%	747	50%
Native Hawaiian or other Pacific Highlander	0	0%	10	<1%
American Indian or Alaska Native	0	0%	1	<1%
Two or more races	0	0%	123	8%
Refused	-	-	25	2%
Not Available	-	-	370	25%

Of the 64 potential participants who attended the April 2019 developmental screening, 45 met inclusion criteria and consented (70%), 6 declined, 4 were called in to their appointment before completing the study, and 8 were ineligible due to speaking a language other than English. Of the 45 parents who consented and participated in the study, 41 completed both phases of the study yielding a 91% follow-up rate between phases. A total of 32 parents

participated in the phone interview. Phase 2 data were collected within 5 to 10 days of Phase 1. The flow of participants for the given study procedures is reported in Figure 2.

Demographic characteristics were collected during Phase 2. The total sample was comprised of relatively well-educated parents (78% mothers) between the ages of 23 and 35 years. Sample demographic characteristics are reported in Table 6. Chi-square of independence tests were calculated to compare demographic characteristics between groups. Results are reported in Table 7. Analyses indicated no significant difference between the intervention and control group with regard to parent and child age. Given the small sample size, analyses related to ethnicity, relationship to child, education level, and child medical diagnosis included cells with expected values less than 5; therefore, failing an assumption of the chi square test. Upon examination of variable frequencies, there was a less than 20% difference between groups with regard to relationship to child, race/ethnicity, highest level of education, and child medical condition suggesting that the groups were not significantly different among such variables. Of note, there was a 26% difference between groups with regard to child gender. Specifically, 80% of participants in the experimental group reported having a female child, compared to 52% of participants in the control group.

In addition to parent participants, three pediatric providers from the pilot study clinic and one provider from the community screening took part in the study by providing feedback on the aspects of the study they found useful, including any suggested improvements. Demographic characteristics of the clinic providers are reported in Table 8. Detailed information is not provided in order to maintain confidentiality of the providers.

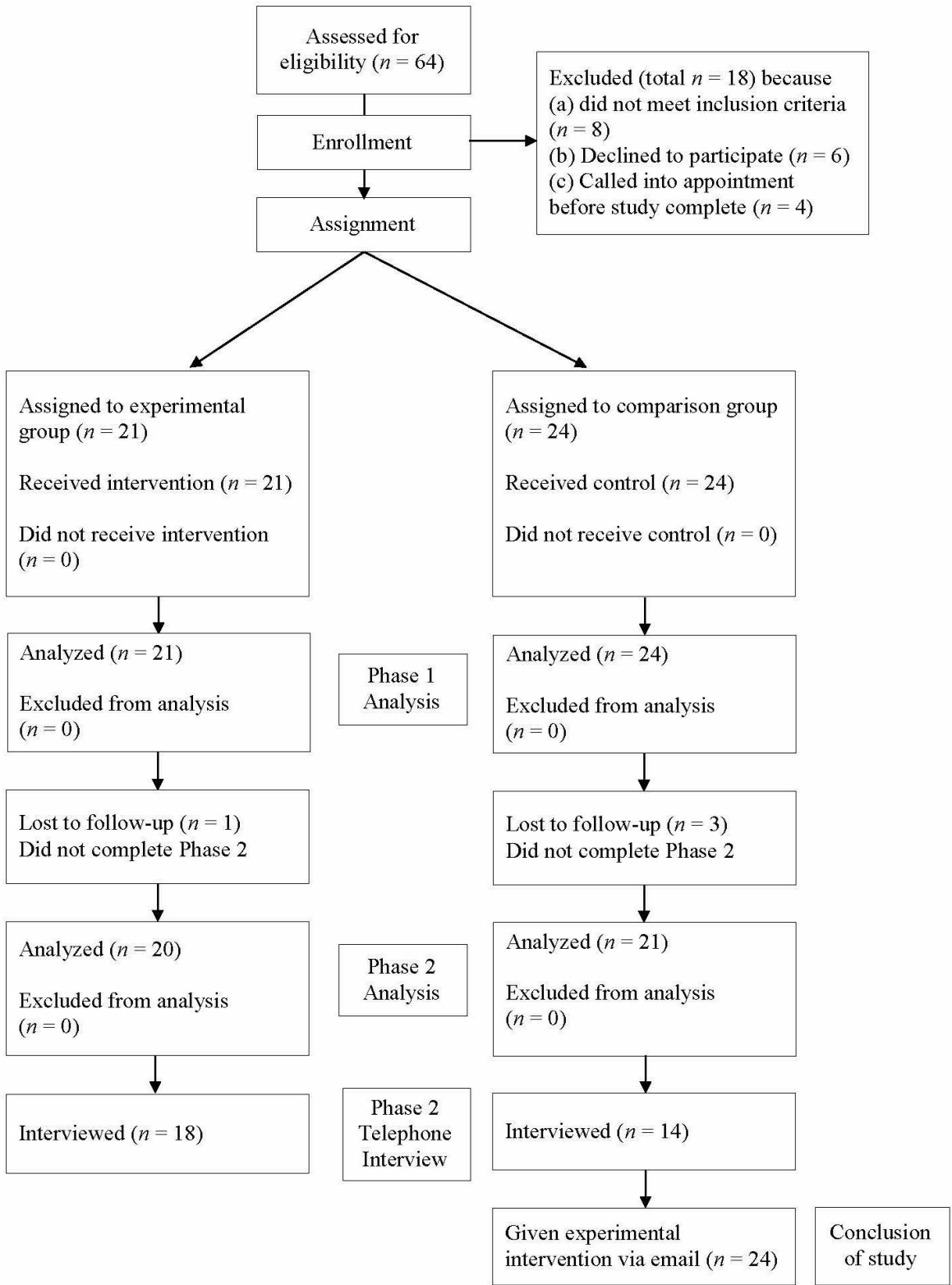


Figure 2. Flow of participants for the given study procedures, assignment, follow-up, and analysis.

Table 6

Demographic Characteristics of Study Participants (N=41)

Variable	Experimental Group		Control Group		Total
	<i>n</i>	%	<i>n</i>	%	N
Parent Gender					
Female	14	70%	19	90%	33
Male	6	30%	2	10%	8
Parent Relationship to Child					
Mother	14	70%	18	85%	32
Father	5	25%	2	10%	7
Grandparent	0	0%	1	5%	1
Foster Parent	1	5%	0	0%	1
Parent Age					
35 years or younger	11	55%	17	81%	28
36 years +	9	45%	4	19%	13
Parent Race/Ethnicity					
Black/African American	3	15%	5	24%	8
Hispanic or Latino	1	5%	3	14%	4
White	16	80%	13	62%	29
Parent Highest Level of Education					
High School	3	15%	1	5%	4
More than High School	17	85%	20	95%	37
Child's Gender					
Female	16	80%	11	52%	27
Male	4	20%	10	48%	14
Child's Age					
2 – 3 years	9	45%	14	67%	23
4 – 5 years	11	55%	7	33%	18
Child medical and/or psychiatric diagnoses					
No	15	75%	18	86%	33
Yes	5	25%	3	14%	8
Autism Spectrum Disorder	0	-	1	-	1
Developmental Delay	3	-	2	-	5
Oppositional Defiant Disorder	2	-	0	-	2
Attention Deficit/Hyperactivity Disorder	2	-	0	-	2

*Numbers do not total to 100% due to some participants indicating more than one diagnosis; Experimental Group = Healthy Sleep Handout, Control Group = Healthy Eating Handout

Table 7

Chi Square Analyses for Group Differences (N=41)

Variable	X ²	p
Relationship to Child	3.76*	.29
Age	3.19	.07
Race/Ethnicity	1.79*	.41
Highest Level of Education	1.22*	.27
Child's Age	1.95	.16
Child medical and/or psychiatric diagnoses	.75*	.39

Note. Cells had an expected frequency cell less than five, which fails an assumption of the chi-square test of association. Group differences involved comparing the experimental group (sleep handout) and control group (eating handout).

Table 8

Demographic Characteristics of Study Providers (N = 4)

Variable	Provider Participants	
	N	%
Gender		
Female	4	100%
Race/Ethnicity		
Black/African American	1	25%
Hispanic or Latino	0	0%
White/Caucasian	3	75%
Highest Level of Education		
Master of Arts (MA)	1	25%
Master of Science (MS)	2	50%
Master of Science in Nursing (MSN)	1	25%
Years in Practice		
Less than one year	0	0%
One to five years	2	50%
Five or more years	2	50%

Data Analysis Plan

Data were analyzed using IBM Statistical Package for Social Sciences 21 (SPSS; IBM Corp, 2012) in order to answer each research question. Descriptive frequencies were reported for demographic and background items. The following section outlines the analyses that were used to address each research question.

Research Question 1. Relative to an alternative intervention control group, is participation in a brief, educational sleep hygiene intervention associated with greater parental sleep hygiene knowledge?

The first research question examined if the brief educational intervention was associated with greater parental sleep hygiene knowledge when compared to the alternative intervention control group. Parental sleep knowledge items were coded as correct (1) or incorrect (0). Some items were reverse coded. To address this question, mean knowledge scores and responses to each sleep hygiene knowledge item were compared between groups. Specifically, an independent samples *t*-test was used to analyze mean total sleep knowledge scores and chi-square test for homogeneity were used to determine any significant differences between the proportions of individual knowledge items between the two conditions. Due to small sample size, Fisher's exact test were run on some items. Descriptive statistics and proportion of successes for each item also are reported.

Research Question 2. Relative to an alternative intervention control group, is participation in a brief, educational sleep hygiene intervention associated with greater implementation of age-appropriate sleep hygiene practices?

The second research question examined if the brief educational intervention was associated with greater implementation of parental sleep hygiene practices when compared to the alternative intervention control group. Data related to sleep hygiene practices were obtained from the Pediatric Sleep Hygiene Questionnaire and were coded as following: 1 = *Never*, 2 = *Rarely*, 3 = *Sometimes*, 4 = *Often*, 5 = *Always*. Some items were reverse coded. To address research question 2, a total sleep hygiene score was derived from the Pediatric Sleep Hygiene

Questionnaire. An independent samples *t*-test was used to analyze mean scores between the experiment and control group. Descriptive statistics also are reported.

Research Question 3. Relative to an alternative intervention control group, is participation in a brief, educational sleep hygiene intervention associated with greater parental intent to communicate with healthcare providers about sleep in the future?

The third research question examined if the brief educational intervention was associated with greater parental intent to communicate with healthcare providers regarding sleep. To address this question, responses to item 41 on the Pediatric Sleep Hygiene Questionnaire were examined and group means were calculated. Specifically, item 41 states, “In the future, do you plan to talk with your child’s pediatric provider about sleep concerns?” Each factor was represented by the following ratings: 1 = *Definitely Not*, 2 = *Probably Not*, 3 = *Probably*, 4 = *Very Probably*, 5 = *Definitely*. An independent-samples *t*-test was used to analyze means between the experimental group and control group. Descriptive statistics also are reported.

Research Question 4. To what extent do parents and pediatric providers deem a written educational sleep hygiene intervention to be acceptable for a pediatric setting?

The fourth research question examined the acceptability of the intervention among pediatric providers and parents who were involved with or participated in the study. To address this question, pediatric providers were asked to complete the Provider Feedback Form. In addition, parents were asked to provide feedback using the Parent Interview Questionnaire.

Chapter Four

Results

This study investigated the impact of a brief, educational sleep hygiene intervention on the knowledge and practices of sleep hygiene of parents of young children. The educational intervention consisted of a one-page sleep hygiene handout designed by the PI to inform parents of evidence-based sleep hygiene practices that can be easily implemented at home. This study collected data on parent knowledge and practices of sleep hygiene, as well as information on parents' intent to communicate with pediatric providers regarding sleep concerns. Further, this study collected information on the acceptability of this intervention among pediatric providers and parents. This chapter provides information on the results of the study.

Data Screening

Data obtained from each phase were transferred from Qualtrics to SPSS. An individual data file was created for Phase 1 and Phase 2, as well as data collected from the phone interview and provider feedback form.

Missing data. No data were missing from the dataset. This was largely due to the data collection methods in which the Qualtrics survey alerted participants of missing data (i.e., parents were not able to go to the next page without addressing the unanswered item). Of note, parents had the option to continue the questionnaire without answering all items, if desired. At the start of the study, potential participants were informed that both phases were required to be completed in order to participate in the study. Participants were advised to only participate in the study if they were available and willing to participate in the second phase. Moreover, during the

phone interview, the PI had the opportunity to remind parents of the importance of completing the questionnaire in full. Four parents were called into their appointment before completing the study; however, none of the four participants had been administered the questionnaire at that time.

Participant Flow

This study was completed in two phases. The final datasets consisted of 45 participants in Phase 1 and 41 participants in Phase 2, yielding a 70% response rate and 91% follow-up rate, respectively. Of the 45 consented participants, 21 were randomly assigned to the experimental group and received the intervention, and 24 were assigned to the control group and received the alternative intervention. All participants from Phase 1 were included in the Phase 1 analyses. Four participants were lost to follow-up and did not complete Phase 2. The final analyses (i.e., Phase 2) consisted of 20 participants in the experimental group and 21 participants in the comparison group.

Reliability

A reliability analysis was completed for the Pediatric Sleep Hygiene Questionnaire and Sleep Hygiene Knowledge Test using Cronbach's alpha. With regard to the Pediatric Sleep Hygiene Questionnaire – Sleep Hygiene Subscale, Cronbach's alpha was calculated using the data collected during the main study ($n = 41$). The scale reached acceptable internal consistency, $\alpha = .70$ and included a total of 13 items ($n = 41$). With regard to the Sleep Hygiene Knowledge Test, Cronbach's alpha approached acceptable reliability, $\alpha = .66$ and included a total of 12 items ($n = 45$).

Research Question 1

Relative to an alternative intervention control group, is participation in a brief, educational sleep hygiene intervention associated with greater parental sleep hygiene knowledge? A total sleep knowledge score (percentage correct) was computed for each participant. Results are reported in Table 9. As shown in Table 9, the experimental group obtained a total mean score of 78% out of 100% ($M = 78.17, SD = 19.80$). The control group obtained a total mean score of 71% ($M = 71.18, SD = 16.30$). Although slightly higher, there was not a significant difference between the experimental group and control group mean scores, $t(43) = 1.30, p > .05$. Results are reported in Table 10. The effect size for this analysis was calculated using Cohen's d (Cohen, 1988). Cohen's effect size value ($d [95\% CI] = .39 [-.20 \text{ to } .97]$) suggested a small effect. With regard to descriptive frequencies, three parents (14%) in the experimental group and three parents (13%) in the control group correctly answered all 12 items. Further, 15 parents (71%) of the experimental group and 13 parents (54%) of the control group earned a total score of 75% or higher. For both groups, the minimum score earned was 33%, and the maximum score earned was 100%.

Table 9

Descriptive Statistics of Sleep Knowledge Test Total Scores

	Mean	<i>SD</i>	Min	Max
Experimental Group ($n = 21$)	78.17	19.80	33.33	100
Control Group ($n = 24$)	71.18	16.30	33.33	100

Note. Means represent percent correct on the Sleep Hygiene Knowledge Test (12-item test). *SD* = standard deviation.

Table 10

Mean Difference of Sleep Hygiene Knowledge Total Scores Between Groups

	<i>t</i>	<i>p</i>	Mean Difference
Sleep Hygiene Knowledge	1.14	.201	6.99

Note. Means calculated from total score on Sleep Hygiene Knowledge Test (12-item test).

To further address this research question, descriptive statistics and proportion of successes were calculated. Results are reported in Table 11 and Figure 3, respectively. With regard to individual items, the majority of parents in the experimental and control groups correctly answered items related to falling asleep with the TV on (95% and 92%, respectively), having a consistent bed time (100% and 96%, respectively), and using ‘staying up late’ as a reward (91% and 96%, respectively). Conversely, the majority of parents in the experimental and control groups incorrectly answered an item related to duration of bedtime routine (48% and 50%, respectively). Figure 3 represents the percent correct on each item between groups.

Further, responses to each knowledge item were compared between groups using chi-square to determine any significant differences between the proportions of the two conditions. Results are shown in Table 9. Due to small sample size, the Fisher's exact *p* value were reported for seven items. As shown in Table 9, there was not a statistically significant difference between the proportion of correct scores between groups, with the exception of item 11. At the conclusion of Phase 1, 14 parents (67%) in the experimental group had demonstrated correct knowledge of the recommended sleep duration for young children compared to 8 parents (33%) in the control group, a statistically significant difference in proportions of .34, $p = .026$.

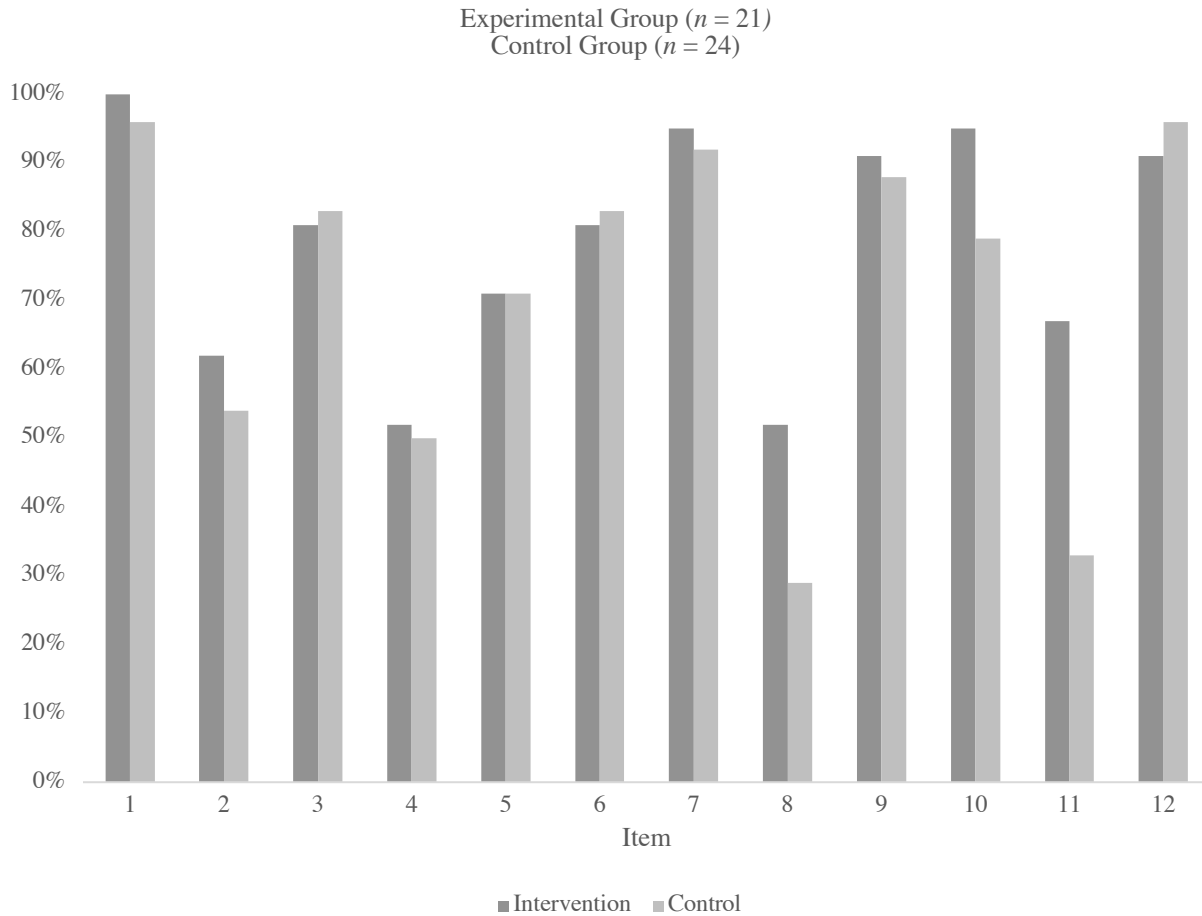


Figure 3. Proportion of parents correctly answering Sleep Hygiene Knowledge Test items.

Key: Sleep Hygiene Knowledge Test item and correct answer (T=true, F=false)

- | | |
|--|---|
| 1 Kids sleep better when they go to bed at the same time each night. | T |
| 2 Kids who have poor sleep are more likely to be underweight. | F |
| 3 Snoring is considered a sleep problem. | T |
| 4 Bedtime routine (e.g., bath, brush teeth, read a book) should last about one hour. | F |
| 5 Active-play (e.g., running, jumping) before bed helps kids fall asleep. | F |
| 6 A child's bed is a good spot for time-out/punishment. | F |
| 7 Falling asleep with the TV on helps kids sleep better | F |
| 8 Not wanting to go to bed is considered a sleep problem | T |
| 9 It's best to let kids fall asleep in places other than their bed (e.g., couch, car), then carry them to their bed. | F |
| 10 Letting kids sleep in on the weekends helps them sleep better during the week | F |
| 11 Young kids (2-5 years) need about 9 hours of sleep per 24 hours. | F |
| 12 Kids should get to stay up late as a reward for good behavior. | |

Table 11

Differences in Sleep Knowledge Item Scores Between Groups

	Pediatric Sleep Hygiene Test Question											
	1	2	3	4	5	6	7	8	9	10	11	12
X ²	.895	.275	.043	.025	.002	.043	.230	2.52	.100	2.50	4.98	.517
<i>p</i> -value	-	.600	-	.873	.965	-	-	.113	-	-	.026*	-
Fisher's Exact <i>p</i> -value	1.00	-	1.00	-	-	1.00	1.00	-	1.00	.193	-	.592

**p* < .05

Note. Due to small sample size, Fisher's Exact Test *p* value was reported for items with expected values less than five.

Key:

- 1 Kids sleep better when they go to bed at the same time each night.
- 2 Kids who have poor sleep are more likely to be underweight.
- 3 Snoring is considered a sleep problem.
- 4 Bedtime routine (e.g., bath, brush teeth, read a book) should last about one hour.
- 5 Active-play (e.g., running, jumping) before bed helps kids fall asleep.
- 6 A child's bed is a good spot for time-out/punishment.
- 7 Falling asleep with the TV on helps kids sleep better
- 8 Not wanting to go to bed is considered a sleep problem
- 9 It's best to let kids fall asleep in places other than their bed (e.g., couch, car), then carry them to their bed.
- 10 Letting kids sleep in on the weekends helps them sleep better during the week
- 11 Young kids (2-5 years) need about 9 hours of sleep per 24 hours.
- 12 Kids should get to stay up late as a reward for good behavior.

Research Question 2

Relative to an alternative intervention control group, is participation in a brief, educational sleep hygiene intervention associated with greater implementation of age-appropriate sleep hygiene practices? To address research question 2, average sleep hygiene scores were compared between groups. Possible scores ranged from 1 to 5. A higher score on the sleep hygiene scale represented greater implementation of sleep hygiene practices at home. Sleep hygiene scores were normally distributed (Shapiro-Wilk's test, *p* > .05) and there was homogeneity of variances for each condition (*p* = .166). Descriptive statistics are reported in Table 12. An independent-samples *t*-test was used to analyze means between the experimental

and control group. Results are reported in Table 13. As shown in Table 12, the experimental group obtained a mean sleep hygiene practice score of 4.35 ($SD = .37$). The control group obtained a mean sleep hygiene practice score of 4.08 ($SD = .47$). The lowest sleep hygiene score obtained by the experimental and control group was 3.69 and 2.92, respectively, and the highest score was 4.92 and 4.77, respectively. Although both groups reported relatively high implementation of sleep hygiene practices, there was a statistically significant difference between group means, $t(39) = 2.04$, $p = .048$, as shown in Table 13. The effect size for this analysis was calculated using Cohen's d . Cohen's effect size value ($d = [95\% \text{ CI}] .64 [.01 \text{ to } 1.27]$) suggested a moderate effect size.

Table 12

Descriptive Statistics of Total Sleep Hygiene Practices

	Mean	SD	Min	Max
Experimental Group ($n = 20$)	4.35	.37	3.69	4.92
Control Group ($n = 21$)	4.08	.47	2.92	4.77

Note. Means represent score on Pediatric Sleep Hygiene Questionnaire – Sleep Hygiene Subscale (13 items). Means have a possible range of 1 to 5, with higher scores indicating a greater implementation of sleep hygiene practices. SD = standard deviation

Table 13

Mean Difference and Results of t-test of Total Sleep Hygiene Practices Between Groups

	t	p	Mean Difference	95% CI of the difference
Sleep Hygiene Scale	2.04	.048*	.27	.003 to .544

* $p < .05$

Note. Means calculated from total score on the Pediatric Sleep Hygiene Questionnaire – Sleep Hygiene Subscale (13 items).

Research Question 3

Relative to an alternative intervention control group, is participation in a brief, educational sleep hygiene intervention associated with greater parental intent to communicate with healthcare providers about sleep in the future? To address this question, responses to item 41 on the Pediatric Sleep Hygiene Questionnaire (i.e., intent to communicate) were examined and group means were calculated. Specifically, item 41 states, “In the future, do you plan to talk with your child’s pediatric provider about sleep concerns?” A higher score represented greater intent to communicate with healthcare providers regarding sleep concerns. Descriptive statistics including mean and median ratings, standard deviations, and minimum and maximum ratings are shown in Table 14, and results of the independent-samples *t*-test are reported in Table 15. As shown in Table 14, the experimental group obtained an intent to communicate score of 3.55 (*SD* = 1.10). The control group obtained an intent to communicate score of 3.24 (*SD* = 1.09).

Table 14

Descriptive Statistics of Item 41 (Parental Intent to Communicate Regarding Sleep)

	Mean	Median	SD	Min	Max
Experimental Group (<i>n</i> = 20)	3.55	4.00	1.10	1	5
Control Group (<i>n</i> = 21)	3.24	3.00	1.09	2	5

Note. Item 41 from the Pediatric Sleep Hygiene Questionnaire stated, “In the future, do you plan to talk with your child’s pediatric provider about sleep concerns?” Means have a possible range of 1 to 5, with higher scores indicating a greater intent to communicate with pediatric providers regarding sleep. *SD* = standard deviation

Although the experimental group endorsed a slightly higher intent to communicate with pediatric providers regarding sleep, there was not a statistically significant difference between group means, $t(39) = .91, p > .05$, as shown in Table 15. The effect size for this analysis was calculated using Cohen’s *d*. Cohen’s effect size value ($d = 0.28$) suggested a small effect.

Descriptive frequencies are reported in Table 16. As shown in Table 16, 65% of the experimental group and 43% of the control group endorsed that they ‘very probably’ or ‘definitely’ plan to talk with their child’s healthcare provider in the future regarding sleep concerns.

Table 15

Results of t-test for Item 41(Parental Intent to Communicate Regarding Sleep) Between Groups

	<i>t</i>	<i>p</i>	Mean Difference	95% CI of the difference
Parental Intent to Communicate (Item 41)	.91	.37	.31	-.38 to 1.00

Note. Item 41 stated, “In the future, do you plan to talk with your child’s pediatric provider about sleep concerns?”

Table 16

Frequency of Intent to Communicate by Group (Item 41)

Group	<i>n</i>	Frequency (Percent)				
		Definitely Not	Probably Not	Probably	Very Probably	Definitely
Experimental	20	1 (5%)	3 (15%)	3 (15%)	10 (50%)	3 (15%)
Control	21	0 (0%)	7 (33%)	5 (24%)	6 (29%)	3 (14%)

Note. Item 41 from the Pediatric Sleep Hygiene Questionnaire stated, “In the future, do you plan to talk with your child’s pediatric provider about sleep concerns?”

Research Question 4

To what extent do parents and pediatric providers deem a written educational sleep hygiene intervention to be acceptable for a pediatric setting?

Parent feedback. Treatment acceptability was documented in the data collection.

Specifically, feedback from all participants was solicited at the end of the study during a brief telephone interview. Parents who participated in the interview were asked questions from the

Parent Interview Questionnaire. The purpose of the interview was to obtain information on parents' thoughts and experiences related to the intervention. A secondary objective of the interview was to ensure participants read the handout. All participants were administered the same questions in the same manner. A total of 18 parents from the experimental group and 15 parents from the control group participated in the phone interview. Sixteen (89%) parents in the intervention group and thirteen (87%) parents in the control group reported that they had tried strategies from the handout to some degree (e.g., "yes, we are trying them little by little"). Of the parents who did not attempt to apply the strategies at home, one parent reported being out of town and three parents reported not having enough time. All parents in the intervention group and control group reported they would recommend the handout to a friend. Information on the aspects of the handout participants liked best is reported in Figure 4. As shown in Figure 4, parents in both groups reported that the best aspect of the handout was the readability (e.g., easy to read) and length (e.g., one-page). The recommendations for improvement of the intervention handout included adding sleep hygiene strategies for older children (e.g., "Information for older kids would be nice because I have a 12-year-old who doesn't sleep as well as my younger child"), to include recommendations for how to put each strategy into practice (e.g., "More suggestions for how to do some of the more difficult recommendations would be helpful"), and specific strategies for children who experience sleep problems (e.g., "It might be helpful to have more specific strategies for helping kids that wake up at night"). The recommendations for improvement of the nutrition handout included adding healthy eating strategies specific to children with Autism Spectrum Disorder.

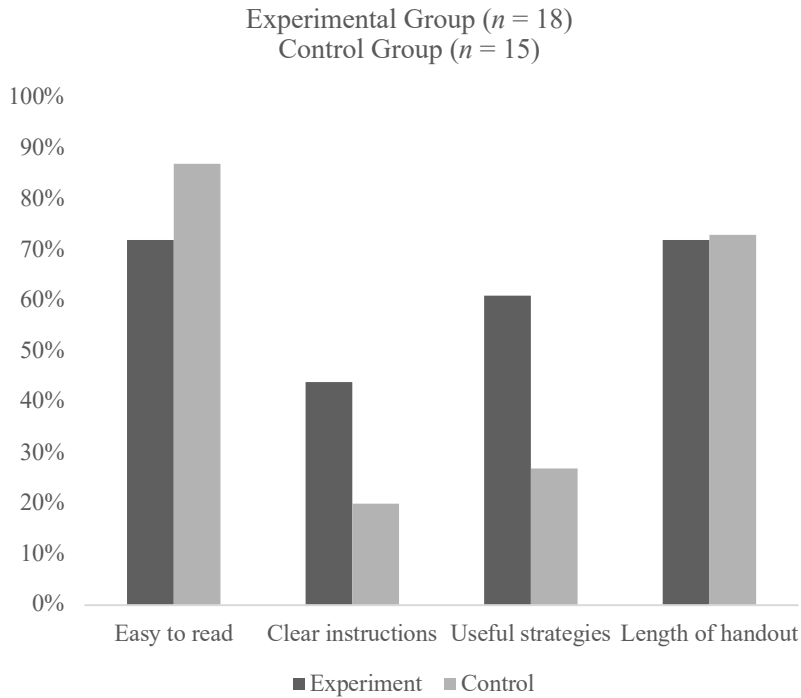


Figure 4. Closed-ended responses to parent interview question 3: “What did you like best about the handout?”

Four of 18 parents in the experimental group reported having difficulty implementing some aspect of the handout. Specifically, parents reported difficulty with removing electronics before bed (e.g., “It’s a little hard taking the tablet away at night”), having a consistent bed time (e.g., “Going to bed at the same time every night is hard for us – we have late work schedules right now”), and having a consistent bedtime routine (e.g., “We try to have the same bedtime routine, but it’s sometimes thrown off when we go out to dinner or have something going on late that weekend”). One of 15 parents in the control group reported having difficulty getting their child to eat a variety of foods (e.g., “My son has issues with a lot of textures so it’s sometimes hard to get in a variety of foods”).

In response to open-ended questions, 17 of 18 parents in the intervention group reported that the handout was helpful to their family (e.g., “Definitely helpful information for all parents”,

“Great list of basic rules of sleep”) and fourteen of eighteen parents reported learning at least one new thing (e.g., “The information was helpful – I learned one or two new things”). Four parents (22%) noted that they did not learn anything new from the handout (“It was good information that I sometimes forget, but I didn’t learn anything new”). Similarly, two parents indicated the handout was a good reminder to practice sleep hygiene (e.g., “We already knew some of them, but this [handout] was a good reminder”). Thirteen of the 15 parents in the control group indicated the handout was helpful to their family and six of fifteen (40%) noted they didn’t learn anything new (“There wasn’t anything on [the handout] that I didn’t already know”).

Information on participants preferred method to receive healthcare recommendations was collected during the interview. Results are reported in Figure 5. In response to one Likert-type item, parents in both groups indicated their preferred method as written handouts/brochures and face-to-face communication. One parent in the control group preferred to receive healthcare communication by postal mail.

Provider feedback. In addition to parent feedback, the pediatric providers associated with the study were asked to complete the Provider Feedback Form designed to collect information on the aspects providers liked best and least, including any suggested improvements, as well as information related to the usefulness of the intervention to the pediatric program.

One provider from the community screening was involved in the study and completed the form, as well as three providers from the university-based clinic used in the pilot study. In response to one closed-ended question, all four providers indicated they would ‘Very Likely’ distribute the handout to parents. In response to open-ended questions, all providers felt the study procedures were feasible for the pediatric setting (e.g., “The study kept parents busy and was extremely informative for the parents”).

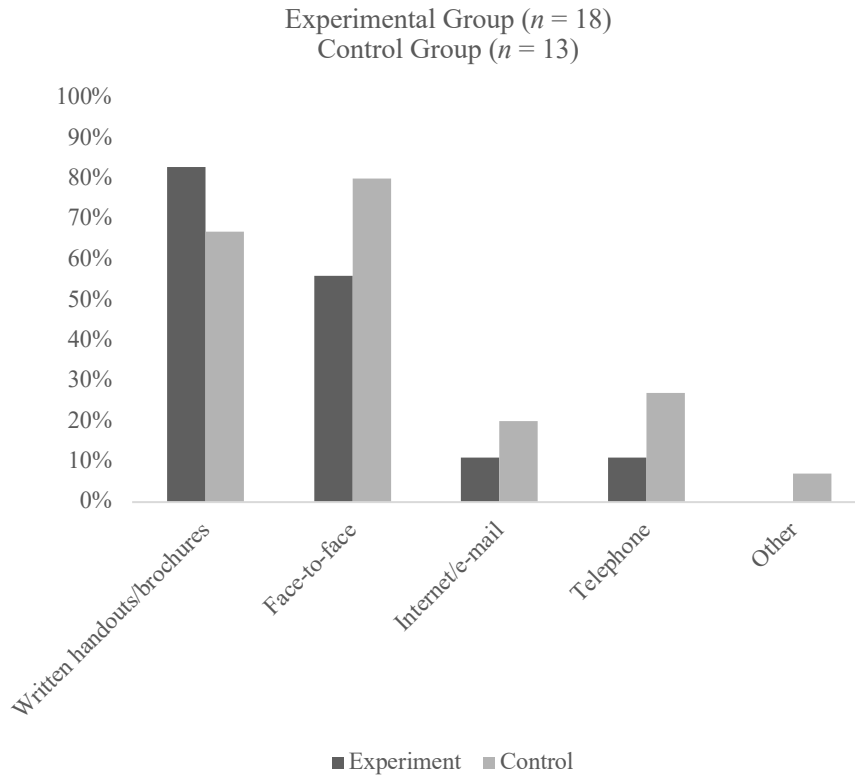


Figure 5. Closed-ended responses to parent interview question 7: “How do you prefer to receive healthcare recommendations?”

Providers reported the most useful aspect of the sleep handout as the educational quality (e.g., “Great information for health promotion and very educational”) and the unique use of iPads with parents (e.g., “Parents seemed to enjoy being interviewed on the iPad and learning about healthy sleep for kids”). Suggestions for improving the sleep handout were related to expanding the age group to include adolescents (e.g., “It would be great to address ages 12-18 years – they seem to have the worst sleep habits”) and adding online sleep resources (e.g., “Adding a few online resources might be helpful for parents with suspected sleep concerns”). With respect to additional comments, one provider noted the importance and relevance of the study to the program population (e.g., “Great study and very applicable to our families attending

the screening”). With regard to barriers to distributing the handout, one provider noted the need for the handout to be translated to Spanish.

Summary

The present study investigated the impact of a brief, educational intervention on parental knowledge, practices, and intentions of healthy sleep in children. This study employed a two-group, true experimental design with random assignment and was completed in two phases. Primary analyses of Phase 1 and 2 included a sample of parents with children between the ages of 2 and 5 years. A total of 45 parents (experimental group $n = 21$, control group $n = 24$) participated in Phase. Of the 45 that participated in Phase 1, 41 parents (experimental group $n = 20$, control group $n = 21$) participated in Phase 2.

Results of these analyses indicated there was not a statistically significant difference between mean knowledge scores or between the proportion of correct items on the Sleep Hygiene Knowledge Test, with the exception of one item. Specifically, 67% of parents in the intervention group demonstrated greater knowledge of the recommended sleep durations for young children compared to 33% of parents in the control group, a statistically significant difference in proportions. Further analyses indicated that parents who received the Healthy Sleep Handout reported significantly greater sleep hygiene practices than parents who received the Healthy Eating Handout. The present study also examined if a brief, educational sleep hygiene handout was effective at increasing parental intent to communicate with healthcare providers regarding their child’s sleep. Parents who received the Healthy Sleep Handout did not report a significantly greater intent to communicate with healthcare providers than parents who received the Healthy Eating Handout. Of note, 65% of the experimental group endorsed that they ‘very probably’ or ‘definitely’ plan to talk with their child’s healthcare provider in the future regarding

sleep concerns. The current study also examined the acceptability of the intervention among parents and pediatric providers. Taken together, both parents and providers reported the intervention as practical and beneficial to practice.

Chapter Five

Discussion

This study investigated the acceptability and impact of a brief, educational intervention on parental knowledge, practices, and future intentions of healthy sleep in children. Parents of young children who attended a community developmental screening were recruited for participation. Specifically, this study collected data on parent knowledge and practices of sleep hygiene in young children, as well as information on parents' future intent to communicate with pediatric providers regarding sleep concerns. Further, this study collected information on the acceptability of the intervention among parents and pediatric providers. This chapter interprets and summarizes the findings reported in Chapter Four. The results from each research question are discussed, followed by study implications, limitations, and future directions.

Responses to Research Questions

Parental sleep hygiene knowledge. The present study examined if a brief handout resulted in greater sleep hygiene knowledge when compared to an alternative intervention. Although the average sleep knowledge score among the experimental group was 78%, there was not a significant difference between the proportion of correct items between experimental and control groups, with the exception of one item related to recommended sleep duration. This implies that the Healthy Sleep Handout may increase parental knowledge regarding recommended sleep duration for young children; however, the findings also suggest that the handout did not have an impact on any other aspect of sleep hygiene knowledge. These results are inconsistent with the findings of Jones et al.'s (2012) study, which found that written

information may increase parent knowledge of healthy sleep in children. The difference in results may be due to the research design used in each study, as well as demographic characteristics of the participants. In particular, Jones et al. (2012) utilized a one-group, pre and post-test design, while the current study used a randomized control condition to determine differences in knowledge between two conditions. Moreover, Jones et al. (2012) implemented a two-page sleep hygiene brochure, whereas the present study utilized a one-page handout. The difference in outcomes may have been a result of differences in the length and coverage of sleep hygiene information between the interventions. Although intervention integrity was recorded during the study, it is possible that parents did not actually read the full handout. Specifically, information on recommended sleep durations was listed at the top of the Healthy Sleep Handout. As such, it is possible that parents only retained the first thing they read. Conversely, given the small sample size and population of parents recruited (e.g., parents who voluntarily brought their child to a developmental screening), it is possible that the majority of parents in the study were already familiar with information provided on the sleep handout. In particular, the majority of both groups correctly answered at least 75% of the knowledge test. Likewise, 22% of the experimental group reported not learning anything new following the intervention. Of note, the control group in this study demonstrated higher levels of sleep hygiene knowledge than those found in similar studies. Specifically, the average sleep knowledge pre-test score in Jones and colleagues' (2012) study was 43% (out of 100%). In a similar study by Owens and colleagues (2011), the average sleep knowledge score was 63%. In the current study, the average sleep knowledge score of the control group was 71%. It is possible that participant education level influenced scores in this study given that 95% of the control group and 85% of the experimental group reported having more than high school level of education; whereas, only 55% of

participants in Jones and colleagues' (2012) study reported having more than high school level of education. Conversely, 96% of participants in Owens and colleagues' (2011) study reported a college or higher education level; therefore, participant education level may not fully account for the differences in sleep knowledge levels across studies. With regard to other demographics, child gender was consistent between the current study, Owen and colleagues' (2011) study, and Jones and colleagues (2012) study, and participant age, ethnicity, and child age were consistent between the current study and Owen and colleagues' (2011) study. These consistencies suggest that these demographic factors may not have contributed to differences in sleep knowledge scores. Of note, 100% of children in the current study were between the ages of 3 and 5 years; whereas, 58% of children in Jones and colleagues (2012) study were between the ages of 1 and 5 years. The difference in age group may have contributed to sleep knowledge scores.

Parental sleep hygiene practices. This study also examined if an educational sleep hygiene intervention resulted in greater implementation of sleep hygiene practices when compared to an alternative intervention control group. Although both groups reported a relatively high implementation of sleep hygiene practices, a statistically significant difference was found between group sleep hygiene scores. This suggests that a brief, educational handout may be effective at increasing parental use of sleep hygiene at home. This finding is consistent with a similar study which determined that written information was effective at helping parents introduce new evening routines related to sleep (Eckerberg, 2002). Of note, Eckerberg (2002) utilized a sample of parents who initially sought out help for sleep problems at a children's clinic; whereas, the current study used a convenience sample of parents who voluntarily presented for a developmental screening. It is possible that the significant findings of the current study are related to intrinsic parental motivation to seek help. More specifically, although parents

in the current study did not particularly attend the screening to seek out sleep services, they did attend the screening to obtain more information on their child's development, which may include sleep. Furthermore, there is evidence that suggests a positive relationship between sleep hygiene knowledge and implementation of sleep hygiene practices (Brown, Buboltz Jr., & Soper, 2010). Given the relatively high scores of sleep hygiene knowledge obtained across both groups, it is possible that the majority of participants in the study practiced good sleep hygiene prior to participating in the intervention.

Parental intent to communicate with pediatric healthcare providers. The present study also examined if a brief, educational sleep handout was effective at increasing parental intent to communicate with healthcare providers regarding their child's sleep. As shown in this study, no significant difference was observed between the intervention and control group with regard to intent to communicate with providers. The results of this study are inconsistent with the findings of Donald, Arays, Elliott, and Jordan (2018) who found that a brief handout on obstructive sleep apnea resulted in higher intent to discuss OSA screening with their provider. One explanation for this is that Donald et al. (2018) utilized a nonrandomized, one-group, pretest and posttest study, whereas this study used randomized, two-group design. Notably, 80% and 67% of the current study's experimental group and control group, respectively, reported that they at least 'probably' planned to talk with their child's pediatric provider regarding sleep following the handout. One explanation for the high percentage of parents in the control group also endorsing at least 'probably' could be that some participants felt prompted to speak with their child's healthcare provider regarding sleep based on their responses to, or after viewing, the Pediatric Sleep Hygiene Questionnaire. For example, it's possible that parents in the control group reflected on their child's current sleep patterns while responding to the questionnaire,

potentially resulting in parents feeling encouraged to speak with their provider about their concerns. This explanation is partially supported by qualitative observations made by the PI while administering this study. In particular, several participants in the control group noted their child's sleep problems while completing the Sleep Hygiene Knowledge Test and Pediatric Sleep Hygiene Questionnaire. For example, during Phase 1, one parent in the control group verbally shared with the PI that their child refuses to sleep in their own bed. It is possible that reading the sleep-related items prompted them to be interested in speaking with their child's provider about sleep. Alternatively, parents in either condition may have had a prior interest in speaking with their healthcare provider regarding sleep. While 80% of the intervention group reported a positive intent to communicate, the design of the study was inadequate to test the hypothesis. As such, a treatment condition that does not expose participants to sleep-related items, or a research design similar to Donald et al. (2018), would better address this research question.

Parent and pediatric provider feedback. The current study also examined the acceptability of the intervention among parents and pediatric providers. Taken together, both parents and providers found the intervention to be useful. Specifically, parents reported that the handout was useful in that it provided good reminders of healthy sleep and was easy to read. Parents communicated that the handout could be improved by including information on reducing less desirable sleep habits. In addition to parent feedback, the pediatric providers associated with the study were asked to communicate the aspects they liked best and least, including any suggested improvements, as well as information related to the usefulness of the intervention to the pediatric program. Providers reported that the study procedures were feasible, and study handout was useful in that it provided great information for health promotion. These results support the conclusions of other healthcare studies that have examined the acceptability of

educational materials in pediatric settings (Eckerberg, 2002; Loring et al., 2016) in demonstrating that brief, written interventions are generally accepted in clinical practice among parents and providers.

Implications of Findings

The results of this study support the potential for simple written interventions, such as the one developed and piloted in this study, to raise awareness of healthy sleep practices among parents of young children. Specifically, this study provides initial evidence of the use of a brief handout to increase parental sleep hygiene practices. Findings indicated not only statistically significant results but, more importantly, a large effect size providing support that clinically meaningful differences occurred in parents' sleep hygiene practices following use of this intervention. Moreover, the sleep hygiene handout tested in this study was described as highly valuable by parents and pediatric providers.

Implications for healthcare settings, schools, and communities. Current behavioral sleep interventions often require a significant amount of resources and are typically only implemented with families of children with identified sleep disorders. There is a critical need for preventative interventions that can be easily implemented and widely distributed. As demonstrated in this study, family-oriented venues such as community developmental screenings and pediatric clinics provide an ideal opportunity to initiate discussion regarding healthy sleep practices with all families. Further, findings from this study provide preliminary support that written educational tools may be effective at improving the sleep practices of parents of young children. The Healthy Sleep Handout could potentially be used as part of a multifaceted approach to promote healthy sleep in children. Ideally, the handout would be distributed at primary care centers, schools, hospitals, and pediatric clinics.

Primary Care Settings. Pediatric healthcare providers could potentially use the handout to overcome current barriers to providing sleep health education during routine examinations. For example, the handout could be distributed to families upon checking in or as a guide during exams, which may address barriers related to lack of time and resources. Further, pediatric healthcare professionals perceive lack of sleep health knowledge and training as additional barriers (Faruqui et al., 2011; Mindell & Colleagues, 1994; Owens, 2001). An informative, research-based sleep health tool that can be distributed even when providers are not well-trained or confident in pediatric sleep may help address to this barrier.

School Settings. Given that school-based sleep education programs have been generally effective in reducing sleep problems and improving academic performance in school-age children (Gruber et al., 2016), the Healthy Sleep Handout could be distributed at community developmental screenings and schools. School psychologists, who promote healthy learning environments in schools, are ideally suited to implement sleep education with parents and educators. The Healthy Sleep Handout could be distributed to all families who are registering for preschool or kindergarten.

Early Intervention Programs. Research has identified a strong relationship between sleep problems and ratings of behavioral and cognitive abilities (e.g., behavior rating scale). As such, children identified as having behavioral problems may also have an underlying sleep problem. One way for early intervention programs to identify this is by eliciting information on sleep habits during community screenings or evaluations, such as with the Parent Sleep Hygiene Questionnaire. Assessing parent and child sleep habits could potentially inform early intervention providers of families in need of parent sleep education or referral for medical and behavioral treatment options. Not only would this address “the call for early intervention

programs to increase access to supportive services” (Turnbull et al., 2007, p.187), but it could maximize developmental potential and increase access to treatment.

Implications related to sleep hygiene screening. This study also resulted in several potential implications for the use of the Parent Sleep Hygiene Questionnaire. Given the preliminary data related to internal consistency, the sleep hygiene scale, which consisted of 13 items, has potential to be used as a sleep hygiene screening tool in pediatric settings. Although further validation research is needed, the scale could be used to determine the current sleep-related practices of parents with young children. Researchers have found that behavioral sleep interventions are less effective when poor sleep habits are present (Johnson et al., 2009); therefore, sleep hygiene is suggested as the first line of treatment (Jan et al., 2008). A screening tool of this nature could potentially help providers determine a starting point for behavioral sleep interventions and ultimately inform subsequent treatment.

Limitations

This study had several limitations. Items related to parental sleep hygiene knowledge were limited in order to reduce the amount of time parents were required to spend on the questionnaire. By reducing the length of the assessment, parents were more likely to have time to complete all items before being called into their appointment. However, reducing the number of knowledge questions may have reduced the chance to identify greater or weaker levels of knowledge. Moreover, the use of true/false questions left participants with a 50% chance of being correct. Also, the use of true/false questions is limited to measuring a low level of learning (e.g., remembering and understanding). Moreover, this study was limited to only English-speaking parents which limited the generalizability to the population. A handful of parents were called to their appointment before completing the study, thus limiting the number of potential

participants. At the same time, participants may have felt rushed to complete the study if they were suspecting to be called next. Similarly, all potential participants were approached while seated in a large waiting room. Chairs were arranged in a circle, while children played in the center. It's possible this seating arrangement had an influence on parents' decision to participate. Specifically, some parents may have felt more or less inclined to participate given that another parent could potentially overhear them. Moreover, parents may have been distracted, as they also were keeping an eye on their child, which also could have affected results. Furthermore, both measures used in this study included questions related to parenting styles and beliefs; it's possible that participants provided socially desirable responses. In particular, there were only six items related to healthy eating on the Pediatric Sleep Hygiene Questionnaire. It is possible that the purpose of the study was not entirely disguised and, consequently, parents who received the sleep handout may have responded in a socially desirable way. In addition, some parents preferred to respond to the Phase 2 questionnaire over the phone. Providing responses directly to the PI may have further contributed to participants' responding in a socially desirable way, particularly to items asking about future intentions. Further, this study did not collect baseline sleep hygiene information. Although random assignment is suggested to create two groups that are "probabilistically similar" to each other, it is possible that one group had greater sleep hygiene knowledge and practices at baseline compared to the other. This study did not include baseline phase in order to keep participation time low; however, measuring change in baseline or use of a pre-test sleep hygiene score as a covariate would have strengthened the study.

In addition, the sample size and certain demographics (e.g., parent education level) limited the generalizability of the findings. Of note, a small sample was utilized in this study in order to examine preliminary effects of the intervention, determine the clinical significance of

the handout, and determine acceptability among providers and parents prior to conducting the study on a larger scale. Further, some relevant demographic information was not obtained during this study, such as information on the number of caregivers in the household, number of other children in the household, current medications (e.g., melatonin), and current behavioral problems. Such information would have strengthened the study.

Although a pilot study was completed, it is possible that items on the questionnaires and interview were unclear or ambiguous to participants. Moreover, participants were given a limited window to demonstrate knowledge and practices (i.e., parents were contacted approximately one week after Phase 1). This short duration could have had a positive or negative influence on parent response to treatment. For example, some parents may have over-reported their use of sleep hygiene practices based on the information being so recent. Conversely, children with a developmental delay may have greater difficulty with change in routine, thus requiring incremental change over time. It is possible that some parents were not able to make significant changes in one week. Given both of these potential scenarios, extended follow-up would have allowed for a variation in assessment of practices over time.

Contributions to the Literature and Future Directions

Despite these limitations, this preliminary study was one of the first to examine the effectiveness and acceptability of a handout on parent knowledge of healthy sleep using a randomized controlled trial. Importantly, this study utilized a stronger research design than what has been used in the extant literature investigating similar research questions. Further, this study was one of few studies to examine outcomes related to actual change in sleep practices independent of other behavioral interventions. Given the prevalence and consequences of insufficient sleep in young children, particularly those with developmental delays, increased

awareness of healthy sleep is critical. According to a review published by the American Academy of Sleep Medicine (Mindell et al., 2006), parent education is considered the most time efficient and cost-effective approach to addressing behavioral sleep problems in infants. Further, many large-scale studies have shown that educational interventions are effective at promoting healthy sleep in infants (Adair et al., 1991; Hiscock et al., 2007; Stremmler et al., 2006; Taveras et al., 2011; Wolfson et al., 1992); however, educational efforts to promote healthy sleep beyond infant years are lacking in the professional literature. The current study extends the literature by examining the effect of an educational intervention on healthy sleep practices among parents of toddlers and preschoolers.

Although preliminary, this study found large effects for the use of a sleep hygiene handout to promote sleep hygiene knowledge and practices in parents of young children. Future research should replicate this study with extended follow up (e.g., at 3 months and 6 months) in order to obtain more information on sustained effects. Furthermore, both parents and pediatric providers evaluated this intervention positively. Given the supportive findings of this study, future research should consider exploring this intervention with a larger, more representative sample that is inclusive of other populations including different socioeconomic and cultural backgrounds. Future studies may wish to examine the effect of the handout on other populations of children, including children with chronic health conditions. Specifically, research should investigate the effect of the handout on this population, as well as the intervention acceptability. In addition, future research may wish to use a more conventional alternative intervention control group (e.g., face-to-face sleep education intervention) to further confirm treatment acceptability and clinical significance, as well as determine if a written handout is equally as effective. With regard to the telephone interview procedures, it may be beneficial to provide participants with a

hard copy of the questionnaire to reference while responding over the phone. Providing this hard copy could potentially avoid confusion or misunderstanding of questions being administered verbally.

One theory that underpinned this study was behavior change theory. Behavioral sleep habits are learned behaviors; therefore, should be amenable to change. To extend the findings of this study, future qualitative research should examine the factors associated with parental readiness to make changes regarding their child's sleep behaviors, including perceived challenges and barriers. Given that some parents may require more guidance than others, future research also may want to expand the handout to include strategies for reversing poor sleep hygiene and unhealthy sleep patterns. Additionally, the current handout provides information on the relationship between sleep and weight; future research should consider adding information on the relationship to behavior, social/emotional, and cognitive domains. Doing this could potentially emphasize the importance of identifying sleep problems early and increase parental motivation to seek assistance from pediatric providers. Furthermore, this study only examined the effect of the intervention on parental sleep hygiene. Given that studies have demonstrated that sleep hygiene is suggested as the first line of treatment when approaching sleep problems (Jan et al., 2008), future studies should examine the clinical significance of the handout on actual sleep patterns (e.g., duration of sleep, number of night wakings, etc.).

Current literature indicates that families also may not voluntarily discuss sleep with their child's pediatrician. Given this gap in communication, resources that promote awareness of healthy sleep and encourage communication between families and providers are critical. Although the majority of parents in the experimental group reported a positive intent to communicate, there was not a significant difference between groups. It is possible that any

handout, in general, could encourage a parent to discuss a particular topic of concern with their child's provider. Similarly, responding to sleep-related items on the questionnaire may have prompted parents in the control group to speak with their child's provider. Given that no literature could be found to support or oppose these theories, future studies should modify the current study by using an intent-to-treat control group that is only exposed to one question from the Pediatric Sleep Hygiene Questionnaire (e.g., "In the future, do you plan to talk with your child's provider about sleep"). This could potentially rule out any influence the questionnaire or handout may have had on participants. Moreover, future studies should be designed to examine the actual effect of the handout on patient-provider communication. This study only collected information on *intent* to communicate.

Although the intervention handout used in the current study prompts parents to discuss sleep concerns with providers, it's possible that some parents do not feel confident in their ability to do so. Further, some parents may not know *how* to bring up sleep problems with their child's pediatrician. Based on the promising findings of a health-related educational intervention conducted with adults (Yeh, Cheng, Chung, & Smith, 2014), future studies should incorporate question prompts (e.g., "What can I do to help my child sleep better") to the handout to further examine its effect on communication. Similarly, parents may not recognize signs or symptoms of behavioral sleep problems; therefore, future research should include this information in the handout. Further, an educational sleep handout could potentially lead to an increase in parental concerns regarding their child's behavioral sleep problems. Given the perceived barriers to addressing sleep problems in primary care (e.g., lack of sleep health knowledge), in addition to the limited number of pediatric sleep specialists (American Board of Pediatrics, 2015), it is important to emphasize the use of an integrated care model. Having a behavioral healthcare

provider on staff, such as a pediatric psychologist, to consult with families regarding behavioral sleep concerns could potentially address these barriers while continuing to promote positive outcomes and cost-effective care. Future research should explore this area further.

Current literature has indicated several barriers to sleep screening (Edwards, 2019; Faruqi et al., 2011). Future research should determine if the distribution of the educational handout developed in this study increases sleep screening practices among pediatric providers. In a similar study, Davies, Monaghan, and Hogan (2016) found an increase in intention to screen for Obstructive Sleep Apnea by nurses after distribution of an educational fact sheet on OSA. Furthermore, the current study provided a measurement tool that can potentially be used in future studies to examine sleep health practices among parents. While sleep hygiene rating scales for adolescents have been evaluated, few questionnaires could be found on sleep hygiene among children (Henderson & Jordan, 2010). Future studies should consider improving and validating the Pediatric Sleep Hygiene Questionnaire. Specifically, researchers in future studies could identify cut scores to determine whether parents have sufficient sleep hygiene knowledge and/or practices. Future studies also could examine if the handout would be more beneficial to parents who have already been identified as having low sleep hygiene practice scores as measured by the Pediatric Sleep Hygiene Questionnaire. Finally, findings from this study provide useful information on the limitations of the handout and emphasize the continued need for routine sleep education and ongoing research in the area of behavioral sleep interventions.

Conclusion

The current study was one of the first to investigate the impact of an educational sleep hygiene intervention on parents of young children. Specifically, findings from this study suggest that a brief sleep hygiene handout may result in increased parental knowledge of age-appropriate

sleep duration for children and greater implementation of sleep hygiene practices among parents of at-risk toddlers and preschoolers. Conversely, results do not support the use of the handout to increase other aspects of sleep hygiene knowledge or parental intent to communicate with healthcare providers regarding sleep. Despite this, both parents and pediatric providers found the intervention to be practical and useful. The parents in this study demonstrated higher levels of sleep hygiene knowledge than those found in similar studies. Taken together, findings from this study suggest that parents may implement greater amounts of sleep hygiene practices after reviewing written information on healthy sleep.

Given the high prevalence of sleep problems among young children, the significant consequences of insufficient sleep on cognitive, physical, and social-emotional domains, and the perceived barriers to providing sleep education in primary care settings, increasing awareness of healthy sleep practices among parents is critical. Parent education has been classified as a “well-established” intervention for the treatment of behavioral insomnia (Kuhn & Elliot, 2003). Results of this study are promising in that brief, written educational interventions can be valuable mechanisms for addressing this need.

References

- Adair, R., Bauchner, H., Philipp, B., Levenson, S., & Zuckerman, B. (1991). Night waking during infancy: Role of parental presence at bedtime. *Pediatrics*, (4), 500.
- Adam, E. K., Snell, E. K., & Pendry, P. (2007). Sleep timing and quantity in ecological and family context: A nationally representative time-diary study. *Journal of Family Psychology*, 21(1), 4-19.
- Adams, L. A. & Rickert, V. I. (1989). Reducing bedtime tantrums: Comparison between positive routines and graduated extinction. *Pediatrics*, 84, 756-761.
- Allen, S. L., Howlett, M. D., Coulombe, J. A., & Corkum, P. V. (2016). ABCs of sleeping: A review of the evidence behind pediatric sleep practice recommendations. *Sleep Medicine Reviews*, 29, 1–14.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179–211.
- American Academy of Sleep Medicine. (2014). *International classification of sleep disorders: ICSD-3* (3rd ed.). Darien, IL: American Academy of Sleep Medicine.
- American Academy of Pediatrics. (2002). Clinical practice guideline: Diagnosis and management of childhood obstructive sleep apnea syndrome. *Pediatrics*, (4), 704.
- American Board of Pediatrics. Workforce data 2015-2016. <https://www.abp.org/sites/abp/files/pdf/workforcebook.pdf> [accessed 09.12.17].
- Armstrong, K. L., Rowe, M., & Kohler, W. (2015). Addressing sleep disturbances in children with autism spectrum disorders. *Annals of Pediatrics & Child Health*, 3(2), 1054.
- Ball, H. L., Hooker, E., & Kelly, P. J. (2000). Parent-infant co-sleeping: Fathers' roles and perspectives. *Infant and Child Development*, 9, 67–74.
- Bandura, A. (1986). *Social foundations of thought and action. A social cognitive theory*. Englewood Cliffs: Prentice Hall.
- Barlow, J. H., & Wright, C. C. (1998). Knowledge in patients with rheumatoid arthritis: A longer term follow-up of a randomized controlled study of patient education leaflets. *British Journal of Rheumatology*, 37, 373-373.

- Bates, J. E., Viken, R. J., Alexander, D. B., Beyers, J., & Stockton, L. (2002). Sleep and adjustment in preschool children: Sleep diary reports by mothers relate to behavior reports by teachers. *Child Development, 73*(1), 62.
- Bauer, K. M., & Blunden, S. (2008). How accurate is subjective reporting of childhood sleep patterns? A review of the literature and implications for practice. *Current Pediatric Reviews, 4*(2), 132-142.
- Blanchard, L. T., Gurka, M. J., & Blackman, J. A. (2006). Emotional, developmental, and behavioral health of American children and their families: A report from the 2003 National Survey of Children's Health. *Pediatrics, 117*, 1202–1212.
- Blunden, S. (2011). Behavioural treatments to encourage solo sleeping in pre-school children: An alternative to controlled crying. *Journal of Child Health Care, (2)*, 107.
- Blunden, S., Benveniste, T., & Thompson, K. (2016). Putting children's sleep problems to bed: Using behavior change theory to increase the success of children's sleep education programs and contribute to healthy development. *Children, (3)*, 11.
- Blunden, S. L., Chapman, J., & Rigney, G. A. (2012). Are sleep education programs successful? The case for improved and consistent research efforts. *Sleep Medicine Reviews, 16*(4), 355–370.
- Blunden, S., Lushington, K., Lorenzen, B., Ooi, T., Fung, F., & Kennedy, D. (2004). Are sleep problems under-recognized in general practice? *Archives of Disease in Childhood, (8)*, 708.
- Blunden, S. & Rigney, G. A. (2015). Lessons learned from sleep education in schools: A review of dos and don'ts. *Journal of Clinical Sleep Medicine, 11*(6), 671-80.
- Bonuck, K. & Grant, R. (2012). Sleep problems and early developmental delay: Implications for early intervention programs. *Intellectual & Developmental Disabilities, 50*(1), 41–52.
- Boyle, C. A., Boulet, S., Schieve, L. A., Cohen, R. A., Blumberg, S. J., Yeargin-Allsopp, M., Visser, S., & Kogan, M. D. (2011). Trends in the prevalence of developmental disabilities in US children, 1997–2008. *Pediatrics, 127*(6), 1034–1042.
- Brockmann, P. E., Diaz, B., Damiani, F., Villarroel, L., Núñez, F., & Bruni, O. (2016). Impact of television on the quality of sleep in preschool children. *Sleep Medicine, 20*, 140–144.
- Bronfenbrenner, U. (1977). Toward an experimental ecology of human development. *American Psychologist, 32*, 513-530.
- Brown, Buboltz Jr., & Soper. (2002) Relationship of sleep hygiene awareness, sleep hygiene practices, and sleep quality in university students. *Behavioral Medicine, 28*(1), 33-38.

- Brown, E. D., & Low, C. M. (2008). Chaotic living conditions and sleep problems associated with children's responses to academic challenge. *Journal of Family Psychology, 22*(6), 920-923.
- Bruni, O., Russo, P. M., Violani, C., & Guidetti, V. (2004). Sleep and migraine: An actigraphic study. *Cephalalgia, 24*, 134–139.
- Byars, K. C., Yeomans-Maldonado, G., & Noll, J. G. (2011). Parental functioning and pediatric sleep disturbance: An examination of factors associated with parenting stress in children clinically referred for evaluation of insomnia. *Sleep Medicine, 12*, (9), 898-905.
- Cain, N., & Gradisar, M. (2010). Electronic media use and sleep in school-aged children and adolescents: A review. *Sleep Medicine, 11*, 735–742.
- Calamaro, C. J., Yang, K., Ratcliffe, S., Chasens, E. R. (2012). Wired at a young age: The effect of caffeine and technology on sleep duration and body mass index in school aged children. *Journal of Pediatric Health Care, 26*(4), 276-282.
- Chambless, D. L., & Hollon, S. D. (1998). Defining empirically supported therapies. *Journal of Consulting and Clinical Psychology, 1*(1), 7.
- Chen, X., Beydoun, M. A., & Wang, Y. (2008). Is sleep duration associated with childhood obesity? A systematic review and meta-analysis. *Obesity, 2*(2).
- Choi, J., Yoon, I. Y., Kim, H. W., Chung, S., & Yoo, H. J. (2010). Differences between objective and subjective sleep measures in children with attention deficit hyperactivity disorder. *Journal of Clinical Sleep Medicine, 6*(6), 589.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Earlbaum Associates.
- Cooney, M. R., Short, M. A., & Gradisar, M. (2018). An open trial of bedtime fading for sleep disturbances in preschool children: A parent group education approach. *Sleep Medicine, 46*, 98–106.
- Cotton, S. M., & Richdale, A. L. (2010). Sleep patterns and behaviour in typically developing children and children with autism, down syndrome, prader-willi syndrome and intellectual disability. *Research in Autism Spectrum Disorders, 4*(3), 490–500.
- Curcio, G., Ferrara, M., & De Gennaro, L. (2006). Sleep loss, learning capacity and academic performance. *Sleep Medicine Reviews, 5*(5), 323.
- Davies, A., Monaghan, W. P., & Hogan, G. T. (2016). Implementing an educational program to increase preoperative screening for obstructive sleep apnea using the stop-bang questionnaire. *International Journal of Advanced Nursing Studies, 5*(1), 56-59.

- DeVellis, R. F. (2017). *Scale development: Theory and applications* (Fourth Edition). Los Angeles: Sage Publications.
- Dillman, D. A., Smyth, J. D., & Christian, L. M. (2014). *Internet, phone, mail, and mixed-mode surveys: The tailored design method*. Hoboken, NJ: John Wiley & Sons.
- Donald, R. A., Arays, R., Elliott, J. O., & Jordan, K. (2018). The effect of an educational pamphlet on patient knowledge of and intention to discuss screening for obstructive sleep apnea in the acute ischemic stroke population. *Journal of Neuroscience Nursing*, (3), 177.
- Durand, V. M., & Mindell, J. A. (1999). Behavioral intervention for childhood sleep terrors. *Behavior Therapy*, 30, 705-715.
- Eckerberg, B. (2002). Treatment of sleep problems in families with small children: Is written information enough? *Acta Paediatrica*, (8), 952.
- Eckerberg, B. (2004). Treatment of sleep problems in families with young children: Effects of treatment on family well-being. *Acta Paediatrica*, (1), 126.
- Edwards, K. (2019). *Sleep disorders in children with autism spectrum disorder: A pilot study of an assessment of pediatric providers' practices and perceptions*. Retrieved from ProQuest Dissertations & Theses Global.
- El-Sheikh, M., & Sadeh, A. (2015). Sleep and development: Introduction to the monograph. *Monographs of the Society for Research in Child Development*, 80(1), 1-14.
- Espie, C. A. (2009). "Stepped care": A health technology solution for delivering cognitive behavioral therapy as a first line insomnia treatment. *Sleep*, (12), 1549.
- Falloon, K., Elley, C. R., Fernando, A., Lee, A. C., & Arroll, B. (2015). Simplified sleep restriction for insomnia in general practice: A randomised controlled trial. *British Journal of General Practice*, (637), 401.
- Faruqui, F., Khubchandani, J., Price, J. H., Bolyard, D., & Reddy, R. (2011). Sleep disorders in children: A national assessment of primary care pediatrician practices and perceptions. *Pediatrics*, (3), 539.
- Ferber, R. (1986). *Solve your child's sleep problems*. New York: Simon & Schuster.
- Fernando III, A., Arroll, B., & Falloon, K. (2013). A double-blind randomised controlled study of a brief intervention of bedtime restriction for adult patients with primary insomnia. *Journal of Primary Health Care*, 5(1), 5-10.
- Fisher, B. E., Ross, K., & Wilson, A. (1994). Parents' and children's ratings of sleep behavior, excitement, and tiredness: A 10-week longitudinal study. *Journal of Genetic Psychology*, 155, (2), 191-199.

- Flesch, R. (1948). A new readability yardstick. *Journal of Applied Psychology*, 32(3), 221-233.
- Flesch, R., (1949). *The art of readable writing*. New York: Harper and Brothers, 237.
- Fowler, F. J. (2009). *Applied Social Research Methods: Survey research methods* (4th ed.). Thousand Oaks, CA: SAGE Publications, Inc.
- Fukuda, K., & Sakashita, Y. (2002). Sleeping pattern of kindergartners and nursery school children: Function of daytime nap. *Perceptual and Motor Skills*, (1), 219.
- Galland, B. C., & Mitchel, E. A. (2010). Helping children sleep. *Archives of Disease in Childhood*, (10), 850.
- Genik, L. M., Yen, J. C., & McMurtry, M. (2015). Historical analysis in pediatric psychology: The influence of societal and professional conditions on two early pediatric psychology articles and the field's subsequent development. *Journal of Pediatric Psychology*, (2)40, 167–174,
- Gruber, R., Cassoff, J., & Knäuper, B. (2011). Sleep health education in pediatric community settings: Rationale and practical suggestions for incorporating healthy sleep education into pediatric practice. *Pediatric Clinics of North America*, 58(3), 735–754.
- Gruber, R., Somerville, G., Bergmame, L., Fontil, L., & Paquin, S. (2016). School-based sleep education program improves sleep and academic performance of school-age children. *Sleep Medicine*, 21, 93–100.
- Hall, W. A., & Nethery, E. (2019). What does sleep hygiene have to offer children's sleep problems? *Paediatric Respiratory Reviews*, 31, 64–74.
- Hall, W. A., Zubrick, S. R., Silburn, S. R., Parsons, D. E., & Kurinczuk, J. J. (2007). A model for predicting behavioural sleep problems in a random sample of australian preschoolers. *Journal of Infant and Child Development*, 523, 509-523.
- Hayes, M. J., Fukumizu, M., Troese, M., Sallinen, B. A., & Gilles, A. (2007). Social experiences in infancy and early childhood co-sleeping. *Infant and Child Development*, 16, 403-416.
- Hayes, M. J., Parker, K. G., Sallinen, B., & Davare, A. A. (2001). Bedsharing, temperament, and sleep disturbance in early childhood. *Sleep*, 24(6), 657-662.
- Hayes, M. J., Roberts, S. M., & Stowe, R. (1996). Early childhood co-sleeping: Parent-child and parent-infant nighttime interactions. *Journal of Infant Mental Health*, 14(4), 348-357.
- Henderson, J. A., & Jordan, S. S. (2010). Development and preliminary evaluation of the bedtime routines questionnaire. *Journal of Psychopathology and Behavioral Assessment*, (2), 271.

- Hiscock, H., Bayer, J., & Gold, L., Hampton, A., Ukoumunne, O. C., & Wake, M. (2007). Improving infant sleep and maternal mental health: A cluster randomised trial. *Archives of Disease in Childhood*, *92*, 952–958.
- Hiscock, H. & Wake, M. (2002). Randomised controlled trial of behavioural infant sleep intervention to improve infant sleep and maternal mood. *British Medical Journal*, *324*(7345), 1062.
- Hodge, D., Parnell, A. M., Hoffman, C. D., & Sweeney, D. P. (2012). Methods for assessing sleep in children with autism spectrum disorders: A review. *Research in Autism Spectrum Disorders*, *6*(4), 1337.
- Hoffman, C. D., Sweeney, D. P., Gilliam, J. E., Apodaca, D. D., Lopez-Wagner, M. C., & Castillo, M. M. (2005). Sleep problems and symptomology in children with autism. *Focus on Autism and Other Developmental Disabilities*, *20*, 194–200.
- Individuals with Disabilities Education Act, 20 U.S.C. § 1400 (2004).
- Institute of Medicine. (2006). *Sleep disorders and sleep deprivation: An unmet public health problem*. Washington, DC: The National Academies Press.
- Isaacman, D.J., Purvis, K., Gyuro, J., Anderson, Y., & Smith, D. (1992). Standardized instructions: Do they improve communication of discharge information from the emergency department? *Pediatrics*, *89*, 1204–1208.
- Jan, J. E., Owens, J. A., Weiss, M. D., Johnson, K. P., Wasdell, M. B., Freeman, R. D., & Ipsiroglu, O. S. (2008). Sleep hygiene for children with neurodevelopmental disabilities. *Pediatrics*, *122*(6), 1343–1350.
- Javadi, M., Kalantari, N., Jalilolghadr, S., Omidvar, N., Rashidkhani, B., & Amiri, P. (2015). Sleep habits and dietary intake among preschool children in Qazvin. *Journal of Comprehensive Pediatrics*, *5*(1), 1-5.
- Johnson, K., Giannotti, F., & Cortesi, F. (2009). Sleep patterns in autism spectrum disorders. *Child and Adolescent Psychiatric Clinics of North America*, *18*(4), 917–928.
- Jones, C. H., Owens, J. A., & Pham, B. (2012). Can a brief educational intervention improve parents' knowledge of healthy children's sleep? A pilot-test. *Health Education Journal* *72*(5), 601-610.
- Kahn, A., Mozin, M. J., Rebuffat, E., Sottiaux, M., & Muller, M. F. (1989). Milk intolerance in children with persistent sleeplessness: A prospective double-blind crossover evaluation. *Pediatrics*, *84*, 595–603.
- Kataria, S., Swanson, M. S., & Trevathan, G. E. (1987). Persistence of sleep disturbances in preschool children. *Journal of Pediatrics*, *110*(4), 642–646.

- Katz, T., Shui, A. M., Johnson, C. R., Richdale, A. L., Reynolds, A. M., Scahill, L., & Malow, B. (2018). Modification of the Children's Sleep Habits Questionnaire for Children with Autism Spectrum Disorder. *Journal of Autism and Developmental Disorders*, (8), 2629.
- Krakowiak, P., Goodlin-Jones, B., Hertz-Picciotto, I., Croen, L. A., Hansen, R. L. (2008). Sleep problems in autism spectrum disorders, developmental delays and typical development: A population-based study. *Journal of Sleep Research*, 17, 197–206.
- Keller, M. A., & Goldberg, W. A. (2004). Co-sleeping: Help or hindrance for young children's independence? *Infant and Child Development*, 13, 369-388.
- Kennedy, A., Robinson, A., Hann, M., Thompson, D., Wilkin, D. (2003). A cluster-randomised controlled trial of a patient-centred guidebook for patients with ulcerative colitis: Effect on knowledge, anxiety and quality of life. *Health and Social Care in the Community*, 11, 64-72.
- Koinis-Mitchell, D., Craig, T., Esteban, C. A., & Klein, R. B. (2012). Sleep and allergic disease: A summary of the literature and future directions for research. *Journal of Allergy and Clinical Immunology*, 130, 1275–1281.
- Kruger, S., & Rawlins, P. (1984). Pediatric dismissal protocol to aid the transition from hospital care to home care. *Journal of Nursing Scholarship*, 16, 120–125.
- Kuhn, B. R., & Elliott, A. J. (2003). Treatment efficacy in behavioral pediatric sleep medicine. *Journal of Psychosomatic Research*, 54(6), 587.
- Kushnir, J., & Sadeh, A. (2011). Sleep of preschool children with night-time fears. *Sleep Medicine*, 12(9), 870-874.
- Li, S. H., Jin, X. M., Shen, X. M., Wu, S. H., Jiang, F., Yan, C. H., Yu, X. D. & Qiu, Y. L. (2007). Development and psychometric properties of the Chinese version of children's sleep habits questionnaire. *Zhonghua Er Ke Za Zhi*, 45, 176–180.
- Lin, C.Y., Strong, C., Scott, A. J., Broström, A., Pakpour, A. H., & Webb, T. L. (2018). A cluster randomized controlled trial of a theory-based sleep hygiene intervention for adolescents. *Sleep*, 41(11).
- Liu, X., Liu, L., & Wang, R. (2003). Bed sharing, sleep habits, and sleep problems among chinese school-aged. *Pediatrics*, 26(7), 839-844.
- Loring, W. A., Johnston, R., Gray, L., Goldman, S., & Malow, B. (2016). A brief behavioral intervention for insomnia in adolescents with autism spectrum disorders. *Clinical Practice in Pediatric Psychology*, 4(2), 112-124.
- Lucas-de la Cruz, L., Martinez-Vizcaino, V., Alvarez-Bueno, C., Arias-Palencia, N., Sanchez-

- Lopez, M., & Notario-Pacheco, B. (2016). Reliability and validity of the Spanish version of the children's sleep habits questionnaire (CSHQ-SP) in school-age children. *Child: Care, Health and Development*, (5), 675.
- Maggs, F. M., Jubb, R. W., Kemm, J. R. (1996). Single-blind randomized controlled trial of an educational booklet for patients with chronic arthritis. *British Journal of Rheumatology*, 35, 775-777.
- Marcus, C. L., Jay Brooks, L., Draper, K. A., Gozal, D., Carol Halbower, A., Jones, J., ... & Shiffman, R. N. (2012). Diagnosis and management of childhood obstructive sleep apnea syndrome. *Pediatrics*, 130(3), 576–584.
- McDowall, P. S., Galland, B. C., Campbell, A. J., & Elder, D. E. (2017). Parent knowledge of children's sleep: A systematic review. *Sleep Medicine Reviews*, 39, 9.
- Meijer, A. M., Habekothe, R. T., & Van Den Wittenboer, G. (2001). Mental health, parental rules and sleep in pre-adolescents. *Journal of Sleep Research*, 10, 297-302.
- Meltzer, L. J. & Crabtree, V. M. (2015). *Pediatric sleep problems: A clinician's guide to behavioral interventions*. Washington, DC: American Psychological Association.
- Meltzer, L. J. ., & Mindell, J. A. (2014). Systematic review and meta-analysis of behavioral interventions for pediatric insomnia. *Journal of Pediatric Psychology*, 39(8), 932–948.
- Michie, S, Richardson, M., Johnston, M., Abraham, C., Francis, J., Hardeman, W., Eccles, M. P., Cane, J., & Wood, C. E. (2013). The behavior change technique taxonomy (v1) of 93 hierarchically clustered techniques: Building an international consensus for the reporting of behavior change interventions. *Annals of Behavior Medicine*, 46(1), 81–95.
- Mindell, J. A., Du Mond, C. E., Sadeh, A., Telofski, L. S., Kulkarni, N., & Gunn, E. (2011). Efficacy of an internet-based intervention for infant and toddler sleep disturbances. *Journal of Sleep and Sleep Disorders Research*, 34(4), 451–458.
- Mindell, J. A., Kuhn, B., Lewin, D. S., Meltzer, L. J., & Sadeh, A. (2006). Behavioral treatment of bedtime problems and night wakings in infants and young children. *Sleep*, 29, 1263–1276.
- Mindell, J. A., Meltzer, L. J., Carskadon, M. A., & Chervin, R. D. (2009). Developmental aspects of sleep hygiene: Findings from the 2004 national sleep foundation sleep in america poll. *Sleep Medicine*, 10, 771–779.
- Mindell, J. A., Moline, M. L., Zendell, S. M., Brown, L. W., & Fry, J. M. (1994). Pediatricians and sleep disorders: Training and practice. *Pediatrics*, (2), 194.
- Mindell, J. A. & Owens, J. A. (2003). *A clinical guide to pediatric sleep diagnosis and management of sleep problems*. Philadelphia, PA: Lippincott Williams & Wilkins.

- Mindell, J. A. & Owens, J. A. (2015). *A clinical guide to pediatric sleep: Diagnosis and management of sleep problems* (3rd ed.). Philadelphia, PA: Wolters Kluwer.
- Mindell, J. A., Sadeh, A., & Kohyama, J., & How, T. H. (2010). Parental behaviours and sleep outcomes in infants and toddlers: A cross-cultural comparison. *Sleep Medicine, 11*, 393–399.
- Mindell, J. A., Telofski, L. S., Wiegand, B., & Kurtz, E. S. (2009). A nightly bedtime routine: Impact on sleep in young children and maternal mood. *Sleep, (5)*, 599.
- Moore, B. A., Friman, P. C., Fruzzetti, A. E., & MacAleese, K. (2007). Evaluating the bedtime pass program for child resistance to bedtime: A randomized controlled trial. *Journal of Pediatric Psychology, (3)*, 283.
- Moore, M., Kirchner, H. L., Drotar, D., Johnson, N., Rosen, C., & Redline, S. (2011). Correlates of adolescent sleep time and variability in sleep time: The role of individual and health related characteristics. *Sleep Medicine, 12*, 239–245.
- Moturi, S., & Avis, K. (2010). Assessment and treatment of common pediatric sleep disorders. *Psychiatry, 7(6)*, 24.
- National Sleep Foundation. (2004). Sleep in America poll [Internet]. Available from: <https://www.sleepfoundation.org/sites/default/files/inline-files/FINAL%20SOF%202004.pdf>
- Nixon, G. M., Thompson, J. M., Han, D. Y., Becroft, D. M., Clark, P. M., Robinson, E., ... Mitchell, E. A. (2008). Short sleep duration in middle childhood: Risk factors and consequences. *Sleep, (1)*, 71.
- Nuutinen, T., Ray, C., & Roos, E. (2013). Do computer use, TV viewing, and the presence of the media in the bedroom predict school-aged children's sleep habits in a longitudinal study? *BMC Public Health, (1)*, 1-8.
- Owens, J. A. (2001). The practice of pediatric sleep medicine: Results of a community survey. *Pediatrics, (3)*, 755.
- Owens, J. A. (2005). Epidemiology of sleep disorders during childhood. In: Sheldon, S. H., Ferber, R., & Kryger, M. H., editors. *Principles and practices of pediatric sleep medicine*. Philadelphia, PA: Elsevier Saunders, 27–33.
- Owens, J. A. (2008). Classification and epidemiology of childhood sleep disorders. *Primary Care: Clinics in Office Practice, 35*, 533–546.

- Owens, J. A., Belon, K., & Moss, P. (2010). Impact of delaying school start time on adolescent sleep, mood, and behavior. *Archives of Pediatrics and Adolescent Medicine*, *164*, 608–614.
- Owens, J. A., Chervin, R., & Hoppin, A. (2019). Behavioral sleep problems in children [Internet]. Retrieved from <https://www.uptodate.com/contents/behavioral-sleep-problems-in-children/abstract/21>.
- Owens, J. A., & Dalzell, V. (2005). Use of the 'BEARS' sleep screening tool in a pediatric residents' continuity clinic: a pilot study. *Sleep Medicine*, (1), 63.
- Owens, J. A., Fernando, S., & Mc Guinn, M. (2005). Sleep disturbance and injury risk in young children. *Behavioral Sleep Medicine*, *3*(1), 18-31.
- Owens, J. A., & Jones, C. (2011). Parental knowledge of healthy sleep in young children: Results of a primary care clinic survey. *Journal of Developmental & Behavioral Pediatrics*, *32*(6), 447.
- Owens J. A., Jones, C., & Nash, R. (2011). Caregivers' knowledge, behavior, and attitudes regarding healthy sleep in young children. *Journal of Clinical Sleep Medicine*, *7*(4), 345–350.
- Owens, J. A., Maxim, R., McGuinn, M., Nobile, C., Msall, M., & Alario, A. (1999). Television-viewing habits and sleep disturbance in school children. *Pediatrics*, *104*, 27.
- Owens, J. A., Rosen, C. L., & Mindell, J. A. (2003). Medication use in the treatment of pediatric insomnia: Results of a survey of community-based pediatricians. *Pediatrics*, *111*(5), 628.
- Owens, J. A., Rosen, C. L., Mindell, J. A., & Kirchner, H. L. (2010). Use of pharmacotherapy for insomnia in child psychiatry practice: A national survey. *Sleep Medicine*, *11*, 692–700.
- Owens, J. A., Spirito, A., McGuinn, M., & Nobile, C. (2000). Sleep habits and sleep disturbance in elementary school-aged children. *Journal of Developmental Behavioral Pediatrics*, *21*, 27-36.
- Paavonen, E. J., Pennonen, M., Roine, M., Valkonen, S., & Lahikainen, A. R. (2006). TV exposure associated with sleep disturbances in 5- to 6-year-old children. *Journal of Sleep Research*, *15*, 154-161.
- Padez, C., Mourao, I., Moreira, P., & Rosado, V. (2009). Long sleep duration and childhood overweight/obesity and body fat. *American Journal of Human Biology*, (3), 371.
- Papp, K. K., Penrod, C. E., & Strohl, K. P. (2002). Knowledge and attitudes of primary care physicians toward sleep and sleep disorders. *Sleep and Breathing*, (3), 103.

- Peek, C. J., & the National Integration Academy Council. (2013). *Lexicon for behavioral health and primary care integration: Concepts and definitions developed by expert consensus*. Rockville, MD: Agency for Healthcare Research and Quality.
- Perrin, E. M., Jacobson Vann, J. C., Benjamin, J. T., Skinner, A. C., Wegner, S., & Ammerman, A. S. (2010). Use of a pediatrician toolkit to address parental perception of children's weight status, nutrition, and activity behaviors. *Academic Pediatrics, 10*(4), 274–281.
- Pesonen, A.-K., Sjösten, N. M., Matthews, K. A., Heinonen, K., Martikainen, S., Kajantie, E., ... Räikkönen, K. (2011). Temporal associations between daytime physical activity and sleep in children. *PLoS One, 6*(8), 1–6.
- Prestwich A, Snichotta, F. F., Whittington, C., Dombrowski, S. U., Rogers, L., & Michie, S (2014). Does theory influence the effectiveness of health behavior interventions? A meta-analysis. *Health Psychology, 33*(5), 465–474.
- Prestwich, A., Webb, T.L., & Conner, M. (2015). Using theory to develop and test interventions to promote changes in health behavior: Evidence, issues, and recommendations. *Current Opinion in Psychology, (5)*, 1-5.
- Prochaska, J.O., Redding, C.A., & Evers, K.E. (1997). *The Transtheoretical Model and Stages of Change*. In: Glanz, K., Lewis, F.M., & Rimer, B.K., eds. *Health Behavior and Health Education*. San Francisco: Jossey-Bass Publishers, 60-84.
- Ray, C., & Roos, E. (2012). Family characteristics predicting favourable changes in 10 and 11-year-old children's lifestyle-related health behaviours during an 18-month follow-up. *Appetite, 58*(1), 326-332.
- Reid, M. J., Walter, A. L., & O'Leary, S. G. (1999). Treatment of young children's bedtime refusal and nighttime wakings: A comparison of "standard" and graduated ignoring procedures. *Journal of Abnormal Child Psychology, (1)*, 5.
- Rhoades, K. A., Leve, L. D., Harold, G. T., Mannering, A. M., Neiderhiser, J. M., Shaw, D. S., ... Reiss, D. (2012). Marital hostility and child sleep problems: Direct and indirect associations via hostile parenting. *Journal of Family Psychology, (4)*, 488.
- Richdale, A. L., & Schreck, K. A. (2009). Sleep problems in autism spectrum disorders: Prevalence, nature, & possible biopsychosocial aetiologies. *Sleep Medicine Reviews, 13*, 403-411.
- Rudnicka, A. R., Nightingale, C. M., Donin, A. S., Sattar, N., Cook, D. G., Whincup, P. H., & Owen, C. G. (2017). Sleep duration and risk of type 2 diabetes. *Pediatrics, (3)*, 28.

- Rune, K. T., Mulgrew, K., Sharman, R., & Lovell, G. P. (2015). Effect of an obesity pamphlet on parental perception and knowledge of excess weight in their children: Results of a randomised controlled trial. *Health Promotion Journal of Australia: Official Journal of Australian Association of Health Promotion Professionals*, (2), 129.
- Sadeh, A., Gruber, R., & Raviv, A. (2002). Sleep, neurobehavioral functioning, and behavior problems in school-age children. *Child Development*, 73(2), 405.
- Sadeh, A., Gruber, R., & Raviv, A. (2003). The effects of sleep restriction and extension on school-age children: What a difference an hour makes. *Child Development*, 74(2), 444.
- Sadeh, A., Mindell, J. A., Luedtke, K., & Wiegand, B. (2009). Sleep and sleep ecology in the first 3 years: a web-based study. *Journal of Sleep Research*, (1), 60.
- Schlarb, A., Schwerdtle, B., & Hautzinger, M. (2010). Validation and psychometric properties of the german version of the children's sleep habits questionnaire (CSHQ-DE). *Somnologie*, (4), 260.
- Schreck, K. A., & Richdale, A. L. (2011). Knowledge of childhood sleep: A possible variable in under or misdiagnosis of childhood sleep problems. *Journal of Sleep Research*, (4), 589.
- Scott, G., & Richards, M. P. (1990). Night waking in infants: Effects of providing advice and support for parents. *Journal of Child Psychology and Psychiatry*, 31, 551-567.
- Sehgal, A., & Mignot, E. (2011). Genetics of sleep and sleep disorders. *Cell*, 146, 194-207.
- Seymour, F. W., Brock, P., During, M., & Poole, G. (1989). Reducing sleep disruptions in young children: Evaluation of therapist-guided and written information approaches: A brief report. *Child Psychology & Psychiatry & Allied Disciplines*, 30(6), 913-918.
- Shadish, Cook, & Campbell (2002). Experimental and quasi-experimental designs for generalized causal inference. Retrieved from <https://pdfs.semanticscholar.org/9453/f229a8f51f6a95232e42acfae9b3ae5345df.pdf>
- Stores, R., & Stores, G. (2004). Evaluation of brief group-administered instruction for parents to prevent or minimize sleep problems in young children with down syndrome. *Journal of Applied Research for Intellectual Disabilities*, 17(2), 61-70.
- Stremler, R., Hodnett, E., Lee, K., MacMillan, S., Mill, C., Ongcangco, L., & Willan, A. (2006). A behavioral-educational intervention to promote maternal and infant sleep: A pilot randomized, controlled trial. *Sleep*, 29, 1609–1615.
- Tan, L. P. (2004). The effects of background music on quality of sleep in elementary school children. *Journal of Music Therapy*, 2, 128-150.

- Taveras, E. M., Blackburn, K., Gillman, M. W., Haines, J., McDonald, J., Price, S., & Oken, E. (2011). First steps for mommy and me: A pilot intervention to improve nutrition and physical activity behaviors of postpartum mothers and their infants. *Maternal and Child Health Journal*, (8), 1217.
- Touchette, E., Petit, D., Paquet, J., Boivin, M., & Japel, C. (2005). Factors associated with fragmented sleep at night across early childhood. *Archives of Pediatrics and Adolescent Medicine*, 159, 242-249.
- Tudor, M. E., Walsh, C. E., Mulder, E. C., & Lerner, M. D. (2015). Pain as a predictor of sleep problems in youth with autism spectrum disorders. *Autism: The International Journal Of Research & Practice*, 19(3), 292.
- Turnbull, A. P., Summers, J. A., Turnbull, R., Brotherson, M. J., Winton, P., Roberts, R., et al. (2007). Family supports and services in early intervention: A bold vision. *Journal of Early Intervention*, 29, 187–206.
- U.S. Department of Education, Office of Special Education and Rehabilitative Services, Office of Special Education Programs. (2007). Archived: Twenty-five years of progress in educating children with disabilities through IDEA. Washington, D.C.
- Vriend, J. L., Corkum, P. V., Moon, E. C., & Smith, I. M. (2011). Behavioral interventions for sleep problems in children with autism spectrum disorders: Current findings and future directions. *Journal of Pediatric Psychology*, 36(9), 1017.
- Waumans, R. C., Terwee, C. B., Van den Berg, G., Knol, D. L., Van Litsenburg, R. L., & Gemke, R. J. (2010). Sleep and sleep disturbance in children: Reliability and validity of the dutch version of the child sleep habits questionnaire. *Sleep*, 33(6), 841-845.
- Westerlund, L., Ray, C., & Roos, E. Associations between sleeping habits and food consumption patterns among 10-11-year-old children in Finland. *British Journal of Nutrition*, 102(10), 1531-1537.
- Wicke, D. M., Lorge, R. E., Coppin, R. J., & Jones, K. P. (1994). The effectiveness of waiting room notice-boards as a vehicle for health education. *Family Practice*, 11, 292–295.
- Wilson, K. E., Miller, A. L., Bonuck, K., Lumeng, J. C., & Chervin, R. D. (2013). Evaluation of a sleep education program for low-income preschool children and their families. *Sleep*, 37(6), 1117-1125.
- Wise, M., Glaze, D., Chervin, R., & Hoppin, A. (2018). Assessment of sleep disorders in children [Internet]. Retrieved from <https://www.uptodate.com/contents/behavioral-sleep-problems-in-children>.

- Wolfson, A., Lacks, P., & Futterman, A. (1992). Effects of parent training on infant sleeping patterns, parents' stress, and perceived parental competence. *Journal of Consultation in Clinical Psychology, 60*, 41-48.
- Yau, S., Pickering, R.M., Gringras, P., Elphick, H., Evans, H.J., Farquhar, M., ... Hill, C.M. (2019). Sleep in infants and toddlers with down syndrome compared to typically developing peers: Looking beyond snoring, *Sleep Medicine*.
- Yeh, J. C., Cheng, M. J., Chung, C. H., & Smith, T. J. (2014). Using a question prompt list as a communication aid in advanced cancer care. *Journal of Oncology Practice, 10*(3), 137-141.
- Zhang, J., Li, A. M., Fok, T. F., & Wing, Y. K. (2010). Roles of parental sleep/wake patterns, socioeconomic status, and daytime activities in the sleep/wake patterns of children. *Journal of Pediatrics, 156*(4), 606.

Appendices

Appendix A – Healthy Sleep Handout



Healthy Sleep for Kids

Kids who don't get enough sleep are more likely to have problems in school, be overweight, and have other health issues. Kids with disabilities are more likely to have sleep problems than typically developing kids. Follow these tips to help your child sleep better.

Child's Age	Healthy Amount of Sleep
1 - 2 years	11-14 hours (including naps)
3 - 5 years	10-13 hours (including naps)
6 - 12 years	9-12 hours

Recommendations set by the American Academy of Sleep Medicine (AASM).

1. **Keep the same bedtime and wake time every day, even on weekends.** Kids sleep better when they go to bed at the same time each night.
2. **Make the bedroom a cozy place for sleeping.** A child's bedroom should be cool and quiet.
3. **Create a bedtime plan.** Keep a bedtime plan that lasts no more than 20 minutes. This can include taking a bath, brushing teeth, and reading a book.
4. **Do quiet and calm things before bed.** Listen to calm music or read a story. Active-play (e.g., running, jumping) can make it hard to fall asleep. Keep all iPads/tablets and TVs out of the bedroom, and do not use before bedtime. Screens wind kids up, not down.
5. **No caffeine.** Try not give your child caffeine (soda, chocolate, tea) in the late afternoon and evening.
6. **Put kids to bed sleepy, but awake.** Try not to let your child fall asleep in any place other than their bed, such as the couch or car.
7. **Bedtime checkups should be short and sweet.**
8. **Try not to use a child's bed as time-out.** This could send the message that sleep is bad.
9. **Know what sleep problems look like.** Two to five year-olds typically sleep well throughout the night. The most common sleep problems in kids are waking up during the night, trouble falling asleep, not wanting to go to bed, and snoring.

Talk with your child's provider.

Discuss any concerning sleep symptoms that your child may have with your child's primary healthcare provider or a sleep specialist. It is important to seek help and get treatment early for your child's sleep problems to prevent future health issues.

Primary reference: *A Clinical Guide to Pediatric Sleep* by Jodi Mindell and Judith Owens, Third Edition. This handout has been reviewed by a dissertation committee. The content is for educational purposes only.

Appendix B – Healthy Eating Handout



Healthy Eating for Kids

Good nutrition is important for your child’s physical and mental health. Follow these tips to help your child eat healthy.

Child’s Age	Healthy Calories (per day)	
	Male	Female
2 - 3 years	1000	1000
4 - 8 years	1200-1400	1200-1400
9 - 13 years	1600-2000	1400-1600

Recommendations set by the United States Department of Agriculture (USDA) and recommended by the American Academy of Pediatrics.

1. **Fiber can help a child feel fuller longer so they stay more alert in school.**
2. **Teach your child that cakes, candy, chips, and other snacks are ok every now and then.** Kids need carbs (sugars) and fats, but too much can lead to health problems.
3. **Give healthy choices.** Packing your child's lunch can help keep things on track.
4. **Kids need water.** Fruit and vegetables are also good sources of water.
5. **Give fruits and vegetables as snacks.** Keep fresh fruits and veggies washed, cut, and in plain sight.
6. **Vitamin A.** Try to include at least one leafy green or yellow vegetable for vitamin A such as spinach, broccoli, or carrots each day.
7. **Vitamin C.** Great sources of vitamin C include oranges, grapefruit, strawberries, melon, tomato, and broccoli. Try to eat at least one serving each day.
8. **Teaching kids to eat healthy will help in the long run.**

Talk with your child’s provider.

Discuss any concerning nutritional concerns with your child’s healthcare provider or nutritionist. It is important to seek help and get treatment early to prevent future health issues.

Primary reference: HealthyChildren.org by the American Academy of Pediatrics. This handout has been reviewed by a dissertation committee. The content is for educational purposes only. Your child’s needs are unique. Before you act or rely upon this information, please talk with your child’s healthcare provider.

Appendix C – Pediatric Sleep Hygiene Knowledge Test

Q1 Please indicate whether you think the following statements are True or False.

	True	False
1 Kids sleep better when they go to bed at the same time each night.	<input type="radio"/>	<input type="radio"/>
2 Teaching children to eat healthy will help them in the long run.	<input type="radio"/>	<input type="radio"/>
3 Kids who have poor sleep are more likely to be underweight.	<input type="radio"/>	<input type="radio"/>
4 Snoring is considered a sleep problem.	<input type="radio"/>	<input type="radio"/>
5 Fiber can help kids feel fuller longer so they stay alert in school.	<input type="radio"/>	<input type="radio"/>
6 Bedtime routine (e.g., bath, brush teeth, read a book) should last about one hour.	<input type="radio"/>	<input type="radio"/>
7 Active-play (e.g., running, jumping) before bed helps kids fall asleep.	<input type="radio"/>	<input type="radio"/>
8 A child's bed is a good spot for time-out/punishment.	<input type="radio"/>	<input type="radio"/>
9 Fruits and vegetables are great snacks for kids.	<input type="radio"/>	<input type="radio"/>
10 Falling asleep with the TV on helps kids sleep better.	<input type="radio"/>	<input type="radio"/>
11 Kids need water every day.	<input type="radio"/>	<input type="radio"/>
12 Not wanting to go to bed is considered a sleep problem.	<input type="radio"/>	<input type="radio"/>
13 It's best to let kids fall asleep in places other than their bed (e.g., couch, car), then carry them to their bed.	<input type="radio"/>	<input type="radio"/>

- 14 Kids will grow out of night wakings (i.e., waking up in middle of night).
- 15 Letting kids sleep in on the weekends helps them sleep better during the week.
- 16 Young kids (2-5 years) need about 9 hours of sleep per 24hrs.
- 17 Kids should get to stay up late as a reward for good behavior.

Q2 How do you prefer to receive Phase 2 of this study? (You will be sent a survey link in addition to the phone interview)

- Email _____
- Call _____
- Text _____

Q3 Phone number (if not listed above)

Q4 For researcher use only:

- Saturday June 1 _____
- Sunday June 2 _____
- Monday June 3 _____
- Tuesday June 4 _____

Appendix D – Parent Sleep Hygiene Questionnaire

Thank you for taking the time to complete Phase 2. This survey will take approximately 3 minutes to complete. Based on the information you read and/or learned from the handout, please answer the following questions as best as you can. In the past month...

Thank you for taking the time to complete Phase 2. This survey will take approximately 3 minutes to complete. Based on the information you read and/or learned from the handout, please answer the following questions as best as you can. In the past month...

	<u>Never</u> (0 times per week)	<u>Rarely</u> (1-2 times per week)	<u>Sometimes</u> (3-4 times per week)	<u>Often</u> (5-6 times per week)	<u>Always</u> (Every day/night)
1 My child gets at least one serving of fruits per day.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2 My child eats three meals per day.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3 My child eats chips, candy, or other snacks.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4 My child eats fruit and vegetables as a snack.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5 My child drinks water throughout the day.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6 My child eats at least one serving of vegetables per day.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7 My child sleeps in my bed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8 My child will not fall asleep unless I lay with them.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9 My child will not fall asleep unless I am in the room.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10 My child needs my help to fall asleep.

11 My child goes to bed at a different time every night.

12 My child has a consistent bedtime routine (take a bath, read a book, etc.).

13 My child goes to bed later on weekends than week days.

14 My child gets 10 or more hours of sleep per 24 hours (including overnight and daytime naps).

15 My child has nightmares and/or night terrors.

16 My child wakes up at the same time every day.

17 My child comes to my room in the middle of the night.

18 My child engages in rough-play (running, jumping, etc.) before bed.

19 My child has caffeine (soda, chocolate, tea, etc.) in the late afternoon or evening.

20 My child does calming activities before bed (read a book, lullaby, yoga, etc.).

21 My child's room is cool and comfortable.

22 My child sleeps with a bottle or sippy cup.

23 My child sleeps with other people in the room (siblings, parent).

24 My child's room is quiet at bedtime.

25 My child uses something to feel safe at night (stuffed animal, blanket, etc.).

26 My child sleeps in his/her own room.

27 My child falls asleep in places other than their bed (couch, car, etc).

28 My child's bedroom is also used for timeout.

29 My child is sent to bed early for bad behavior.

30 My child has electronics in their bedroom (iPad, tablet, etc.).

31 My child falls asleep with the TV on.

32 My child has a TV in their bedroom.

33 My child uses electronics before bed (computer, TV, tablet, etc.).

The following questions ask for general information about you and your child.

34 Relationship to child:

- Mother
 - Father
 - Grandmother
 - Grandfather
 - Other (please state) _____
-

35 Your age (years):

36 Your highest level of education:

- Less than high school
 - High school
 - More than high school
-

37 Your ethnicity:

- American Indian/Alaska native
 - Asian
 - Black/African American
 - Hispanic or Latino
 - Multiracial
 - Native Hawaiian/Pacific
 - White/Caucasian
 - Other _____
-

38 Your child's gender:

- Male
 - Female
 - Other _____
-

39 Your child's age:

- 2 years
 - 3 years
 - 4 years
 - 5 years
-

40 Does your child have any medical or psychiatric diagnoses?

- No
 - Developmental Delay
 - Autism
 - Other _____
-

41 In the future, do you plan to talk with your child's pediatric provider about **sleep** concerns?

- Definitely
 - Very Probably
 - Probably
 - Probably Not
 - Definitely Not
-

42 In the future, do you plan to talk with your child's pediatric provider about **eating** concerns?

- Definitely
 - Very Probably
 - Probably
 - Probably Not
 - Definitely Not
-

43 Phone number

44 Which handout did you receive?

- Healthy Sleep for Kids
- Healthy Eating for Kids

Appendix E – Parent Interview Questionnaire (Phone Interview)

(Items were read to parents via telephone interview and recorded by the PI)

Hi, this is Kristin, the graduate researcher that you met at the developmental screening a couple/few days ago. How are you? Thank you again for completing the first part of the study. I'm calling in regard to the second phase of the study which involves a brief phone interview that will take less than 5 minutes of your time. Is now a good time to talk? [if not, is there a better time that I can call back?]

Voicemail: Hi, this is Kristin, the graduate researcher that you met at the developmental screening a few days ago. Thank you again for completing Phase 1 of the study. I'm calling in regard to the second phase of the study which involves a brief phone interview that will take less than 5 minutes of your time. I am also going to email/text you the link to the required questionnaire. Please let me know a better time to call back. You can call or text me at _____. Thanks and have a great day.

Please answer these questions honestly, as your opinions will help to improve this research project.

Q1 Which handout did you receive?

- Sleep
- Nutrition

Q2 Have you tried anything from the handout?

Q3 If you did try something from the handout, did you see a change in your child's sleep?

- No change
- A slight improvement
- A moderate improvement
- A major improvement
- It got worse
- n/a

Q4 What did you like best about the handout?

- easy to read
- clear instructions
- useful strategies
- length of handout (one-page)
- Other _____

Q5 Did you find the handout helpful? Did you learn anything new?

Q6 Was there any part of the handout that you had difficulty with?

Q7 Would you change anything about the handout?

Q8 How do you prefer to receive healthcare recommendations?

- written booklets/handouts
 - face-to-face
 - internet/email
 - telephone
 - other _____
-

Q9 Would you recommend this handout to a friend?

Yes

Maybe

No

Q10 Please tell about how you felt when using strategies from the handout, any experience you would like to share, or any comments or questions you have.

Appendix F – Provider Feedback Form

1. Were the study procedures feasible for the clinic setting?

2. What did you find most useful about the sleep handout?

3. What suggestions do you have to improve the sleep handout?

4. Any additional comments?

5. How likely are you to distribute to handout to parents? 1 – Not Likely, 5 – Very Likely

1 2 3 4 5

6. What barriers would prevent you from distributing the handout?

Appendix G – Study Team Protocol/Intervention Procedures Checklist

Study Team Protocol Version #1

1. Check randomization sequence to determine assigned handout. Collect intervention materials (assigned handout, iPad, consent documents). Approach potential participant.
2. Read through consent and procedures. Once consent is obtained, ask participant to complete the Sleep Hygiene Knowledge Test (KT) on the provided iPad.
3. Ask participant to read the page handout.
4. After reading the handout, inform participant that they will be contacted via their preferred method (phone, text, email) to complete another questionnaire (PSHQ), as well as be called to participate in a phone interview.
5. Provide participant with reminder slip of their prefer date and time to be contacted. Remind participant that participation in second phase is required to be included in the study.

Procedures Checklist

1. Complete PPQ on iPad (5 minutes)
2. Read assigned handout (5 minutes)
3. Complete PPQ on iPad (5 minutes)
4. Complete PPQ at home (via phone call interview 10 minutes)

Appendix H – Consent Letter



Informed Consent to Participate in Research Involving Minimal Risk

Information to Consider Before Taking Part in this Research Study

Title: Initial effects of a brief educational intervention for parents of young children

Pro # Pro00040239

Overview: You are being asked to take part in a research study. The information in this document should help you to decide if you would like to participate. The sections in this Overview provide the basic information about the study. More detailed information is provided in the remainder of the document.

Study Staff: This study is being led by Kristin Edwards who is a Doctoral Candidate in the School Psychology program at the University of South Florida. This person is called the Principal Investigator. She is being guided in this research by Dr. Kathy Bradley-Klug. Other approved research staff may act on behalf of the Principal Investigator.

Study Details: This study is being conducted with Early Steps at USF CMS Curran Children's Health Center. This study is also being conducted at a community developmental screening. The purpose of the study is to determine if a brief, educational handout is effective at increasing positive parenting practices. Participants in this study will receive a one-page written handout and will be asked to complete two, brief questionnaires. The expected duration of participation for Phase 1 is 3 minutes. The expected duration of Phase 2 is 10 minutes. Given that this is a randomized controlled trial, the true purpose of the study is withheld in order to accomplish the study objectives.

Participants: You are being asked to take part because you are the parent or guardian of a child between the ages of 2 years and 5 years.

Voluntary Participation: Your participation is voluntary. You do not have to participate and may stop your participation at any time. There will be no penalties or loss of benefits or opportunities if you do not participate or decide to stop once you start. If you are a USF employee, your decision to participate or not to participate will not affect your job status, employment record, employee evaluations, or advancement opportunities.

Benefits, Compensation, and Risk: We do not know if you will receive any benefit from your participation. There is no cost to participate. You will not be compensated for your participation.

This research is considered minimal risk. Minimal risk means that study risks are the same as the risks you face in daily life.

Confidentiality: Even if we publish the findings from this study, we will keep your study information private and confidential. Anyone with the authority to look at your records must keep them confidential.

Why are you being asked to take part?

You are being asked to take part in this study because you are a parent or guardian of a young child. Providing families with brief handouts offers a unique opportunity to significantly improve the health and quality of life of children and families.

Study Procedures:

Once consent is obtained, you will be assigned to read a one-page handout. The experimental condition and control condition will consist of a brief educational handout focused on enhancing parental knowledge. You will be randomly assigned to a condition. The random assignment sequence will be identified prior to the start of data collection and will be determined by picking cards ‘E’ (i.e., experiment) or ‘C’ (i.e., control) out of a jar. Once the sequence is created (e.g., ECEECCE), it will be repeated until data collection is complete.

After reading the assigned handout, you will be asked to complete the Parenting Questionnaire - Knowledge (PQ-K) on a provided iPad. The PQ-K is a 16-item instrument developed by the PI to obtain information concerning the knowledge of parents.

Within one week of your visit, you will be invited to participate in Phase 2 of the study, which includes a 5-minute phone interview. You will also be asked to complete the Parenting Questionnaire – Practices (PQ-P) via email, phone, or text. The PQ-P is a 43-item instrument developed by the PI to obtain information concerning the practices of parents. Below is a table that outlines the study procedures.

Phase 1

Read assigned handout. (1 minute)	Complete survey on iPad. (2 minutes)
---	--

Phase 2

Complete survey via email or phone (your preference) (5 minutes)	Phone Interview (5 minutes)
--	---------------------------------------

Total Number of Participants

About 40 individuals will take part in this study at USF.

Alternatives / Voluntary Participation / Withdrawal

You do not have to participate in this research study. You should only take part in this study if you want to volunteer. You should not feel that there is any pressure to take part in the study. You are free to participate in this research or withdraw at any time. There will be no penalty or loss of benefits you are entitled to receive if you stop taking part in this study.

Benefits

We are unsure if you will receive any benefits by taking part in this research study.

Risks or Discomfort

This research is considered to be minimal risk. That means that the risks associated with this study are the same as what you face every day. There are no known additional risks to those who take part in this study.

Compensation

You will receive no payment or other compensation for taking part in this study.

Costs

It will not cost you anything to take part in the study.

Privacy and Confidentiality

We will do our best to keep your records private and confidential. We cannot guarantee absolute confidentiality. Your personal information may be disclosed if required by law. Certain people may need to see your study records. These individuals include:

- The research team, including the Principal Investigator, study coordinator, research nurses, and all other research staff.
- Certain government and university people who need to know more about the study. For example, individuals who provide oversight on this study may need to look at your records. This is done to make sure that we are doing the study in the right way. They also need to make sure that we are protecting your rights and your safety.
- Any agency of the federal, state, or local government that regulates this research. This includes the Department of Health and Human Services (DHHS) and the Office for Human Research Protection (OHRP).
- The USF Institutional Review Board (IRB) and its related staff who have oversight responsibilities for this study, and staff in USF Research Integrity and Compliance.
- We may publish what we learn from this study. If we do, we will not include your name. We will not publish anything that would let people know who you are.

If completing an online survey, it is possible, although unlikely, that unauthorized individuals could gain access to your responses. Confidentiality will be maintained to the degree permitted by the technology used. No guarantees can be made regarding the interception of data sent via the Internet. However, your participation in this online survey involves risks similar to a person's everyday use of the Internet. If you complete and submit an anonymous survey and later request

your data be withdrawn, this may or may not be possible as the researcher may be unable to extract anonymous data from the database.

You can get the answers to your questions, concerns, or complaints.

If you have any questions, concerns or complaints about this study, call Kristin Edwards or Dr. Kathy Bradley-Klug at (813) 974-9486. If you have questions about your rights, complaints, or issues as a person taking part in this study, call the USF IRB at (813) 974-5638 or contact by email at RSCH-IRB@usf.edu.

Authorization to Use and Disclose Protected Health Information (HIPAA Language)

The federal privacy regulations of the Health Insurance Portability & Accountability Act (HIPAA) protect your identifiable health information. By signing this form, you are permitting the University of South Florida to use your health information for research purposes. You are also allowing us to share your health information with individuals or organizations other than USF who are also involved in the research and listed below.

In addition, the following groups of people may also be able to see your health information and may use that information to conduct this research:

- The medical staff that takes care of you and those who are part of this research study;
- The USF Institutional Review Board (IRB) their related staff who have oversight responsibilities for this study, including staff in USF Research Integrity and Compliance and the USF Health Office of Clinical Research.

Anyone listed above may use consultants in this research study, and may share your information with them. If you have questions about who they are, you should ask the study team. Individuals who receive your health information for this research study may not be required by the HIPAA Privacy Rule to protect it and may share your information with others without your permission. They can only do so if permitted by law. If your information is shared, it may no longer be protected by the HIPAA Privacy Rule.

By signing this form, you are giving your permission to use and/or share your health information as described in this document. As part of this research, USF may collect, use, and share the following information:

- Your phone number
- Your email address

You can refuse to sign this form. If you do not sign this form you will not be able to take part in this research study. However, your care outside of this study and benefits will not change. Your authorization to use your health information will not expire unless you revoke (withdraw) it in writing. You can revoke your authorization at any time by sending a letter clearly stating that you wish to withdraw your authorization to use your health information in the research. If you revoke your permission:

- You will no longer be a participant in this research study;
- We will stop collecting new information about you;

- We will use the information collected prior to the revocation of your authorization. This information may already have been used or shared with others, or we may need it to complete and protect the validity of the research; and
- Staff may need to follow-up with you if there is a medical reason to do so.

To revoke your authorization, please write to:

Principal Investigator

For IRB Study # Pro00040239

13101 Bruce B. Downs Blvd.

MDC 101

Tampa FL 33612

While we are conducting the research study, we cannot let you see or copy the research information we have about you. After the research is completed, you have a right to see the information about you, as allowed by USF policies.

Consent to Take Part in Research

I freely give my consent to take part in this study. I understand that by signing this form I am agreeing to take part in research. I have received a copy of this form to take with me.

Signature of Person Taking Part in Study	Date

Printed Name of Person Taking Part in Study

Statement of Person Obtaining Informed Consent and Research Authorization

I have carefully explained to the person taking part in the study what he or she can expect from their participation. I confirm that this research participant speaks the language that was used to explain this research and is receiving an informed consent form in their primary language. This research participant has provided legally effective informed consent.

Signature of Person Obtaining Informed Consent	Date _____

Printed Name of Person Obtaining Informed Consent

Appendix I: Participant Reminder Slip

Thank you for participating in this research study.
Participation in Phase 2 is required to be included in the study.

Phase 2
(10 minutes total)

Complete survey via email or phone (your preference) (5 minutes)	Phone Interview (5 minutes)
--	--------------------------------

Your Phase 2 will take place on: _____ **at** _____

Appendix J – Debriefing Statement

Post-Study Debriefing Statement

Kristin Edwards

Pro00040239

In this study, we told you that you would receive a one-page handout on parenting practices and were then asked to complete a brief questionnaire. We intentionally did not specify which type of handout you were going to receive. Some participants received the Healthy Sleep Handout and others received the Healthy Eating Handout. The process for determining which participant received which handout was random. We did not initially tell you the full nature of this study because we did not want the information to influence your behaviors during the study, as the purpose of this study was to determine if the sleep handout was effective at improving sleep hygiene practices at home. In other words, we didn't want you to feel obligated or pressured to change your sleep or eating practices just because you were participating in the study.

You are receiving this email because you were provided the Healthy Eating Handout. Attached you will find the intervention (Healthy Sleep Handout) that was assessed and used in this study.

Please know that you may choose to have your information withdrawn from the study if you wish. If you have further concerns, please contact me (the PI, Kristin Edwards) or my supervisor, Dr. Kathy Bradley-Klug, to discuss any questions about the research.

Appendix K: Pilot Study - Items Related to Validity

Thank you for completing the Pediatric Sleep Hygiene Questionnaire. The following questions are related to the clarity and structure of this questionnaire. Please answer these questions honestly, as your opinions will help to improve the accuracy of this research project.

Question 1. Were there any words in the handout or questionnaire that you did not understand?

Question 2. Was there any time that you wanted to stop participating in the study?

Question 3. Was there anything on this questionnaire that you felt should have been included and wasn't?

Optional. Do you have anything else you would like to tell us that you haven't had a chance to mention?

Appendix L – USF IRB Approval



RESEARCH INTEGRITY AND COMPLIANCE
Institutional Review Boards, FWA No. 00001669
12901 Bruce B. Downs Blvd., MDC035 • Tampa, FL 33612-4799
(813) 974-5638 • FAX (813) 974-7091

May 1, 2019

Kristin Edwards
Educational and Psychological Studies
Tampa, FL 33612

RE: **Expedited Approval for Initial Review**

IRB#: Pro00040239

Title: Initial effects of a brief educational intervention for parents of young children: Results from a pilot randomized controlled trial

Study Approval Period: 4/30/2019

Dear Ms. Edwards:

On 4/30/2019, the Institutional Review Board (IRB) reviewed and **APPROVED** the above application and all documents contained within, including those outlined below. **Please note this study is approved under the 2018 version of 45 CFR 46 and you will be asked to confirm ongoing research annually in place of a full Continuing Review. Amendments and Reportable Events must still be submitted per USF HRPP policy.**

Approved Item(s):

Protocol Document(s):

[Protocol, Version #1, 4.24.19](#)

Consent/Assent Document(s)*:

[Informed Consent, Version #1, 4.24.19.pdf](#)

*Please use only the official IRB stamped informed consent/assent document(s) found under the "Attachments" tab. Please note, these consent/assent documents are valid until the consent document is amended and approved.

(continued)

It was the determination of the IRB that your study qualified for expedited review which includes activities that: (1) present no more than minimal risk to human subjects, and (2) involve only procedures listed in one or more of the categories outlined below. The IRB may review research through the expedited review procedure authorized by 45 CFR 46.110. The research proposed in this study is categorized under the following expedited review category:

(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

As the principal investigator of this study, it is your responsibility to conduct this study in accordance with IRB policies and procedures and as approved by the IRB. Any changes to the approved research must be submitted to the IRB via an Amendment for review and approval. Additionally, all unanticipated problems must be reported to the USF IRB within five (5) business days.

We appreciate your dedication to the ethical conduct of human subjects research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

A handwritten signature in blue ink that reads "Melissa Sloan". The signature is fluid and cursive, with a large loop at the end.

Melissa Sloan, PhD, Vice Chairperson
USF Institutional Review Board