

2023

Sleep practice in occupational therapy: an educational program to improve sleep quality for autistic children

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BOSTON UNIVERSITY
SARGENT COLLEGE OF HEALTH AND REHABILITATION SCIENCES

Doctoral Project

**SLEEP PRACTICE IN OCCUPATIONAL THERAPY:
AN EDUCATIONAL PROGRAM TO IMPROVE SLEEP QUALITY
FOR AUTISTIC CHILDREN**

by

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Submitted in partial fulfillment of the
requirements for the degree of
Doctor of Occupational Therapy

2023

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DEDICATION

I dedicate this work to my former autistic student Yan and her parents. They have shared their experiences with sleep challenges and allowed me to be part of their journey in overcoming sensory and sleep difficulties, one day at a time.

ACKNOWLEDGMENTS

I would like to express my deep gratitude to Dr Lisa Marnell for her efficient and professional supervision, enthusiastic inspiration, and valuable critiques throughout this research project. She gave prompt advice on this project, supported my career development, and shared insightful clinical experience in serving autistic children. Lisa is extremely knowledgeable and resourceful in her guidance throughout my OTD journey. I am tremendously grateful for her teaching and support.

A sincere appreciation for my family. My husband and children have always cheered me on with positive encouragement and taken up additional family chores to allow time and space for my project planning and writing. Most importantly, I want to thank God for giving me a supportive family, a rewarding and meaningful occupational therapy career, and an opportunity for post-professional training at Boston University.

Finally, I wish to thank all my circle of advisors for guiding this project. Dr Elaine Chiu shared her extensive knowledge, skills and experience in her OT practice. Dr Andrew Siu has given me valuable insights into sleep assessment and data collection. Professor Sidney Chu has taught me the importance and utilization of sensory assessment for children with diverse needs. Special thanks to Professor Karen Jacobs, the occupational therapy online doctorate program director for Boston University, for her continuous support and encouragement. Dr. Jacobs once told me that learning is limitless. Her teaching philosophies are truly inspiring. I am honored to be part of the Boston University OT professional learning community.

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MAN YEE DAPHNE IP

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ABSTRACT

Sleep is a critical occupation that supports and promotes participation in occupational performance in all individuals (AOTA, 2014). It builds the foundation for cognitive development and supports learning in children (Ashworth et al., 2014; Schlieber & Han, 2018; Kurz et al., 2019). Children with poor sleep habits may exhibit dysregulation in their daytime activity level (Foitzik & Brown, 2018; Johnson et al., 2017). Consequently, sleep difficulties affect their academic performance and social participation at school (Taylor et al., 2012; Deliens & Peigneux, 2019). Sleep problems in autistic children are two to three times greater than in neurotypical children (Moore et al., 2017; Souders et al., 2017). Of further concern is that a significant increase in sleep problems in autistic children has been associated with the Covid-19 pandemic (Bruni et al., 2022).

Occupational therapy practitioners (OTPs) in schools recognize the importance of sleep as an essential building block for learning (Beisbier & Cahill, 2021; Gronski & Doherty, 2020) and specialize in assessing sensory behaviors using evidence-based assessments (Kirby et al., 2019; Schoen et al., 2018). However, due to a lack of sleep

knowledge and resources, many school-based OTPs do not address sleep problems during the assessment and intervention process (Gentry & Loveland, 2013). Sensory assessments can help to detect atypical sleep patterns and inform a proactive approach to nurturing a healthy lifestyle (Tauman et al., 2017; Reynolds et al., 2012). OTPs are encouraged to provide sensory-informed sleep health education and consultation to support autistic children in school-based practice.

A literature review was completed based on current occupational therapy (OT) practice in sleep care. Several key findings suggested that (a) the teaching and clinical training in sleep health are lacking in formal OT educational programs, (b) teachers are unaware of OT scope of practice, and (c) most OTPs in school experience heavy caseloads and have time constraints which may hinder interdisciplinary collaboration and family partnership. Furthermore, research studies from OT, psychology, neuroscience, and education were identified and carefully reviewed to determine effective therapies that fall within the scope of OT practice. Through this doctoral work, an evidence-based educational program was developed for OTPs to fill this practice gap and address sleep difficulties in autistic children within the school setting.

Sleep Practice in Occupational Therapy (SPOT) is a research-informed program for OTPs who provide school-based services to autistic children in Hong Kong. The main objective of this program is to extend OT school-based practice in areas of sleep assessment, intervention, interprofessional collaboration, and family partnership within this student population. This four-week online educational course consists of mini-lectures on the neurobiological evidence in sleep in autistic children, multiple group

discussions regarding sleep health education, and individual work projects to build competence in sleep assessment and intervention. Upon completion, OTP participants will be equipped with evidence-based sleep hygiene resources and sleep health educational presentation materials generated by the program author. Qualitative and quantitative data will be collected for program evaluation and to inform the efficacy of this OT-led sleep health education program in school settings. It is anticipated that the SPOT program will advance our professional service delivery and advocacy within schools and, ultimately, improve the academic learning and quality of life in autistic children. Furthermore, this training program is applicable to school-based OT practice in other geographic regions of the world that advocate for an inclusive approach to serving children with diverse sensory needs.

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LIST OF ABBREVIATIONS

ABA.....	Applied Behavioral Analysis
AOTA.....	American Occupational Therapy Association
ATN.....	Autism Treatment Network
CBCL.....	Child Behavior Checklist
CBT.....	Cognitive Behavioral Therapy
CPD.....	Continuous Professional Development
CSHQ.....	Children’s Sleep Habits Questionnaire
ELT.....	Experiential Learning Theory
ESF.....	English Schools Foundation
FISH.....	Family Inventory Sleep Habits
HKOTA.....	Hong Kong Occupational Therapy Association
IEP.....	Individualized Education Plan
OT.....	Occupational Therapy
OTPF.....	Occupational Therapy Practice Framework
OTPs.....	Occupational Therapy Practitioners
SBOT.....	School-based Occupational Therapy
SEN.....	Special Educational Needs
SNAG.....	Special Needs Advisory Group
SPOT.....	Sleep Practice in Occupational Therapy

CHAPTER ONE – Introduction

Sleep is a critical component that supports and promotes occupational performance participation (AOTA, 2014). Several theories explain why sleep is crucial as a basic human need (Ezenwanne, 2011). Katz & Malow (2014) posited that the restorative theory of sleep described how bodily functions are under regeneration during sleep and that sleep plays an essential role in child development, particularly for autistic children. The restorative theory explains how sleep improves our immune system, muscle growth, emotional regulation, and brain function. A recent study stated that children who suffer from chronic sleep deprivation are at risk for obesity and type II diabetes due to dysregulated hormonal activities (Bonanno et al., 2019).

Sleep also plays a crucial part in cognitive development and supports children's learning (Ashworth et al., 2014; Kurz et al., 2019). There is mounting evidence that sleep is a pivotal occupation for our physical and psychological well-being (Schlieber & Han, 2018). Referencing the International Classification of Functioning, researchers have established guidelines to measure sleep health status according to body functions and structures (mental, sensory, and movement functions), activities and participation (carrying out daily activities and interpersonal relationships), and environmental factors (Gradinger, 2011). To promote good quality and healthy sleep, we must define the optimal sleep variables for children. Sleep-wake regulation is a complex neurophysiological process, and it changes over time, especially in the early years of children (Bathory & Tomopoulos, 2017). According to the National Sleep Foundation, researchers have established the recommended sleep durations for preschoolers to school-

aged children ranging from 10 to 13 hours per night (Hirshkowitz et al., 2015). Optimal sleep is determined based on sleep quality, timing, architecture, consistency, and continuity (Matricciani et al., 2013).

The Nature of the Problem

Sleep disturbance is a common problem identified by parents of autistic children (Couturier et al., 2005; Jan et al., 2008; Kotagal & Broomall, 2012; Reynolds et al., 2012). The increased mental health-related problems are linked to sleep disturbance in this population of children (Reynolds et al., 2012; Kotagal & Broomall, 2012). Children with poor sleep habits would exhibit dysregulation in their daytime wakefulness which affects their academic performance and social participation at school (Taylor et al., 2012; Deliens & Peigneux, 2019). Studies have suggested that sensory processing is linked to sleep quality in children (Foitzik & Brown, 2018; Appleyard et al., 2020). Sensory modulation is closely associated with circadian cycle regulation, affecting sleep quality (Reynolds et al., 2012; Rajaei et al., 2020). Autistic children have a high prevalence of sensory processing difficulties (Roley et al., 2015). Atypical sensory sensitivity (poor sensory modulation) affects social participation and could disrupt other occupational performances in these children.

Autistic children who experience sensory modulation issues are particularly vulnerable and require additional structured day and nighttime activities (Kotagal & Broomall, 2012). Also, having sleep problems could cause parenting stress and negatively impact family functions (Malow et al., 2014). In the recent review by Deliens & Peigneux (2019), they propose a bidirectional relationship between sleep problems and

autism symptoms. In essence, the causes of chronic sleep disruption are multifactorial.

Interventions to Address the Problem

There is moderate to strong evidence that behavioral and pharmacological approaches are used in the assessment and intervention of pediatric insomnia (Souders et al., 2017; Buckley et al., 2020). Sleep education is often the first line of treatment for children who suffer from chronic sleep deprivation and their families. Parents are encouraged to modify undesirable bedtime habits by establishing a structured routine and utilizing positive behavioral strategies and environmental adaptations at home (Malow et al., 2014). Behavioral and pharmacological management are common interventions recommended by pediatricians and clinical psychologists (Malow et al., 2012). They have proposed a practice pathway for insomnia in autistic children and suggested that pediatricians and primary care providers take proactive measures to screen all autistic children for insomnia, teach parents behavioral strategies, and increase good sleep hygiene.

The Role of Occupational Therapy

According to the Occupational Therapy Practice Framework (OTPF) (AOTA, 2020), sleep is a crucial occupation that supports other domains. Sleep is further defined as two components: sleep preparation and sleep participation. It is essential to regulate a consistent sleep-wake cycle in a supported environment and promote physical and mental wellness (Green, 2008). The American Occupational Therapy Association (AOTA) reclassified sleep and rest as an occupational domain and emphasized sleep activity as an occupation and participation (Gentry & Loveland, 2013). This organization states that it

is crucial to foster collaboration with fellow therapists, physicians, and clinical psychologists in serving children with chronic sleep issues.

Occupational therapy practitioners (OTPs) are encouraged to proactively engage in schoolwide activities to promote physical and mental health in a population health approach (AOTA, 2014). School-based occupational therapists (SBOTs) should advance their knowledge and skills in sleep, integrate them into their practice, and facilitate interdisciplinary collaboration with other health disciplines (Tester & Foss, 2018).

However, many occupational therapists do not feel equipped to address sleep difficulties in school (Fung et al., 2013). In the recent study by Seruya & Garfinkel (2020), it is reported that there is a lack of resources and training in evidence-based practice in addition to other barriers such as the lack of administrative support, high caseload numbers, and lack of time. The study also states that SBOT practitioners continue to deliver the intervention in a pull-out service delivery model and work with students in the therapy room (Seruya & Garfinkel, 2020). This doctoral project aims to empower SBOT practitioners to engage in sleep education, improve sleep hygiene for children with sleep disturbance and their families, and increase awareness of sleep health for the wider school community.

The Approach to Address the Problem

As will be presented in this dissertation, Sleep Practice in Occupational Therapy (SPOT) is an educational program developed for school-based occupational therapy practitioners to address sleep hygiene in autistic children. The primary objective of the SPOT program is to advance school-based occupational therapy (OT) practice in areas of

sleep assessment, intervention, interprofessional collaboration, and family partnership within this student population.

Recipients of the Program

The key audience of the SPOT program is school-based OTPs. The author intends to educate these participants to cultivate their understanding of the significant impact of sleep health on the occupational performance of autistic children. OT participants will learn practical strategies to promote sleep hygiene in schools. Additionally, the SPOT program will prepare OTPs to deliver sleep health education to teachers, school administrators, other health disciplines, and parents and to build partnerships with these groups to maximize the health benefits to children.

The SPOT Program in Greater Context

The long-term outcome of the SPOT program is to enhance the quality of sleep for young autistic children to improve their physical health, physiologic function, academic engagement, and emotional regulation. Yet, another far-reaching goal of the program is to strengthen OT-led health education in schools. SPOT program participants will foster their confidence, leadership, and OT advocacy skills by addressing sleep health in autistic children and by working collaboratively with teachers and other school health professionals. Furthermore, addressing optimal sleep function is an essential step toward raising the awareness of mental wellness in all children and their parents (Stuttard et al., 2015; Ho & Siu, 2018). In turn, it is hoped that positive health improvement outcomes will increase social participation and school involvement in autistic children.

CHAPTER TWO – Project Theoretical and Evidence Base

Overview of the Problem

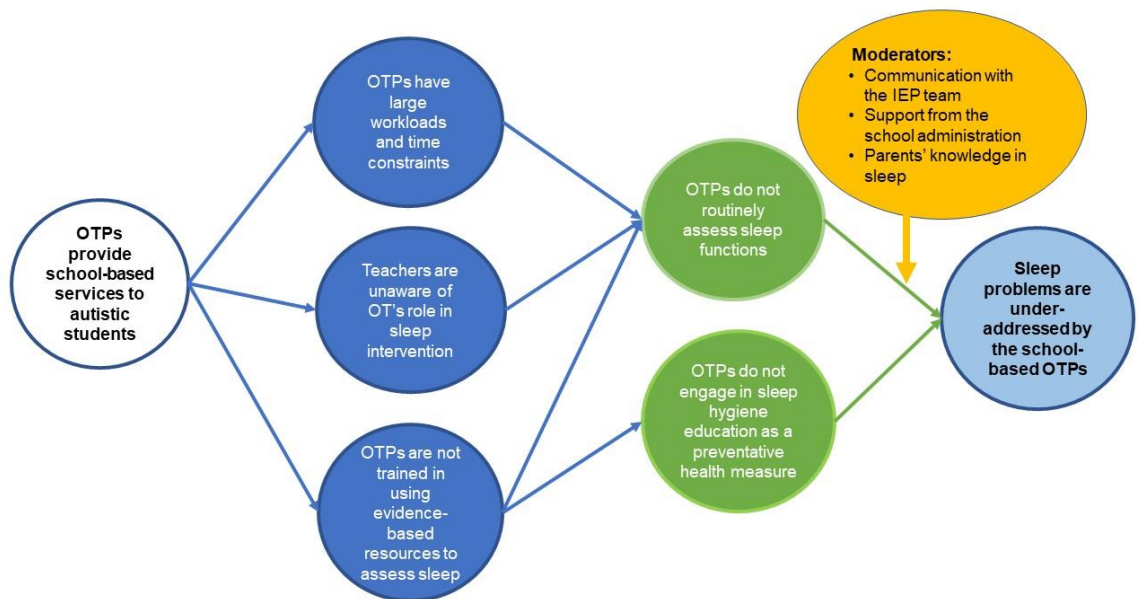
School-based OTPs provide therapeutic interventions and consultations for students with special learning needs through a collaborative approach with teachers and other health professionals (Spencer et al., 2006; Anaby et al., 2018). Recent studies have indicated that school-based OTPs experience heavy caseloads in school settings across the United States, United Kingdom, Canada, and Australia (Mills & Chapparo, 2018; O'Donoghue et al., 2021; Seruya & Garfinkel., 2020; Phoenix et al., 2021). OTPs face ongoing challenges in providing student services and collaborating with school teaching professionals (Hart Barnett & O'Shaughnessy, 2015). The lack of interprofessional collaboration will jeopardize the contribution of occupational therapy in schoolwide health promotion and prevention programs (Seruya & Garfinkel., 2016).

According to a recent systematic review, school-based sleep education programs significantly promote sleep health in children and youth (Rigney et al., 2021). However, studies have shown that school-based OTPs are not involved in sleep assessment and promotion at the school level (Wooster et al., 2015; Gruber et al., 2019). Formal OT educational programs lack teaching and clinical training in sleep health (Tester & Foss, 2018). In school settings, teachers may not be widely aware of the OT scope of practice, leading to the slow progression of interdisciplinary collaboration (Cahill et al., 2014). School-based OTPs are aware of sleep as an essential function, and it is considered within our scope of practice. However, sleep problems are often assessed using non-standardized assessments with no progress tracking (Tester & Foss, 2018). There is a lack

of sufficient time for effective partnership between the teachers and OTPs due to the heavy caseload, scheduling conflicts, and limited time embedded for interprofessional collaboration from the school administrative level (Hart Barnett & O'Shaughnessy, 2015). The problem addressed by this doctoral project is described in the explanatory causal pathway presented in Figure 2.1.

Figure 2.1

Explanatory Causal Pathway



The Experiential Learning Theoretical Framework

Experiential Learning Theory (ELT) describes learning as a holistic process of creating knowledge and adapting it to the world (Lee et al., 2016). In 1984 David Kolb, an American educational theorist, proposed that effective learning happens through the stages of experiencing, reflecting, thinking, and acting (Fewster-Thuente & Batteson, 2018). According to the ELT, learning is an ongoing process, and effective learners can balance the learning cycles of grasping the experience and transforming it through

reflective observation and active experiments (Regoniel, 2021). In this doctoral project, the ELT was applied to deepen the understanding of the challenges and barriers in assessing the occupation of sleep in autistic children in school-based practice.

Application of Experiential Learning Theory to the OT Practice in Sleep

The first assumption of ELT proposes that learners will gain substantial professional and educational experience, and consequently, new knowledge will inform better practice and personal growth (Kitchie & Arnaud, 2020). The increased knowledge will scaffold the learning for future organizational development (Norwich University Online, 2017). In the Occupational Therapy Practice Framework, sleep and rest are identified as one of the occupations that should be included when assessing occupational performance and participation (AOTA, 2020). OTPs might be aware of our scope of practice in the occupation of sleep. Fung et al. (2013) argued that OTPs are well-positioned to enhance the scope of practice in sleep health. However, there is a gap in assessing sleep in OT practice. Sleep difficulties in people with neurological impairments are often viewed as secondary problems in the OT assessment (Tester & Foss, 2018). The authors further emphasize that OTPs are not addressing sleep as an occupation but continue to state sleep function as an activity of daily living. The lack of addressing sleep occupation in school practice could potentially become a barrier to clinical and professional growth.

The second assumption of ELT suggests that learners expand their experiences through reflective observation and develop new strategies or ideas to aid clinical reasoning (Lee et al., 2016). Therapists are encouraged to have sufficient supervision and

time allowance to reflect on their work with clients to foster effective learning (Caron et al., 2021). However, a recent study shows that reflective practice through supervision is not regularly encouraged, reducing practitioners' clinical reasoning skills development (Guy et al., 2020). Due to the time restraints and lack of resources at schools (Seruya & Garfinkel, 2020), school-based OTPs may be at risk of lacking optimal clinical supervision and resources to develop evidence-based knowledge for professional growth.

The ELT further proposes that learners continue testing, revising, and conceptualizing their experiences. This process will help identify strengths, inadequacies, and areas for improvement (Lee et al., 2016). The ELT has been applied in team learning in addition to the traditional focus on individual learners (Fewster-Thuente & Batteson, 2018). The role of teachers and related service providers are distinctive and require constant collaboration to support students' needs (Gosselin & Sundeen, 2019). Effective collaboration enhances interdisciplinary learning opportunities through active experimentation and risk-taking (Fewster-Thuente & Batteson, 2018). Teachers may have extensive knowledge of students, however, they are often unprepared to support students' various learning needs in schools (Mills & Chapparo, 2018). Due to time constraints, teacher-therapist collaboration and implementation of therapeutic strategies in the classroom can be challenging (Gosselin & Sundeen, 2019). The lack of cooperation with teachers may lead to unawareness of the OT scope of practice, leading to fragmented OT service provision.

The final assumption identifies learning as a process of receiving training on effective strategies followed by practical application in real-life situations. It will involve

re-evaluation, revision, or reinvention through experiments and testing (Lee et al., 2016). According to a recent systematic review, a school-based sleep education program has shown its significance in promoting sleep health in children and youth (Rigney et al., 2021). However, there is a lack of evidence that school-based OTPs are involved in sleep assessment and health promotion activities (Boerner et al., 2015; Wooster et al., 2015; Gruber et al., 2019). Evidence demonstrates that OTPs do not use standardized sleep assessment tools. Therefore, it is challenging to establish levels of impairment, track progress, and validate medical reimbursement. A recent Australian study suggests that many health professions can contribute to the screening, diagnosing, and treating of sleep disorders in children. However, this evidence concluded that only a relatively small proportion of young people receive evidence-based sleep care (Richardson et al., 2021). The researchers further identified that the contributing factors were the lack of sleep knowledge, training, and clinical practices among health professionals in pediatric care. As a result, it is incredibly challenging for school-based OTPs to actively implement effective sleep health education when the knowledge base and clinical training are limited.

In summary, the experiential learning theory serves as the lens to deepen the understanding of the current challenges for school-based OTPs in promoting sleep health in the school environment. The OT Practice Framework (AOTA, 2020), clinical knowledge, and expertise may not be fully transformed to deliver optimal services due to the lack of administrative support and insufficient collaboration with other teaching and health professionals in a school setting. OTPs are urged to consistently reflect on and

transform their practices to meet the needs of the changing world, especially in leading mental health wellness in schools. There is an insufficient understanding and practice in transforming OT expertise from clinical practice to a leading role in the multidisciplinary team (Shams et al., 2019). The traditional role of SBOT requires a continuous reflection to scaffold the lived experiences and inform contemporary practice in promoting sleep care as a vital component in mental health wellness.

An Overview of the Proposed Explanatory Model

Numerous research studies have suggested that sleep problems reported in autistic children are closely linked to sensory sensitivity and anxiety (Richdale & Schreck, 2009; Reynolds et al., 2012; Kotagal & Broomall, 2012; Mazurek & Petroski, 2014; Carpenter et al., 2018; Foitzik & Brown, 2018; Ballester et al., 2020). Sleep is a vital area of occupation that fuels daily occupational performance and social participation (AOTA, 2020). OTPs are well-positioned to address sleep-wakefulness issues in relation to learning and social participation in the school environment. However, due to time constraints, high caseload numbers, unawareness of the OT scope of practice, and the lack of sleep knowledge and resources, sleep problems in children with diverse needs are not being addressed during the OT assessment and intervention (Gentry & Loveland, 2013).

In school practice, interprofessional collaboration is an essential component in service delivery to improve student learning outcomes and participation (Hart Barnett & O'Shaughnessy, 2015). School-based sleep education and intervention need to be anchored in holistic care and support from schools and parents. A cohesive partnership

with teachers and school health professionals can strengthen the role of each team member and effectively address the needs of the students. In contrast, poor communication amongst the teaching team will challenge successful collaboration. The support and allocation of financial resources from school administrations may vary, impacting the degree of collaboration (Phoenix et al., 2020). Studies have found that parents experience stress from the sleepless child at home and need professional support in learning sleep health information for autistic children (Malow et al., 2016). Parents may not be informed of the importance of a balanced sleep-wake routine at home and the specific sensory processing knowledge linked to sleep in autistic children (Schoen et al., 2017; Veatch et al., 2016).

There is a growing need to improve OT services to raise health and well-being awareness in the community, such as within the school environment (Reitz et al., 2020). By addressing the above causal factors associated with the gap in the school-based sleep health practice, OTPs are urged to reflect on their current practice. Sleep health promotion in autistic children can be incorporated through the process of OT assessment, intervention, parental health education, and interprofessional collaboration.

Evaluative Summary

Key Element: OT Knowledge in Sleep Care and Service Transformation in Health

Promotion

In 2008, the AOTA officially reclassified sleep from an activity of daily living to an area of occupation in the OTPF: Domain and Process (AOTA, 2008). Given that this change occurred within the last 15 years, there has been insufficient knowledge, training,

and research to support the status and qualities of OT regarding the occupation of sleep. OT researchers have begun examining sleep care in children and discussed using sleep screening tools such as questionnaires and sleep logs to measure sleep patterns in children (Fjeldsted & Hanlon-Dearman, 2009; Green, 2008).

While there is a need to address sleep and incorporate it into the OT assessment, there are limited learning opportunities in the educational curricula and professional learning workshops regarding the evaluation and intervention of sleep within OT practice (Green, 2008; Fung et al., 2013; Faulkner & Mairs, 2015; Tester & Foss, 2018). Gentry & Loveland (2013) discussed that OT programs offered little sleep management training, which might lead to the limited research effort on sleep health in the OT scope of practice. Many OTPs continue to address sleep concerns as an activity of daily living. Hence, it is difficult to establish baseline levels of impairment, report progress, and justify medical reimbursement (Ganjikia & Gansor, 2015). It was also found that most OTPs have used non-standardized methodologies to collect sleep data (Tester & Foss, 2018).

Additional evidence reveals insufficient sleep knowledge and training in Canadian health professionals. When encountering sleep problems, they may rely on common beliefs rather than evidence-based knowledge and resources (Boerner et al., 2015a). Non-sleep health professionals lack sleep knowledge and training from their educational curriculum to implement and support behavioral change and childhood sleep problems (Boerner et al., 2015b). In a recent study in Australia, pediatric sleep knowledge has not been emphasized by psychologists, social workers, and occupational

therapists, which leads to a gap in providing evidence-based practice and effectively addressing sleep disturbance in children (Richardson et al., 2020). According to a study in the Netherlands, most healthcare professionals (including OTPs) did not have sufficient sleep knowledge to address sleep in children with developmental disabilities and their parents (Hulst et al., 2020). As a result, health professionals might experience low perceived competence to address sleep problems adequately, and sleep problems are left unaddressed and untreated.

Key Element: Addressing the Occupational Need for Sleep in School Practice

In reviewing the current role of OTPs in school practice, it is imperative to address function and participation that are meaningful to parents and families, which often involve performance in areas such as play, sleep, activities of daily living, and social participation (Schaaf et al., 2018). Studies have shown that sleep problem is one of the most common concerns identified by parents of autistic individuals in community settings (e.g., hospitals and early intervention clinics) (Halliwell et al., 2021; Little et al., 2018). However, sleep assessment, intervention and education have not been widely addressed to meet the needs of children with diverse needs (Faulkner & Mairs, 2015; Tester & Foss, 2018).

Over the past decade, OT researchers have examined the association between physiologic responses to sensation and sleep in children experiencing sensory challenges (Reynolds et al., 2012; Reynolds et al., 2015; Applegate et al., 2020). Other OT studies investigated the application of weighted blankets for sleep and their impact on sleep quality in autistic children (Gee et al., 2017; Gee et al., 2021). A feasibility study of the

aquatic sensory program was completed by OT researchers on autistic children with sleep disturbance (Lawson & Little, 2017). There is a rising need for further research studies in OT sleep health assessment and intervention in children. In a recent systemic review, the authors included 196 articles to examine OT practice guidelines; 19 of the 196 studies are sleep and rest-related (Clark et al., 2020). This review found moderate-strength evidence to support parent training as an intervention method to address sleep in young children aged 2 to 5. In a separate systematic review examining interventions to address activities of daily living, sleep, and rest in OT practice, only five out of 28 studies related to sleep and rest for children aged 5 to 21 (Beisbier & Laverdure, 2020). Sleep care in children has not yet been acknowledged as a widely researched topic in the OT field.

Key Element: Partnership with Teaching and Other Health Professionals

School-based OTPs can support mainstream school settings to facilitate teaching and learning outcomes in learners with diverse needs. To embrace the trend of inclusion and the contemporary conceptualization of disabilities, it is important to adopt innovative ways to support the differences rather than remediate impairments (Chen & Patten, 2021). OTPs can measure and address school environments to improve social inclusion and participation and all areas of occupational performance in children (WFOT, 2016). To achieve this mission, partnership with teachers, other school health professionals, and parents is vital through the process of sharing knowledge and respecting experiences. In reference to Part C of the Individuals with Disabilities Education Improvement Act of 2004 (Lipkin et al., 2015), OTPs must collaborate with other early childhood and school

professionals to support the physical, communication, cognitive, adaptive, and social-emotional domains of infants and toddlers.

School-based OTPs across the United States have implemented effective strategies and therapeutic interventions under the Response to Intervention (RTI) model (CaHill et al., 2014; Jasmin et al., 2018). In a national survey of school-based OTs about their experience implementing the RTI model, CaHill et al. (2014) summarized that school personnel typically did not understand the full scope of OT practice and this directly impacted the collaboration and service provision. CaHill & Egan (2017) examined the teaching professionals' perception of OT contribution to school-based mental health services. The authors have identified that teaching professionals (i.e., psychologists and social workers) have a limited view of OT's role in mental health and that team members often frame their understanding of the scope of occupational therapy based on their limited personal experience. A similar finding was revealed in a recent unpublished study completed by Bradley et al. (2020) but could not be presented due to online event limitations. The researchers examined general education teachers' perceptions of collaborating with school-based OTPs. They have found that teachers value collaboration with OTPs but do not fully understand the role of OT, which may diminish the effectiveness of partnership (Bradley et al., 2020).

In Australia, studies revealed that teachers were unaware of the OT scope of practice in schools and expressed the need for occupational therapists to understand classroom routines and the teacher's role by spending time in the classroom, explaining their position, and building relationships (Kennedy & Stewart, 2012; Rens & Joosten,

2014; Mills & Chapparo, 2018). Mills & Chapparo (2018) explained that teachers valued working closely with OTs in the classroom. However, the barriers such as limited time and staffing have hindered the collaboration and implementation of therapeutic strategies in classrooms.

Interprofessional collaboration is paramount in the educational system for children with diverse needs. Sinai-Gavrilov et al. (2019) examined professionals' experiences from different disciplines in the Israeli autistic community preschool settings. The finding suggested a lack of a clear description of each member's role and inadequate operational direction from the team.

In Canada, Partnering for Change (P4C) (Missiuna et al., 2017) has been adopted as a research-based model for Canadian OTPs to work collaboratively with classroom educators to observe, identify and support children. Studies have highlighted the need to strengthen interprofessional collaboration in schools for students' success (Kennedy & Steward, 2012; Gosselin & Sundeen, 2019). Researchers have found that the barriers to effective teacher-therapist collaboration included inconsistent therapist support, insufficient teacher training, and lacking perceptions of the OT scope of practice (Wilson & Harris, 2018; Phoenix et al., 2020).

Sleep problems can impact all areas of occupation, growth and learning in all children. Key findings reveal the practice gap in school-based OT services due to the lack of sleep knowledge and clinical training across the globe. The problem identified by this explanatory causal pathway strongly validates the development of evidence-informed sleep practice training for OTPs who serve in the autistic community.

CHAPTER THREE – Overview of Current Approaches and Methods

Introduction

The impacts of sleep dysregulation in autistic children are wide-ranging and include alterations in emotional regulation, cognitive functions, and academic learning (Schreck & Schreck, 2020). Screening and intervention for pediatric sleep disturbances are primarily addressed by clinical practitioners such as pediatricians, psychiatrists, clinical psychologists, and neurologists (Malow et al., 2012; Kirkpatrick et al., 2019; Rana et al., 2021). Parental sleep education and strategies are delivered in a variety of methods, ranging from informational pamphlets to brief workshops led by trained health clinicians (Malow et al., 2014). In the recent decade, clinical psychologists and psychiatrists have developed different sleep education programs to address sleep problems in children with additional needs (Malow et al., 2012; Hunter et al., 2020).

A thorough review of the literature was performed to identify studies and revealed relevant evidence on the topic of sleep health management and intervention for children in clinical and community settings such as schools. Academic literature and commercial non-fiction books were examined from various disciplines, including occupational therapy, psychiatry, psychology, nursing, and public health, using the search engines CINAHL, PsychINFO, and PubMed. Terms used within searches included a combination of keywords such as sleep problems, dysregulation, disturbance, sleep health, sleep hygiene, education, intervention, treatment, assessment, preschoolers, autism, autism spectrum disorder, preschoolers, and children.

In reviewing the literature regarding sleep treatment guidelines, sleep researchers

suggested that an initial clinical assessment of sleep problems is critical and is often overlooked (Rana et al., 2020; Ballester et al., 2020). The findings show minimal evidence of sleep health practice in school settings for the autistic population. Also, screening and intervention for pediatric sleep disorders within schools are not widely documented (Faulkner & Mair, 2015). It can be concluded that the work of integrating sleep health practice in the school setting has yet to be fully explored by OTPs.

Evaluative Summary

The Importance of Clinical Sleep Assessment and Guidelines

According to the literature review, autistic individuals are more susceptible to sleep dysregulation, possibly due to the pathophysiology of autism, such as abnormalities in the cortisol and melatonin profiles, mutations in circadian-relevant genes, or co-existing psychiatric disorders (Schreck & Richdale, 2020; Malow & McGrew, 2020; Rana et al., 2020). A thorough medical assessment is vital first to treat the health conditions related to poor sleep, such as gastrointestinal disorders, allergies, respiratory disorders, and epilepsy (Reynolds et al., 2019; Deliens, & Peigneux, 2019). Early sleep research suggested using clinical intervention guidelines to assess and guide sleep intervention for autistic children (Malow et al., 2014). Such an approach was primarily developed by pediatric neurologists, psychiatrists, and pediatricians to guide the management of pediatric insomnia. The researchers have suggested that all autistic children should have a sleep health screening by their general pediatricians or primary care providers (Johnson et al., 2018).

Surveys and questionnaires are frequently employed to evaluate children's sleep

habits and difficulties in reviewing sleep-related literature. The Children's Sleep Habits Questionnaire (Malow et al., 2014) is the most used measure in sleep research studies; it asks parents of children ages 3 to 10 to report on several different aspects of children's sleep, including possible medical concerns (Mazurek & Petroski, 2014; Moore et al., 2017; Johnson et al., 2017). Actigraphy and sleep diary data are often used to establish a baseline and track progress (Malow et al., 2014; Weiss & Hung, 2020).

The Autism Treatment Network (ATN) recognizes the importance of evidence-based sleep care training for health professionals and formed a sleep committee to collect data on sleep research and interventions (Souders et al., 2017). ATN comprises multidisciplinary medical practitioners and researchers in North America for autistic children (Autism Speaks, 2019). Based on numerous intervention studies and the consensus of sleep experts, a sleep practice pathway was devised and has been cited in several sleep research studies in autistic children (Souders et al., 2017; Rana et al., 2020; Buckley et al., 2020; Hunter et al., 2020).

Most of the articles reviewed have campaigned for the need to increase sleep knowledge in parents and caregivers through an individualized educational approach and practical strategies (Adkins et al., 2012; Malow et al., 2014; Stuttard et al., 2015; Kirkpatrick et al., 2018). It is essential to have a timely follow-up to monitor the progress and tailor intervention strategies when providing sleep education (Malow et al., 2014; Souders et al., 2017). The ATN Practice Pathway offers a systematic approach to guide healthcare professionals in addressing sleep problems in clinical and community settings. Medical screening and parental sleep education should be discussed at the initial stage

and followed by sleep interventions according to the needs of the child (Souder et al., 2017). Table 3.1 shows the ATN 10-step Practice Pathway for autistic children.

Table 3.1

ATN Practice Pathway

Step	ATN Sleep Practice Pathway
1	Screen all autistic children for insomnia with a sleep questionnaire annually
2	Identify any parent or child sleep concerns and discuss
3	Screen for medical conditions that may be contributing to insomnia an refer to appropriate sub-specialist
4	Treat any medical conditions significantly affecting sleep before continuing with the practice pathway
5	Determine the willingness and capacity of the family to implement a sleep intervention
6	The first-line approach is parent education about environmental modification, positive bedtime routines, and behavioral strategies
7	Introduce the ATN Sleep Tool Kit and educational materials with visual schedule
8	If the family is unable or unwilling to follow environmental and behavioral strategies, consider consultation to a sleep specialist
9	Pharmacological interventions may be considered, start with melatonin
10	Timely follow-up in 2-4 weeks for all interventions

Effectiveness of Parental Sleep Education

Several studies described the benefits of interactive parental sleep education by trained health professionals, leading to improved parenting competency and quality of life for parents (Stuttard et al., 2015; Hunter et al., 2020). As suggested by sleep researchers, the provision of parental education should be considered the first line of intervention (Reynolds et al., 2019). Evidence revealed that the standalone sleep education pamphlets and online sleep toolkits are insufficient for families with autistic children and may require more support and tailored strategies (Malow et al., 2014; Souders et al., 2017; Kirkpatrick et al., 2018).

Regarding the mode of sleep education, studies have found no significant statistical difference between group versus individual approaches (Kirkpatrick et al., 2018). Both learning methods have reduced sleep latency with a satisfactory rating from

parent participants (Malow et al., 2014; Souders et al., 2017). Researchers have found improvements in sleep duration and behaviors in children with developmental disabilities, including autism, by parents teaching sleep hygiene and supported by a trained sleep health educator (Malow et al., 2016; Sutton et al., 2020). It was also suggested that home visits and observation by the professional who supports the family in sleep education would add value to the sleep intervention (Kirkpatrick et al., 2018).

Effectiveness of Sleep Medications

Given the continuous effort in sleep medicine research studies, sleep education is advised to be provided before the trial or regular use of sleep medications in autistic children (Sounders et al., 2017; Rana et al., 2020; William Buckley et al., 2020). Studies have found that if sleep medications were given in the absence of therapeutic interventions, disruptions to sleep patterns would return once the pharmacological agent was discontinued (Malow & McGrew, 2020; Ballester et al., 2020). Recent studies suggested that melatonin could effectively treat insomnia in autistic children (Reynolds et al., 2019; Ballester et al., 2020). It is strongly advised that autistic individuals who use sleep medications should be carefully monitored for sleep problems (Malow & McGrew, 2020; Buckley et al., 2020). Several other psychotropic drugs prescribed to mitigate behavioral symptoms have been shown to reduce sleep problems in children and adolescents on the spectrum (Ballester et al., 2020). The researchers suggest proper medical consultations in the pharmacological treatment of insomnia in autistic children because medications can adversely affect children's daytime behavior and quality of life (Rana et al., 2020).

Effectiveness of Cognitive-Behavioral Sleep Intervention

Nearly two-thirds of the reviewed articles are studies focused on integrated behavioral sleep interventions (i.e., behavioral strategies combined with environmental adaptations and consistent bedtime routines). Researchers have found a link between sleep problems and internalizing and externalizing behaviors in autistic children (Schreck & Schreck, 2020; Schreck & Richdale, 2020; MaLay et al., 2022). Internalizing behaviors are characterized by processes within the self, such as anxiety around bedtime. In contrast, externalizing behaviors are characterized by actions in the external world (e.g., meltdowns and challenging behaviors in response to change during the day-to-night transition period) (Deliens & Peigneux, 2019).

According to a scoping review of anxiety in young children, the most common anxiety measure used is the parent-report Child Behavior Checklist (CBCL) (Vasa et al., 2020). It is used to assess symptoms across emotional and behavioral functioning areas based on a 3-point scale (ranging from Not True to Very True) and has remarkable psychometric properties (Mazurek & Petroski, 2015).

Regarding behavioral sleep intervention, recent studies have identified that the cognitive-behavioral treatment (CBT) approach is the most used behavioral intervention in young autistic children who experience sleep problems (Howlett et al., 2020; Vasa et al., 2020). Environmental adaptations are often used in conjunction with behavioral strategies before and during bedtime (Dewald-Kaufmann et al., 2019; McLay et al., 2018). Intervention strategies may include psychoeducation about the importance of sleep hygiene and the consequences of insufficient sleep (Howlett et al., 2020; Vasa et al.,

2020). Other commonly used sleep interventions include consistent bedtime routines, stimulus control (e.g., using the bed for sleep only), graduated extinction (e.g., gradual reduction in parental involvement in sleep routines), and positive reinforcement when demonstrating good sleep habits (Howlett et al., 2020).

CBT for insomnia has shown encouraging results in their preliminary studies (Dewald-Kaufmann et al., 2019; Vasa et al., 2020; McCrae et al., 2020; William Buckley et al., 2020; McCrae et al., 2021). Six articles highlighted the importance of parental involvement during the training. In addition, CBT has improved daytime behaviors in autistic children and parental sleep quality (McCrae et al., 2020). A recent single-subject study on telehealth delivery of a CBT parental-based program has shown positive results in sleep and daytime functioning for a young autistic child (Davenport et al., 2021). Other online sleep education programs include ABCs of SLEEPING Tool, Sleepwise, and Better Nights Better Days programs (Kirkpatrick et al., 2018; Howlett et al., 2020).

Benefits of Applied Behavioral Analysis Sleep Intervention

McLay et al. (2019) discussed the functional assessment-based intervention in changing parents' behaviors regarding unwanted co-sleeping habits in autistic children. The authors examined the use of behavioral strategies, including systematic fading of parental presence/graduated extinction, visual schedule, positive reinforcement, and sleep hygiene rules (McLay et al., 2019). The authors also identified additional individualized sensory-based sleep preparation strategies, such as calming sounds or music, deep pressure touch, and environmental adaptations.

A recent systematic review has revealed positive collateral effects of daytime

functioning in autistic children following behavioral sleep interventions that included psychoeducation, applied behavioral analysis (ABA), and CBT strategies (Hunter et al., 2020). The authors summarized the improvement as follows: improvement in stereotypic and restricted behaviors, challenging daytime behaviors, emotional regulation, and children's quality of life. However, the authors concluded that there is still a lack of solid evidence for using ABA to inform treatment for sleep problems in autistic children. Hunter et al. (2020) urged researchers and clinicians to consistently consider the bi-directional relationship between poor sleep and challenging daytime behaviors in assessing and treating autistic children.

Limitations of Behavioral Interventions

Stuttard et al. (2015) explained that the success of a behavioral intervention partially depends on the emotional and physical resources of the parents, and families may often experience a short-term worsening of sleep problems. The authors also described significant sleep improvements at the 3-month post-intervention measurement.

Malow and her research team (2021) recently conducted an online parental sleep education research study. The authors have transferred the sleep education curriculum to an online platform and provided virtual learning lessons, digital data recording, and other practical tools such as bedtime pass, visual schedule template, and pictorial cue cards for autistic children with limited verbal skills. The authors reported that the online digital sleep teaching program was cost-efficient, convenient, and safe for families and children, especially during the pandemic. However, they did not find that access to multimedia materials statistically improved sleep habits and patterns in their study (Malow et al.,

2021).

Effectiveness of Occupational Therapy Practice in Sleep for Autistic Children

A systematic review completed by Weaver (2015) revealed that efficacy studies supporting OT interventions for sleep or rest in the autistic population have not yet been published. In recent years, growing evidence suggests that disruptive sleep preparatory habits are closely linked to sensory reactivity patterns and the internalizing and externalizing symptoms in autistic children (Rossow et al., 2021; Schreck & Schreck, 2020; Vasa et al., 2020; MacDuffie et al., 2020). Addressing sleep dysregulation falls within the scope of OT practice for all ages (Weaver, 2015; Gronski & Doherty, 2020). The reciprocal relationship between sleep and daytime functioning has become a strong argument that pediatric OTPs should incorporate sleep screening and consultation when working with children with additional needs (Franklin et al., 2015). However, there is a limited amount of OT-specific sleep intervention for the autistic children population in reviewing the existing literature.

Sleep researchers have posited that sleep disturbances are associated with sensory hypersensitivity and anxiety; thus, sensory assessment should be included in the sleep screening process (Reynolds et al., 2012; Souders et al., 2017; Goldman et al., 2020; Vasa et al., 2020). The sensory profile is commonly used in at least five reviewed studies (Reynolds et al., 2012; Mazurek & Petroski, 2014; Shui et al., 2018; Tzischinsky et al., 2018; Rajaei et al., 2020).

In recent years, OT researchers have published studies to suggest the relationship between sensory processing and sleep and its application to sleep disturbance in autistic

children (Reynolds et al., 2012; Gee et al., 2017; Schoen et al., 2017; Bestbier & Williams, 2017; Lawson et al., 2017; Foitzik & Brown, 2018; Rajaei et al., 2020; Eron et al., 2020; Lawson et al., 2022). In a systematic review, researchers discovered that the substantial evidence for sleep and rest in young children was the internet-delivered parental education in implementing sleep hygiene (Gronski & Doherty, 2020). The current OT research primarily targets infants, toddlers, and neonatal populations.

Regarding sensory tools, Spira (2021) examined using a massage protocol as an OT sensory intervention to reduce sleep dysregulation in children with sensory processing disorders. She explained that joint compression and pressure touch massage offered by parents as a sleep-preparatory activity had lowered arousal levels in the study's sleep and sensory measures. Gee et al. (2021) investigated the use of weighted blankets in a single-subject study. It was revealed that using a weighted blanket had not demonstrated a predictable and consistent improvement in sleep quality for autistic children. According to the outcome of this study, one subject showed improvement in the total duration of sleep, and another showed a reduction in sleep onset delay. Gee et al. (2021) suggested that a weighted blanket is a feasible treatment intervention; however, the outcomes might vary depending on the child's sleep and sensory patterns. The authors advised OTPs should be cautious when prescribing weighted blankets and highlighted the importance of sleep assessment to understand the underlying contributing factors to sleep disturbance in autistic children (Gee et al., 2017; Eron et al., 2020; Gee et al., 2021).

Physical activity interventions for autistic children have positively impacted sleep enhancement (Oriel et al., 2016; Tse et al., 2019). Lawson & Little (2017) investigated

the effectiveness of a sensory-based aquatic program and demonstrated a decrease in sleep dysregulation following the intervention. The authors suggested that proprioceptive sensory input through swimming would benefit the sensory regulation of children with high sensory sensitivities and avoidance behaviors. A recent pilot study of a yoga-based program suggested that a mind-body practice yoga program may help to reduce bedtime resistance and sleep anxiety for autistic children (Tanksale et al., 2022). The growing evidence of sleep-promoting daytime physical activity intervention facilitates a comprehensive approach to planning for school-based wellness programs (Franklin et al., 2015).

Regarding the intervention to reduce anxiety at bedtime, environmental modifications are often employed in the sleep environment, such as changing lights, using calm bedtime activities, and adjusting room temperature (Schreck & Richdale, 2020). Relaxation techniques are often taught and practiced through the sleep hygiene program, such as breathing exercises, progressive muscle relaxation, and guided imagery (Didden et al., 2020). Recent behavioral sleep interventionists have acknowledged addressing sensory over-responsivity as a preventative approach to emotional regulation and managing anxiety (Carpenter et al., 2019). Growing evidence has suggested that sensory-over responsiveness is linked to anxiety symptoms and sleep problems in young children (Carpenter et al., 2019; Vasa et al., 2020).

School-based Sleep Educational Programs: Collaboration and Partnership

The school-based sleep programs have mainly targeted primary and secondary school students with neurotypical conditions, and published studies are scarce despite the

rapidly rising sleep problems in school-aged children and adolescents (Gruber et al., 2016; Gruber et al., 2019; Rigney et al., 2021). A targeted search was conducted for school-based sleep education programs for autistic children using the online databases Cinahl, APA PsycINFO, and PubMed. However, there is no related peer-reviewed study published in the search. Hence, the following findings are based on the school-based sleep education programs for the typically developing children population.

Sleep specialists encouraged school-based sleep education programs as they saw the rising need to enhance awareness and education on sleep health for adolescents through school health programs (Blunden & Rigney, 2015). In a recent systematic review of school-based education programs, the researchers have found an increase in published studies of 30 different sleep programs in mainstream schools (Rigney et al., 2021). The authors explained that trained teachers led most sleep educational programs, and sleep curricula were incorporated into the health curriculum. In addition, the reviewed studies have shown an increase in the willingness of teachers and schools to engage in sleep education. However, the authors also discovered mixed findings on the impact on sleep behaviors of the target groups despite the significant increase in sleep knowledge among teaching professionals (Rigney et al., 2021). This review shows that the Australian sleep programs focus on sleep psychoeducation and implementing CBT and mindfulness practice in schools (Rigney et al., 2021). Another key finding from this review is the inclusion of parents and peers in the learning journey and engagement in interactive learning activities.

Sleep researchers in Canada have also published a series of studies to investigate

the effectiveness of school-based sleep education programs and highlight the concept of translating knowledge into action (Gruber et al., 2016; Gruber, 2017; Gruber et al., 2019). Gruber (2017) advised sleep health educators to continually apply the research findings in teaching pediatric sleep as a public health measure. The author also highlighted the importance of improving sleep knowledge, attitudes, and related daytime health outcomes. Health educators should seek to adapt the presented knowledge to the local context. Gruber et al. (2019) suggested improving Canadian school-based sleep programs at the local school level and collaborating with national organizations for policy changes. School health professionals are encouraged to enhance children's physical, mental, and cognitive health by raising awareness of the importance of sleep.

Implications

The literature review presents critical implications for translating research evidence to sleep practice for OTPs for autistic children. There is increasing evidence of a correlation between sensory sensitivity and sleep habits in autistic children (Reynolds et al., 2012; Rajaei et al., 2020). OTPs should emphasize the importance of sleep and its relationship with daytime functioning for all children. Developing evidence suggests that autistic children suffer from alterations in the neurobiological processes that impact the sleep-wake cycle (Moore et al., 2017). Practitioners should consider and respect the physiological responses in autistic children in sleep assessment and intervention. Sensory and therapeutic strategies should be carefully monitored and supported by data collection through evidence-based measures. The overall evidence poses an imperative need to improve pediatric sleep literacy among health professionals, including OTPs (Rigney et

al., 2015; Gruber et al., 2019; Richardson et al., 2020).

Although most of the reviewed studies of the school-based sleep programs are based on neurotypical children and adolescent populations, some key findings can be referred to as important elements to tailor for the neurodivergent populations. The core ingredients of a successful school-based program for autistic children may include evidence-based sleep assessment measures, parental involvement, a whole-school approach, and an embedded health education curriculum with sleep care and hygiene in schools. In addition, implementing a school-based program should entail measures to address sustainability to improve sleep quality and quantity.

Pertaining to parental education, evidence has shown positive outcomes through telehealth and internet-based teaching of sleep hygiene and home-based strategies (Malow et al., 2014; Davenport et al., 2021; Malow et al., 2021). School-based OTPs can contribute to the existing sleep practice clinical pathway by offering expertise in the sensory assessment of autistic children, consultation on sensory-friendly environmental adaptation, and parental sleep education. Interprofessional collaboration with school psychologists and teachers is crucial in sleep health promotion. Teachers are in the position to provide feedback on children's daytime academic performance. School psychologists and OTPs can collaborate in assessing and documenting daytime behaviors, emotional regulation, and school and social participation.

In conclusion, translating sleep knowledge into sleep health education requires a collaborative effort, and it is a novel service provision by OTPs. Using a sound theoretical framework such as the experimental learning theory, partnering for change

and knowledge to action will inform the development of the program and measure the readiness to change (Blunden & Rigney, 2015; Stuttard et al., 2015; Rigney et al., 2015; Sutton et al., 2020).

CHAPTER FOUR – Description of the Proposed Program

Basis of the Proposed Program

Sleep Practice in Occupational Therapy (SPOT) is designed as an educational program for OTPs to address sleep hygiene for autistic children. The main objective of the Sleep Practice in Occupational Therapy program is to improve OT school-based practice in sleep assessment, intervention, interprofessional collaboration, and family partnership in sleep health. The long-term outcome of this program is to enhance the quality of sleep for the target population.

Review of the Explanatory Model

Autistic children who suffer from poor sleep quality may exhibit dysregulation in their daytime performance. It could affect their academic learning and social participation at school (Deliens & Peigneux, 2019; Taylor et al., 2012). A recent study identified a lack of resources and training in sleep intervention for school-based OTPs (Seruya & Garfinkel, 2020). Teachers may have extensive knowledge of students, however, they are often not prepared to support students' additional physical and mental health needs in schools (Mills & Chapparo, 2018). Due to time constraints, teacher-therapist collaboration and implementation of therapeutic strategies in the classroom are lacking (Gosselin & Sundeen, 2019). This may lead to unawareness of the OT scope of practice, resulting in fragmented OT service provision. The aforementioned challenges can hinder the effectiveness of OT practice in school-based health promotional initiatives.

Consequently, it is essential for our profession to address the occupation of sleep at the school level to enhance the health and well-being of young students. Through

school-based sleep health education and wellness programs, teachers and other school administrators will become more aware of the importance of sleep hygiene and its impact on children's learning. The SPOT program advocates for a holistic OT service provision through collaboration with teachers and family partnerships.

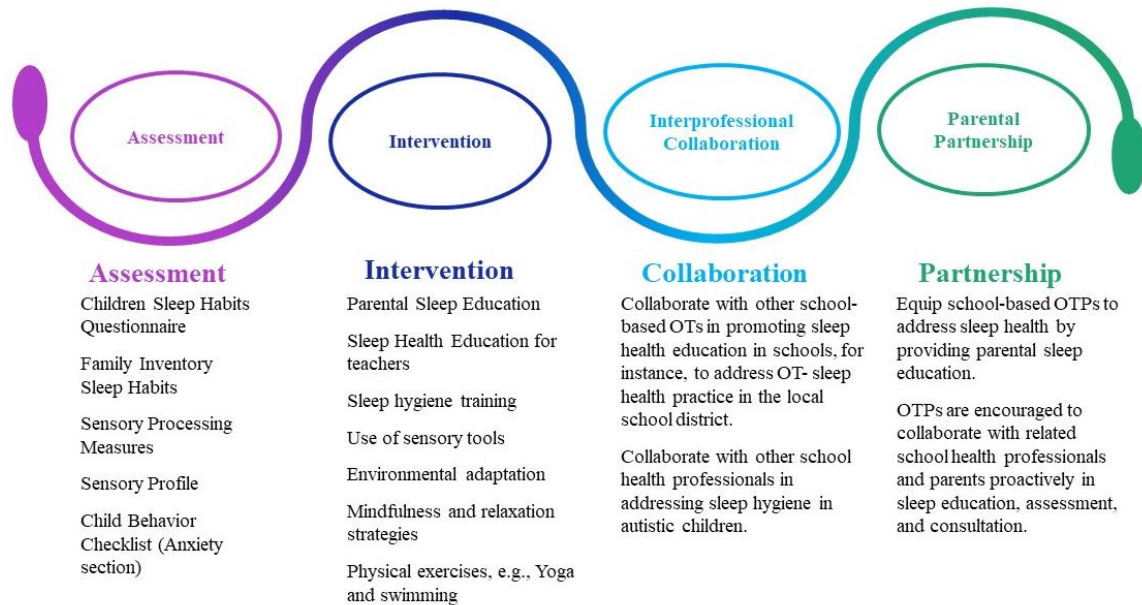
Key Features of the SPOT Program

The SPOT program for autistic children will be offered on a virtual webinar platform. The presentations will also be recorded and available asynchronously. The course content will consist of mini-lectures and group discussions for knowledge consolidation. This program consists of four main sections, as presented in Figure 4.1 as the SPOT Roadmap. Participants will engage in small group projects utilizing sleep and sensory assessments through case scenarios. They will learn to create a bedtime visual schedule and modify the bedroom environment based on the findings of simulated cases. In addition, fact sheets and presentation materials will be shared with participants to prepare for the delivery of parental sleep-health workshops.

The SPOT program will equip school-based OTPs to deliver sleep health education to teachers, school administrators, and other health disciplines, focusing on sleep and daytime wakefulness for young autistic children. The program author aims to increase awareness of the role of OTPs in sleep health and strengthen the partnership with teachers and parents. Program participants will also learn to develop a proposed teaching plan for sleep hygiene. The tailored teaching plan can be presented to school administrators as a health educational topic and be embedded into the existing teaching curriculum.

An optimal sleep hygiene education for autistic children with sensory processing difficulties should entail using a consistent bedtime routine, sensory-friendly adaptations, and cognitive-behavioral strategies (Applegate et al., 2020). Sleep hygiene may effectively alleviate sleep problems in some autistic children (Sutton et al., 2020). Also, daytime emotional regulation and anxiety around bedtime will be addressed through cognitive-based strategies, mindfulness and relaxation exercises, and daytime physical activities intervention (Gruber, 2017; McCrae et al., 2020).

At the meso level, the SPOT program will act as a catalyst to impact the current educational system to extend school-based mental health wellness programs. Given the growing evidence in OT research in recent years, OTPs are encouraged to explicitly teach sleep and health at all levels in the community (Green, 2015). With increased sleep knowledge and practice guidelines in sleep education, OTPs are well-placed to advocate for children who suffer from chronic sleep disturbances. In viewing the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD, 2016), free and quality primary and secondary education should be implemented at all levels of the education system for learners with additional needs. Autistic children share the right to access learning with sufficient accommodations. School-based OTPs must advocate for accommodations and provide necessary related services in schools for children who experience sleep problems in collaboration with parents and teachers. The SPOT educational program author hopes to enhance current OT practice and address sleep health as part of school-based mental health promotion.

Figure 4.1*Sleep Practice in Occupational Therapy Roadmap***Important Key Stakeholders**

The key audience of the SPOT educational program is school-based OTPs. OT participants will be recruited through the Hong Kong OT Association, the international school community, and the pediatric private OT practice interest group in Hong Kong. An invitational message and a short promotional presentation of the SPOT program will be posted on social media platforms such as private Facebook and the author's personal LinkedIn account. As discussed in the causal pathway in Chapter Two, school-based OTPs face many challenges in promoting mental health wellness in school settings. The SPOT program aims to improve knowledge and skills in sleep health based on the current research evidence. Consequently, OTPs are hoped to be empowered with evidence-based resources when communicating and collaborating with other teaching and health

professionals in schools.

Moreover, teachers and school administrators are the secondary stakeholders at the meso level. Program participants will learn to modify the resources of the SPOT program and tailor a proposed teaching plan on sleep hygiene. School-based sleep health wellness programs are strongly recommended in addition to teaching sleep hygiene. The author hopes to establish a link to share our skill practice in sleep with other school professionals, such as school psychologists and nurses. To promote an equitable service for children with diverse needs, it is important to develop effective interprofessional collaboration at schools (Phoenix et al., 2020). School-based OTPs are encouraged to share their sleep knowledge with teachers and school administrators to facilitate a healthy lifestyle for all children, ultimately enhancing teaching and learning outcomes. An example of teacher-therapist and school administrative collaboration to address sleep challenges at school is described in Figure 4.2.

Figure 4.2*A Case Scenario to Justify SPOT Program in Schools*

Zoe, a first-grade teacher, notices an autistic student named Anna is showing increased daytime sleepiness and struggles to participate in class. Zoe has recently attended a workshop on sleep health for children and understands that daytime sleepiness needs to be addressed to prevent further disruptions to learning at school. She also recognizes that Anna is showing signs of sensory challenges at school. The Individualized Educational Plan (IEP) team acknowledges the need for an OT assessment. The school principal is aware of Anna's daytime sleepiness problem and supports further collaboration with the school OT. Additional teacher-therapist planning time and resources are granted to address Anna's challenges.

After the OT sleep screening and consultation, Zoe becomes more aware of wakefulness and emotion regulation in class. Zoe understands the impact of poor sleep quality on daytime school participation and how it relates to the sensory needs of autistic children. Zoe has become more competent in communicating with parents of children with sleep concerns. She works closely with the school OT to adjust classroom routines and support the implementation of sensory diets to improve alertness and attention in class. Through OT consultation with Anna's parents, it is recommended that Anna needs a consistent bedtime routine, a sensory-friendly bedroom environment, and use of the appropriate sensory tools and activities in a home program. A structured bedtime schedule with calming activities is recommended. Addressing sleep concerns and daytime sleepiness behaviors has benefited all stakeholders and, most importantly, will ultimately improve students learning and participation at school.

Aims of the Sleep Practice in Occupational Therapy Program in Schools

The author intends to educate school-based OTPs to extend their knowledge of sleep and daytime wakefulness. The course content is based on current findings in the neuroscience of sensory processing, brain functions, and sleep physiology. The program participants will also learn how to be effective health educators by translating the knowledge of neuroscience into health information and sharing it with other stakeholders, such as teachers and school administrators. OT participants will use practical strategies to

promote sleep hygiene in schools and deliver parental and teacher sleep education workshops. Addressing optimal sleep functions is an essential step toward raising the awareness of mental wellness in all children and their parents (Stuttard et al., 2015; Ho & Siu, 2018). Program participants will be empowered in OT advocacy skills by addressing sleep health for mental wellness in autistic children and working collaboratively with teachers and other school health professionals. The long-term program outcome is to strengthen OT-led health education in schools and improve the occupation of sleep. In turn, it is hoped to improve access to social participation and academic learning for autistic children.

Full Logic Model

A logic model displays the interactive components of the Sleep Practice in Occupational Therapy training program (Appendix A). In addition to the visual representation of the proposed program, the program activities are guided by the key assumptions of experiential learning theory, which is depicted in Table 4.1.

Table 4.1

Summary of the SPOT Key Elements

Key Elements of SPOT based on the Experiential Learning Theory (ELT)	
Key element	Description
Concrete Learning	Learners gain concrete professional and educational experience, and as a result, new knowledge will further inform better practice and personal growth (Kitchie & Arnaud, 2020).
Reflective Observation	Learners expand their experiences through reflective observation and develop new strategies or ideas to aid clinical reasoning (Lee et al., 2016). Therapists are encouraged to have sufficient supervision and time allowance to reflect on their work with clients to foster effective learning (Caron et al., 2021).
Abstract Conceptualization	Learners continue testing, revising, and conceptualizing their experiences. This process will help identify strengths, inadequacies, and areas for improvement (Lee et al., 2016). The ELT has been applied in team learning in addition to the traditional focus on individual learners (Fewster-Thuente & Batteson, 2018).
Active Experimentation	Learning is a process of receiving training on effective strategies followed by practical application in real-life situations. It will involve re-evaluation, revision, or even reinvention through a series of experiments and testing (Lee et al., 2016).
	Application to the SPOT program
	The SPOT program is aimed to enhance the OT scope of practice in addressing sleep health in children with all abilities. Participants will learn about the basics of neurobiology and mechanisms that are related to sleep function. The utilization of sleep assessments and evaluation tools and interventions will be examined during the course.
	Participants will engage in interactive case studies and learn to use sleep assessment tools. Case studies, small group activities, and role-playing opportunities will be utilized throughout the SPOT program. Each module will involve a reflection based on the learned clinical knowledge and reading resources given during the course. Reflection will be based on their own lived experiences, case studies provided in the course, and another participant's shared experience. The analysis will be done through clinical reasoning and to develop a new approach to be adopted in their current practice.
	Participants will learn to create bedtime routines together with appropriate sensory tools during the simulated case scenarios. In the small group discussions, each team member will engage in problem-solving in dealing with challenges in assessment, interventions, interprofessional collaboration, and family partnership. Participants will share their current role of OT in mental health wellness at school and devise potential avenues to embed sleep health in their everyday practice. Participants will also be encouraged to identify barriers and facilitators in school sleep health promotion and engage in active discussion of their current school management and working relationships with mental health school professionals, e.g., school psychologists or nurses.
	Participants will devise a plan of action to adopt sleep health in their current school practice. OT participants are encouraged to teach sleep hygiene in a whole-school approach. The author of this program will recruit interested OTs to launch a pilot study and collect data on OT-led sleep health education in a school setting.

Program Participants and Resources

Intended Program Participants

Autistic children are affected by sleep dysregulation globally (Heussler & Malow, 2020), particularly during the COVID-19 pandemic, as daily routines in children are dramatically disrupted (Bruni et al., 2022). OT practitioners are strongly encouraged to address sleep problems with our clients across the lifespan (Ho & Siu, 2018). The SPOT program is specially designed for school-based OTPs according to the practice guideline for young children in sleep and rest (Gronski & Doherty, 2020). Although the program is created based on the 3-tiered school system in the United States, it can be adapted to tailor to the needs of school systems internationally. Secondary stakeholders (teachers, school personnel, and administrators) will also benefit from this program to promote mental health wellness at the school level.

Program Structure

The four-week educational module will be delivered via an online platform allowing small group discussions and survey data collection. Reading assignments and case studies will be sent through a week-by-week course email before the live session. Participants must have stable internet access for interactive discussion and video viewing throughout the live session. The program author plans to initially schedule this course as part of the professional staff development within the Hong Kong English School Foundation (ESF) school calendar in sync with the teachers' training day. The course format is divided into four main sections and delivered consecutively for four weeks. The program can also be adapted into a half-day training according to the different school

systems internationally.

Role of Personnel

The Sleep Practice in Occupational Therapy program will be led by a registered OT who is a passionate advocate for school-based mental wellness. The health benefits of sleep hygiene and education will be delivered based on a whole-school approach. OTPs in school practice are well-positioned in health education of the essential occupations. OTPs have the knowledge and skills in social and home environmental adaptations and remove barriers to improve participation for autistic children. OTPs are integral members of the individualized educational program (IEP) team. We can further extend our role in promoting mental health wellness through consultation and individualized work with teachers, students, and parents.

In addition, the program author will contact a local university in Hong Kong to recruit one to two OT student volunteers who may be interested in school-based practice. Basic training, such as sensory integration, sleep hygiene, and child development, will be provided for OT students before the program's launch. The role of the OT student assistant is to help with material preparation, online registration, and survey data collection to evaluate this program.

Plan for Outreach

In reaching out to the school-based OT community, a promotional video will be created to address the importance of sleep and the vital role of OT in the promotion of optimal sleep-wakefulness for occupational performance and participation. This video will be available on social media platforms such as OT private Facebook groups,

LinkedIn, and YouTube. The program author will publish a brief article to address the occupation of sleep in the local school district newsletter and the special interest section of the Hong Kong OT Association. An electronic link to the SPOT course brochure will be attached via the newsletter for a detailed online course description. Interested OTPs can easily register online through the QR code located in the newsletter.

The participants will complete a pre-training survey (Appendix B) which consists of six questions via SurveyMonkey, an online survey tool. This brief questionnaire aims to gather information about their practice area, the age of the children they serve, their level of sleep knowledge and the use of sleep and sensory-based assessments, experience in working with children with sleep disturbance, and the expected learning goals from this course.

Intervention and Activities

Program content

The SPOT program consists of four main sections, as shown previously in Figure 4.1. In Module One, Basics of Sleep, the author will review the neurophysiology of sleep, the stages of sleep and changes across the lifespan, the occupation of sleep according to the OTPF - Fourth Edition (AOTA, 2020), the role of OTPs in sleep health practice, and sleep problems in children with autism. The participants will receive the Sleep Practice in Occupational Therapy Padlet link as supplementary resources to review the neurobiology of sleep and the importance of sleep occupation to OT practice. Current statistics and data on sleep dysregulation in children with autism will be highlighted by reviewing the current literature. The author will create two short video clips to explain the impact of

sleep dysregulation in children on daytime school participation and learning. Brief discussions are scheduled every 15–20 minutes for reflections and questions. When implementing an educational program, it is imperative to monitor the level of understanding and attitude toward sleep knowledge and practice (Gruber, 2017).

In Module Two, Sleep Assessment, the author will discuss using Sensory Profile 2 (Reynolds et al., 2012) and Sensory Processing Measure 2 (Appleyard et al., 2020) as the primary tools to assess sensory processing in children and how these assessments could provide valuable information related to sleep dysregulation patterns. As mentioned in Chapter Three of this dissertation, sleep researchers have posited that sleep disturbances are associated with sensory hypersensitivity and anxiety. Thus, sensory assessment is the critical element in the evaluation phase of sleep habits in children with autism (Reynolds et al., 2012; Souders et al., 2017; Goldman et al., 2020; Vasa et al., 2020).

The author will also discuss using two sleep questionnaires for young children with autism, the Children's Sleep Habits Questionnaire (CSHQ) (Reynolds et al., 2018; Malow et al., 2013) and the Family Inventory of Sleep Habits (FISH) (Malow et al., 2013). In the suggested reading list in this module, participants will be asked to review three research studies and to examine the utilization of the CSHQ and FISH. During the live session, the author will highlight the benefit of data collection and progress tracking in the OT assessment process in school practice. The CSHQ can identify issues related to daytime sleepiness and anxiety-related conditions in a child (Weiss & Hung, 2020). The FISH is specially designed for autistic children to screen their sleep hygiene and is a user-

friendly tool for parents (Weiss & Hung, 2020). Clinical psychologists can further examine anxiety symptoms using specific psychological measures such as the Child Behavior Checklist, a parental questionnaire to identify emotional and behavioral concerns in children (Sikora et al., 2012). OT participants are encouraged to share the sensory and sleep assessment findings and collaborate with their school psychologists to address the underlying anxiety symptoms.

In Module Three, *Sleep Intervention*, participants will engage in interactive learning opportunities through practice and reflection. Several sleep intervention-related articles will be assigned as suggested reading for Module Three. At the beginning of the Module Three live discussion, the author will administer an online poll to check in with the participants regarding their level of sleep knowledge and confidence in assessing sleep habits in their practice settings. To delve into sleep intervention, the author will identify a variety of sleep-enhancing strategies based on OT-led research data and other commercially available sensory-based sleep tools. The discussion will briefly include a CBT-based sleep treatment approach. The participants will examine the existing CBT programs supported by sleep researchers, such as ABC- Sleeping Tools and Sleep Success (Howlett et al., 2020; Gruber et al., 2016).

The course assignment will be given at the end of Module Three. Participants will complete one CHSQ sleep assessment based on one of the three case scenarios provided. Each case study will accompany a scored Sensory Profile 2 and Sensory Processing Measure 2. According to the sleep and sensory assessment findings, participants will list strategies and suggestions to prepare for an OT consultation with parents. Participants

will also learn to make recommendations for school accommodations and develop relevant educational goals focusing on increasing daytime alertness and joint attention for school participation.

In the fourth module, *Interprofessional Collaboration and Family Partnership*, the author will lead an active discussion first by reflecting on participants' lived experiences in working with their school team, school administrators, and parents or caregivers. Participants are encouraged to share their success stories and lessons learned from their practice. The author will emphasize the whole-school approach to implementing sleep health education in a school setting and advocate for the role OT plays in promoting mental wellness through sleep health. Participants will also establish a list of practical strategies to address current challenges in promoting health education, such as time constraints and lack of support from the school administration.

Regarding the family partnership, activities will be guided by the service delivery model called *Partnering for Change (P4C)*. Kennedy et al. (2019) explained that P4C represents building capacities through collaboration and "coaching in context" (p. 98) and suggested improving family-therapist partnership by engaging in face-to-face interactions, building relationships without increasing demands, and improving the awareness of OT services. Hence, participants will engage in role-play activities by giving a case scenario and brainstorming ideas through small group discussions.

Guided by P4C principles, the teacher-therapist collaboration is based on a tiered service model through universal teaching design strategies, differentiated instruction, and individualized consultation (Wilson & Harris, 2017). Upon completion of the SPOT

training program, the OT participants will be encouraged to form a special interest group in sleep practice within the Hong Kong OT Association. Increased collaboration amongst school-based OT practitioners will help to sustain and increase self-confidence in delivering sleep education in school.

Upon completion of the SPOT program, participants will have access to the prepared teaching PowerPoint presentations (Appendix D), brochure (Appendix E), fact sheets (Appendix G), posters, and promotion videos to implement parental and teacher training in sleep health.

Educational Modules Teaching Plan

To further describe the SPOT program, a 4-week teaching plan is shown in Table 4.2 with suggested topics to be included in the educational modules.

Table 4.2

The 4-week SPOT Teaching Plan

Module One	Basics of sleep (1-hour lecture) <ul style="list-style-type: none"> • Neurobiology of Sleep: Brain structures & neurochemistry (Bathory & Tomopoulos, 2017; Lane et al., 2019; Ballester et al., 2020; Rana et al., 2020). • Stages of sleep: circadian cycles, optimal sleep time, and sleep duration (Katz & Malow, 2014) • Use of pharmacological interventions (Reynolds et al., 2018; Malow & McGrew, 2020; Ballester et al., 2020). • Occupational Therapy Practice Framework- the Occupation of Sleep (AOTA, 2014; Gentry & Loveland, 2013) • Sleep problems in autistic children and case studies (Foitzik & Brown, 2018; Appleyard et al., 2020)
Module Two	Sleep Assessment (1-hour lecture and interactive group activities) <ul style="list-style-type: none"> • Assessing children with sensory needs (Lane et al., 2019; Reynolds et al., 2012; Rajaei et al., 2020) • Assessing sleep quality – e.g., use of actigraphy, polysomnography (Rana et al., 2020)

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- Assessing sleep habits and daytime wakefulness – use of sleep assessments, e.g., Children’s Sleep Habits Questionnaire, Family Inventory of Sleep Habits (Katz & Malow, 2014)
 - Addressing sleep-related anxiety (Carpenter et al., 2018; Richardson et al., 2020)
 - Review the sleep assessment protocol- *Sleep Practice Pathway* by Autism Treatment Network (Souders et al., 2017; Buckley et al., 2020)
 - Group activities: Case studies and practical exercises on using the tools; participants will engage in case discussion and identify barriers and benefits of OT sleep assessment in school practice
 - Reading assignments: Based on the reading and course materials, participants will share their reflections based on past experiences
-

Module Three Sleep intervention (1-hour lecture with video demonstration, users’ experiences, and case studies)

- Sleep hygiene (e.g., bedtime routine, visual schedule) (Katz & Malow, 2014)
- Use of sensory tools (e.g., weighted blanket, listening therapy, sensory lifestyle redesign/ sensory diet) (Gee et al., 2017; Eron et al., 2020; Gee et al., 2021)
- Relaxation strategies e.g., mindfulness practice, yoga (Tanksale et al., 2022)
- Increase the amount of physical exercise to promote daytime wakefulness in school (Oriel et al., 2016; Tse et al., 2019)
- Environmental adaptations (lighting, temperature, auditory): identify and examine some of the commercially available equipment (Katz & Malow, 2014)

Empower OTPs in the delivery of sleep education in schools (Gruber, 2017; Kennedy et al., 2019)

- Participants engage in small group discussions
-

Module Four Interprofessional collaboration and family partnership (1-hour lecture and discussions)

- Advocate the role OT plays in sleep education in school practice; introduce trauma-informed care & Polyvagal theory-based approach to address mental wellness (Porges, 2011; Gruber, 2017)
- Deliver a whole-school approach (e.g., Response to Intervention- US school system or Partnering for Change- Canadian model (Dall’Alba et al., 2014; Gruber, 2017)
- Address sleep health through individualized consultation
- Work with school administration to support funding for OT services

Family partnership/ communication

- Preparing OTs in parental support: share parental and teachers’ views on sleep problems through pre-recorded video interviews (Kennedy et al., 2019)
 - Address parental mental health wellness i.e., sleep wellness for parents
-

Program Outputs and Outcomes

Anticipated Program Outputs

The projected program outputs entail the number of school-based OT participants and participating schools that provide inclusive education, including special schools and early intervention centers. The outcomes include the number of generated teaching PowerPoint presentations, factsheets, resource pages on the Padlet, and short promotional and teaching videos. Teaching videos are created as an additional tool to present the key concepts of the SPOT program, and program participants are granted to share with other school-based OTPs.

Measurable Changes

The program outcomes can also be measured by the observable intervention objectives. Upon completion of the 4-week educational modules, the short-term outcomes are as follows:

- OT participants will identify at least three major causes of sleep disturbance in autistic children related to the neurophysiology of the brain, sensory processing, and anxiety and the two critical impacts of sleep disturbance on academic learning and school participation.
- OT participants will increase their knowledge of one of the sleep assessment tools, as demonstrated by using a tool with at least two students by the end of the course.
- OT participants will demonstrate increased competency by completing the assessment analysis, goal formulation, and intervention plan of one assigned case

scenario.

The intermediate intervention outcomes for two to six months post-program are as follows:

- OT participants will engage in sleep health education by completing at least two online or in-person workshops for teachers or parents.
- OT participants will engage in at least one sleep health promotional activity (such as writing about sleep health awareness in a school newsletter, displaying a sleep health poster in school, or speaking about sleep knowledge and OT practice through a podcast or social media platform).

The long-term intervention outcomes of the program will be child-oriented and lead to a positive change in sleep habits and school participation of autistic children. In an approximately one-year period, after the completion of OT-led sleep health education, the intervention outcomes are as follows:

- Parents will increase sleep hygiene awareness by implementing a consistent bedtime routine and sensory strategies, with an increase of 20% or more measured by an online pre- and post-sleep education survey.
- Teachers will increase collaboration with OTPs in sleep health and daytime wakefulness by addressing sleep-related problems through OT referrals, IEP documentation, and team discussions, with an increase of 20 % or more through an online survey completed at the pre-and post-sleep education.

Anticipated Implementation Challenges and Proposed Solutions

It is imperative to consider the potential barriers during the implementation of the

program. The proposed solutions will increase the likelihood of adopting OT-led sleep assessment and consultation in school practice. Suggestions to mitigate identified barriers are listed in Table 4.3.

Table 4.3

Potential Barriers and Proposed Solutions

Potential Barriers within the primary stakeholders	Proposed Solutions (for school-based OTPs)
Time constraints	<ul style="list-style-type: none"> • Share easy-to-use completed teaching PowerPoint presentations, factsheets, flyers, posters, and promotional videos to be shared with teachers and parents • Use early-release school days for therapy staff training opportunities • Schedule therapy staff training at the beginning of the school year (e.g., early August) before the start of the OT referrals and assessments IEP period • The SPOT program training could be approved for professional development credits with Hong Kong OT Association through the professional development scheme
Unaware of the role OT plays in sleep health	<ul style="list-style-type: none"> • Refer to the Occupational Therapy Practice Framework – 4th Edition (AOTA, 2020) and evidence in OT school-based practice guidelines • Present the workload versus caseload practice model to adopt health-related education from a whole-school perspective
Lack of parental communication and experience in delivering a home program	<ul style="list-style-type: none"> • Review evidence of OT in child-centered and holistic practice • Learn how to connect with parents (e.g., participate in school social events and offer both group and individualized teaching) • Engage in online meetings with parents to share resources and track progress

<p>Limited opportunity with school administration</p>	<ul style="list-style-type: none"> • Initiate conversation via email; share information of lived experience of children struggling with sleep problems and impacts on learning and school participation • Use sleep health education posters • Always follow up with the initial email and be persistent in advocating the role of OT in mental health wellness
<p>Unable to relate sleep concerns to educational relevant goals</p>	<ul style="list-style-type: none"> • Present evidence: the importance of daytime wakefulness • Generate examples of the Present Level of Performance (baseline) or IEP goals, e.g., to address daytime school participation through attendance tracking, the frequency of active participation in the class, and adopting strategies to manage school assignments due to missing school days or lessons • Engage program participants in discussion and share goal-writing ideas incorporating daytime wakefulness strategies at school • Highlight the use of a holistic OT assessment in assessing the foundational occupations of school children • Collaborate with teachers to co-teach mental health-related topics in class and seize opportunities to talk about sleep hygiene • Collaborate with a school psychologist, social worker, or nurse to support your findings
<p>Anticipated Challenges within the Secondary Stakeholders</p>	<p>Proposed Solutions (For teachers, school administrators, and parents)</p>
<p>Unaware of the role OT plays in mental wellness and sleep health in school practice</p>	<ul style="list-style-type: none"> • Present evidence via posters, promotional videos • Be present in the classroom and take advantage of informal conversations with teachers and other classroom staff to explain OT's role in health education • Seek opportunities for brief workshops or staff meetings and present topics on mental wellness and sleep health for staff and children with all abilities, then focus on specific sleep concerns seen in children
<p>Teachers or school administrators do not</p>	<ul style="list-style-type: none"> • Present evidence of the impact of sleep problems on daytime sleepiness and challenging behaviors in schools

feel responsible for and control over students' sleep quality	<ul style="list-style-type: none"> • Present evidence of parental and teachers' views of sleep dysregulation in school learning outcomes and the benefits of the family partnership to improve learning outcomes • Focus on reducing the financial burden of hiring additional staff to manage students with sleep-related behavioral issues at school • Suggest a team approach to address daytime sleepiness, that is, to include school OT, psychologist, social worker, and nurse • Children with health problems (including mental health issues) have the right to access related services and are supported by sufficient accommodations, for example, adjusting the teaching schedule and incorporating additional physical activities to increase alertness
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Summary and Conclusion

The Sleep Practice in Occupational Therapy educational program is designed to enhance the OT scope of practice in schools. The purpose of the program is to empower OTPs to transform sleep knowledge into practical strategies through sleep health education to teachers and parents. The SPOT program is informed by the experiential learning theory (Norwich University Online, 2017) and is developed based on the current neuroscientific evidence. OT participants will utilize their lived experiences and reflective observation based on the newly learned knowledge. The program author aims to expand the OT practice in schools in sleep health and education for autistic children. Program participants are encouraged to translate sleep knowledge into action by offering sleep screening and consultation, delivering parental and teacher education, and empowering parents and children to improve sleep quality and health.

CHAPTER FIVE – Program Evaluation Research Plan

Program Scenario and Stakeholders

Nature of the Program

Sleep Practice in Occupational Therapy is an educational program for school-based OTPs to address sleep hygiene for young autistic children. The SPOT program aims to improve OT school-based practice in sleep assessment, intervention, interprofessional collaboration, and family partnership in sleep health. Through sleep health education, school-based OTPs will increase self-competence in health promotion delivery in schools and facilitate mental health and wellness for young children with diverse needs.

Program Logistics

The SPOT program will be offered on a virtual webinar platform. The author will host a live, interactive, and engaging opportunity for the OT participants, and the presentations will be recorded and available asynchronously. The course content will consist of mini-lecture and group discussions for knowledge consolidation. Participants will engage in small group projects utilizing sleep and sensory assessments through case scenarios.

Professional Implications of the Program

The intended users of program evaluation research findings will be school-based OTPs. The knowledge will be translated into action by promoting sleep health and hygiene through collaborating with other stakeholders. The lived experiences and reflections of school-based OTPs shared will deepen the understanding and advocate for

OT sleep practice at schools. The evaluation findings would also benefit parents, caregivers, and teachers of children with sensory processing challenges and poor sleep habits and routines. School administrators and other health professionals such as school nurses, speech therapists, and physiotherapists may further acknowledge the need for increased collaboration and financially commit to sustaining the program initiatives.

Program Practice Scenario

A research practice scenario that supports the SPOT program in a school setting was described in Figure 5.1.

Figure 5.1

Research Practice Scenario

Sue has been an OT serving in a public school district for many years. She understands that the increased daytime sleepiness and sleep dysregulation reported by teachers and parents have been rising among autistic children in recent years. She has recently attended a course on sleep health for children and learned that daytime sleepiness behaviors need to be addressed to prevent further disruptions to learning at school. Sue begins to share information on sleep hygiene and sensory-based education with children and families impacted by sleep disturbances. Sue also agrees that teachers and school administrators should have a collective awareness of sleep health to promote mental health and wellness from a whole-school perspective.

Sue uses research evidence in her practice and is interested in collecting data to identify the need for sleep education within the school curriculum. The research evidence will inform her practice and consequently strengthen her confidence in sleep health education, improve collaboration with teachers and parents and advocate for OT's role in school practice. With data to support her practice, Sue will become more competent in communicating with teachers and parents about sleep problems. She can extend her effort in advocating for autistic children who experience chronic sleep problems by offering accommodations at school and parental consultations and facilitating overall mental wellness.

Vision for the Program Evaluation Research

When the qualitative and quantitative information is collected and analyzed, the author hopes to create more evidence of the association between sleep and sensory processing in autistic children for future clinical research studies. Also, the findings will help to bridge the gap for OTs in sleep intervention for young children. A recent study shows a consistent and significant lack of sleep knowledge and clinical training for primary care professionals (Howlett et al., 2020). OTs can fill this gap by offering appropriate screening, intervention, and education in the school setting. Formal sleep hygiene education and promotional activities can be built into the health curriculum at schools; sleep health can also be embedded in the existing mental health awareness programs.

The program evaluation will guide the development and revision of the teaching materials and delivery methods for participants with diverse needs and provide insights into sleep health and wellness programs for different age groups. The preliminary conclusions will provide feedback to inform and address any concerns regarding the implementation and testing of the program. The research will also strengthen the experiential learning approach in designing sleep practice for OTPs at school in the future. Conducting research in school will also increase the awareness of sleep in supporting mental health and academic learning in children. The evidence can further support sleep health education to be adopted in a school-wide health curriculum.

Engagement of Stakeholders

Stakeholders Collaboration

The primary stakeholder group for my research project is the school-based OTPs recruited from the ESF in Hong Kong. They will be invited to join the pilot study through personal invitation. A poster and video will be created to introduce the soft launch of this pilot study. The promotional materials will be distributed to the pediatric OT clinics currently providing school-based services in all the mainstream learning support classes and special schools within the ESF community. The poster will also be shared with the Occupational Therapy Division of the Hong Kong Polytechnic University to recruit OT student volunteers. Basic training such as sensory integration, sleep hygiene, and child development will be provided for the OT students before the program's launch.

The special education coordinators and teachers within the English School Foundation form the secondary stakeholders for my research program. The program author will seek formal permission to conduct the pilot study from the OT teaching faculty of Boston University and Hong Kong Polytechnic University. They will serve as another crucial stakeholder to offer guidance and data analysis.

The evaluation results will aid in improving the SPOT training program by adjusting the training materials or learning activities in sleep health promotion, the format of group work, and additional professional support in educating parents or caregivers. The data collected will boost the program funding resources and potentially expand the training for other primary schools as part of teachers' training or parents' workshops. For the teachers and school administration, the program evaluation outcomes will help

enhance their awareness of the role of OTs in school practice.

Stakeholder Engagement

Stakeholder engagement will be based on the experiential learning theory model to guide reflection and knowledge building, then transform into usable materials. Active listening and discussion are crucial strategies in searching for the needs and goals of the stakeholders. Schools are the ideal setting for health promotional programs as they reach large segments of the children population, which serve as a platform for health education (Gruber et al., 2016). Recent reviews have shown promising results in school-based sleep education programs; researchers urge further studies to be done focusing on the program's length, the content's trainers, and the involvement of parents and caregivers (Rey et al., 2020; Rigney et al., 2021). OTs play an essential role in educating parents, teachers, and other educational professionals on improving the functions and participation of children in schools. The program evaluation will provide practical tools to improve school practice and enhance children's quality of life at home and in school environments. All these outcomes would advance school administrators' goals of improving their students' academic function and success. The program results will help set goals and track progress in daytime wakefulness, school participation, and sensory processing for school functions.

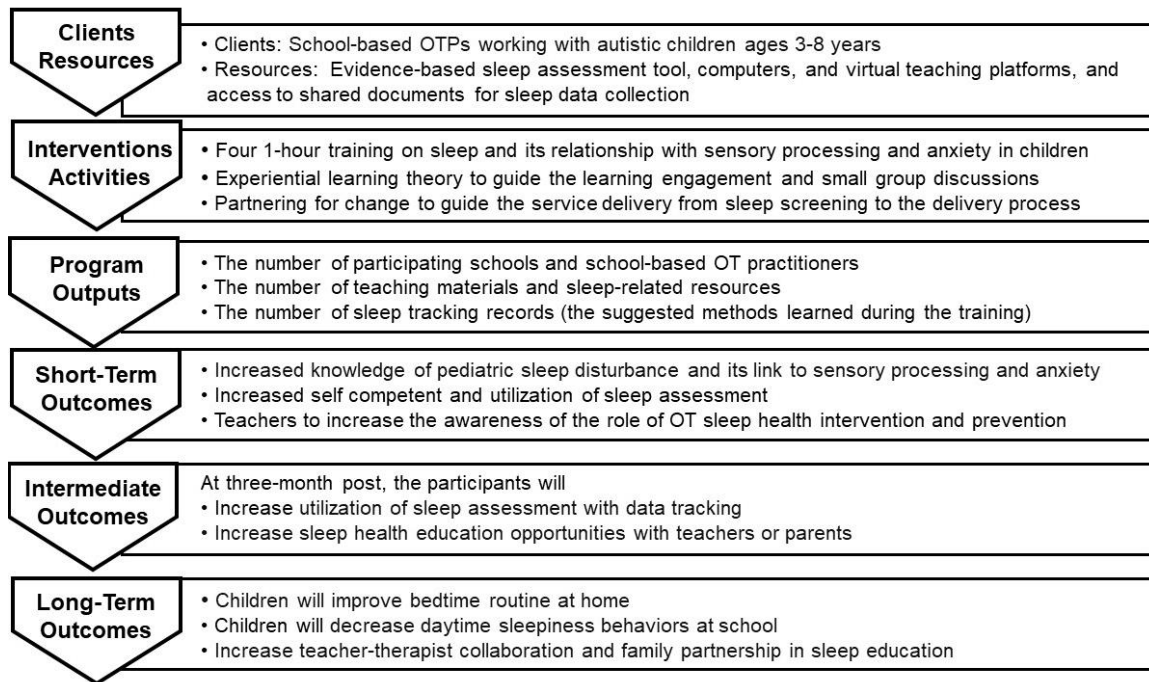
Simplified Logic Model for Stakeholders

A simplified logic model will be presented to the stakeholders as part of the introduction to this pilot study. School-based OTs are essential in assessing sleep, sensory functions, and emotional regulation in promoting health and wellness to support school

participation. School is the ideal environment for health education for children and to reach out to parents through a cohesive partnership with teachers and school administrations. The experiential learning theory will lead the learning engagement through discussion and form practical strategies to implement the action plan. The Partnering for Change model will guide this program to fine-tune the working relationship with teachers and other health disciplines involved in children's sleep health. As presented in Figure 5.2, the simplified logic model describes the objectives and theories behind the SPOT program.

Figure 5.2

Simplified Logic Model for the SPOT Program



Preliminary Exploration and Confirmatory Process

The initial confirmatory process will involve the dialogue among the school-based

OTPs about their views on sleep intervention in school-based practice and their knowledge and skills for implementing the program. The educational modules will be delivered on the virtual platform as this learning mode has become a very efficient way for meeting regardless of geographic location.

A fact sheet of the SPOT program will be prepared to introduce the visions and objectives of the program, along with the simplified logic model. A literature review on sleep health education programs will highlight the benefits of health promotion in schools and potential barriers to learning. The program design and data collection methodologies will also be discussed. As a ground rule for all the discussions in this program, stakeholders' knowledge and experience will be acknowledged and honored with respect.

To ensure a clear understanding of the purpose of this study, the author will use case studies to present the potential health risks of chronic sleep problems and daytime sleepiness. Sleep health education and promotion will be proposed as part of the mental health wellness initiatives. The program author will highlight the signs and symptoms of sleep deprivation in children to expand the conversation towards daytime wakefulness at school. In addition, there will be a discussion regarding interprofessional collaboration and partnership with families in providing consultation and home programs.

Program Evaluation Research Questions

Anticipated research questions are categorized under the different groups of stakeholders. The questions can be answered by quantitative and qualitative methodologies listed in Table 5.1. Data collection will be performed during the pre-and post-program four-week training to measure the degree of change.

Table 5.1*Specific Research Questions from Stakeholders*

Stakeholders	Types of Program Evaluation Research Questions
Researcher	<p><i>Qualitative questions:</i></p> <ul style="list-style-type: none"> • How do the participants understand the relationship between sensory processing and sleep quality in autistic children? What will impact children's school participation and social engagement after the completion of the SPOT program as compared to before? • How does this affect the OT assessment and treatment intervention in school practice? • Did the information presented provide insights into young children's daytime sleepiness or related disruptive behaviors at school? If yes, in what way? If not, do you have other assumptions for what might be the possible underlying causes? • What strategies or programs do they currently use to support young children with daytime sleepiness or disruptive behaviors related to lacking sleep? <p><i>Quantitative question:</i></p> <ul style="list-style-type: none"> • Have the participating OTPs increased their utilization of evidence-based sleep screening tools, and is there a change to the user's experience in the usability and satisfaction of the assessment tools being identified in the program? • Have the participating OTPs reported increased perceived confidence in using the sleep screening and sensory assessment tools they have learned in the program? • Have the participating OTPs reported increased knowledge of the relationship between sleep and sensory processing in autistic children? • Have the participating OTPs reported increased awareness of sleep health and how it may deepen the understanding of OTP's role in school-based practice? • Have the participating OTPs reported increased confidence in advocating for the role of occupational therapy as a change agent in areas relevant to the project? • Did the findings demonstrate that the course content matches the knowledge needed to close the clinical gap the project intended to address?

<p>School teachers or other health professionals in school</p>	<p><i>Qualitative questions:</i></p> <ul style="list-style-type: none"> • Was the concept of sensory processing and sleep clearly presented, and was it demonstrated how these factors relate to students' learning outcomes? • Was the information presented helpful in managing children's daytime sleepiness behaviors at school? If yes, in what way? If not, do you have other suggestions? • Did the school OTPs address sleep needs? Has the program changed your view on interprofessional collaboration in helping children with sleep problems? If yes, in which stage? During the IEP planning stage or OT consultation? • Did they feel supported by the school OTPs through case discussions and group activities in the program? Is there any additional support or materials that could be added to improve the learning experience in this program? • Did they experience a change in collaboration with school-based OTPs? (e.g., increase awareness of the OT scope of practice in school or readiness for increased cooperation with OTPs in sleep health education.) <p><i>Quantitative questions:</i></p> <ul style="list-style-type: none"> • On a scale of 1-5, how well do they understand the link between sleep and sensory processing that may contribute to school participation and learning for autistic children? • On a scale of 1-5, how confident do they feel they can address daytime sleepiness or related challenging behaviors at school?
<p>Parents and caregivers</p>	<p><i>Qualitative questions:</i></p> <ul style="list-style-type: none"> • Did the presented information help parents and caregivers understand sleep problems in children? • Did the program offer adequate information on sleep and sensory processing in children and how sleep may impact daytime behaviors? • What strategies are parents/caregivers using to support their child to improve sleep habits or hygiene at home? • Did parents/caregivers notice any changes in the child's daily performance throughout participation in this program? After the completion of the program? Any changes to their attention, behaviors, moods, or participation in self-care? • Was the school OTP able to offer advice and support in assessing sleep problems and provide practical strategies? • Was the communication and partnership with teachers and therapists effective when addressing your child's sleep problems or concerns?

	<p><i>Quantitative questions:</i></p> <ul style="list-style-type: none"> • On a scale of 1-5, how well do they understand the relationship between sensory processing and sleep? • On a scale of 1-5, how well do they understand how sleep and sensory processing contribute to school participation and learning? • On a scale of 1-5, how well are they prepared to apply suggested strategies to support your child's sleep?
<p>Special Education administrators</p>	<p><i>Qualitative questions:</i></p> <ul style="list-style-type: none"> • Was the information presented in the course relevant to planning the school curriculum and activities? • Does the program's content match the school development plan/ goals and the existing health curriculum? • Did the teaching staff and family members report a satisfactory experience with the sleep health education received? • Are there any external factors that impede the execution of the research methodology? <p><i>Quantitative questions:</i></p> <ul style="list-style-type: none"> • Did the research data show that school-based sleep screening and education led to the desired change in school participation and learning engagement? • Has the program positively impacted children in their mental health wellness? • Is the suggested delivery of the program more costly than other means of delivery? Would participants prefer to attend the course in person or via a virtual platform?
<p>Funding agencies such as the private OT clinics, HKOTA, and the HK Polytechnic University</p>	<p><i>Qualitative questions:</i></p> <ul style="list-style-type: none"> • Did the participants report an increased understanding of the distinctive role of OT within schools? • Does this program increase awareness of the OT scope of practice in sleep hygiene education? • Will this program improve mental health and wellness in young children? <p><i>Quantitative questions:</i></p> <ul style="list-style-type: none"> • Did the research data demonstrate the importance of OT in providing sleep screening and intervention? • Did the findings demonstrate that the course content matches the knowledge needed to close the clinical gap the project intended to address?

Research Designs and Methods

This pilot study will involve both qualitative and quantitative data collection. It will be a one-group non-experimental design using pre- and post-program for both formative and summative data collection stages. Summative data will be collected through quantitative methodologies, whereas formative data collection will be based on qualitative methods. The program evaluation will take place primarily in the learning support division within the ESF schools in Hong Kong.

An application for the Institutional Review Board will be submitted before initiating any interaction with participants and data collection. The application will include the project protocol, informed consent, recruitment materials, focus group design, and study instruments. Throughout the data collection and analysis, all participants will be assigned a code comprising letters and numbers. Collected data will be coded and kept in the Excel program with password protection. Only the researcher of this project will have access to all the research data. The program author will send individual invitations to the school-based OTPs of the ESF schools. Besides, a brief 30-minute presentation will be arranged in the ESF therapy staff meeting as the SPOT introduction. A handout of the research program initiative and the researcher's contact information will be shared.

Formative/Qualitative Data Collection Methods

Individual interviews and focus groups will be conducted as the primary formative data collection approach in the pre-and post-training stages of the study. Qualitative data collection before the program's introduction clarifies the needs and characteristics of the primary stakeholders. The number of participants will not be more

than four in each focus group. Study inclusion criteria for the participants will include school-based OTPs (a) working with autistic children ages 3-8 years who are experiencing sleep problems and (b) having some experience in sleep education to address children's sleep problems or daytime sleepiness behaviors at school.

Participating OTPs will be interviewed individually via Zoom during the initial formative data collection phase. The sessions will be held during afterschool hours and facilitated by the lead researcher, who will serve as the facilitator. The recruited OT students will provide technical support in scheduling meetings and data analysis. For the semi-structured interview and focus group meeting, the researcher will use a discussion guide to initiate the discussion. The guide consists of 6-7 open-ended questions, such as a description of the student's daytime sleepiness problems, understanding of sleep and knowledge of sleep in autistic children, teacher-therapist collaboration, and their readiness to address sleep health at schools. The facilitator will record the entire discussion session with the participants' consent. Focus group meetings and interviews will be conducted during the pre-and post-training phases.

The questionnaires will be used repeatedly as the primary tool to collect qualitative data. Standard open-ended questions will be asked of each participating OTP. The SPOT questionnaire will collect data for pre-and post-training analysis (Appendix B). The SPOT questionnaire will be sent out via SurveyMonkey. The questions are designed to gather their experience using sleep assessments and whether there is a change in their attitude and views about embedding sleep hygiene programs for young children in schools. Participating OTPs will be asked about their experience using the suggested

OT screening tool (i.e., CHSQ, BEARS Sleep Screening Tool, Tayside Child's Sleep Questionnaire, Family Inventory of Sleep Habits (FISH), and ABCs SLEEPING Tool).

A knowledge quiz will be administered as a pre-and post-training assessment to measure the change in the participants' understanding of sleep, the impact of sleep dysregulation in autistic children, and the OT scope of practice in schools. The knowledge quiz will consist of questions about neural structures that support sleep functions and how sleep and sensory processing functions are interconnected. These questions will be formatted in a mix of multiple choices, yes/no answers. A total of 10 questions will be asked, and progress can be tracked with direct access to the statistics.

Summative/Quantitative Data Collection Designs

Summative data for the soft launch of this project will be collected before the commencement of training, after the training is completed, post-training in 3-month and 1-year intervals. A self-rating competency scale will be created by the author of the SPOT program (Appendix C).

- The independent variables: a) the four 1-hour training sessions at the online video conferencing platform, b) the use of training materials and activities, the selected sleep assessment and screening tools, and c) the sleep hygiene workshop protocol used in the program.
- Dependent variables: a) the perceived competence level in implementing the sleep assessment, intervention, and education in their school practice, b) the knowledge of sleep and pediatric sleep disturbance in autistic children, and c) increased confidence in advocating for the role of OT as a change agent in areas relevant to

the project

- **Measurement:** A Likert rating scale of 6 questions will measure the competence of participating OTs in delivering sleep assessment and sleep health education. Areas to be assessed are as follows: (a) critical thinking, (b) collaboration, (c) communication, (d) creativity and innovation, (e) self-direction, (f) using technology for learning, and (g) local connection (Bray et al., 2020). The responses to the scale are as follows: "5- fully competent", "4- fairly competent", "3- somewhat competent", "2- slightly competent", and "1- not competent" (Appendix C).

For the timing of data collection, participants will meet at the first focus group before the launch of the training workshop and after the training is completed, as shown in Figure 5.3. OT participants will receive four 1-hour live training sessions via an online video conferencing platform. Additional professional guidance will be provided for participating OTPs using sleep screening tools or sleep hygiene recommendations by the program author as needed.

Immediately after completing the training, a knowledge quiz will be repeated to measure the changes in sleep knowledge. Three-month post-completion, a focus group meeting for participating OTPs will be arranged. An open-ended SPOT questionnaire is used to measure the changes in self-efficacy in sleep screening utilization and partnership with teachers and parents. A whole group discussion session will be held in 1-year post-training to collect feedback to measure the long-term effectiveness of sleep education for teachers and parents and the effectiveness of OT sleep practice in schools. All the data

collected will inform the full launch of this program in the future.

Figure 5. 3

Timeline of the Research Data Collection



Data Management and Analysis

All the recorded interview discussions will be transcribed, coded, and entered into the Excel program manually by the trained OT student volunteers. Names of the participants will be coded, and all the transcripts will be processed to identify recurring themes using the NVivo software. The participants will validate the preliminary themes for authenticity and cross-check by the researcher's circle of advisors and the academic mentor at Boston University. Further refinement of the themes will be performed in the second and third rounds of the focus group. The coding stages will include developing themes and memos and summarizing them into strong assertions to give the data a higher level of significance (Giancola & Morrison, 2020).

The quantitative information collected will be analyzed using SPSS software with parametric and non-parametric descriptive statistics as appropriate. For instance, the mean and standard deviation can be calculated for the knowledge quiz score for pre-and post-training to measure the degree of change in the sleep knowledge of the participants. A repeated-measures ANOVA will be utilized to compare the mean confidence level at the start of the program to the mean level after the program and at the 3-month and 1-year time intervals. This process will then generate a p-value to provide a preliminary determination of the magnitude of difference.

The chosen qualitative analysis aims to gather formative input from school-based OTPs learning to implement sleep practice and education and collect their positive and constructive feedback. The communicated experiences throughout the SPOT program will help to inform the adaptation of program content and logistics.

Disseminating the Findings of the Program Evaluation Research

The Message

Sleep is an essential function and vital occupation for all children at the early stage of development. Recent studies have revealed a higher prevalence of sleep problems in autistic children and how sleep disturbance is closely linked to sensory sensitivities and anxiety (Schreck & Richdale, 2020; Chen et al., 2021). School-based OTPs are urged to include sleep screening in assessing overall occupational performance (Tester & Foss, 2018). Sleep intervention will help establish consistent sleep routines and habits in children and improve their sleep quality. OTPs can address emotional regulation and sensory processing to improve daytime behaviors at school and tailor specific home

activities for bedtime preparation. School-based sleep education will increase sleep health knowledge, and parents can be better informed of OT service provision at school. The interprofessional collaboration will improve stakeholders' knowledge and strengthen partnerships with parents. School-based OTPs must address optimal daytime and nighttime self-regulation for children struggling with sleep and sensory processing challenges.

The Audience

School-based OTs are the primary stakeholder audiences for the soft launch of the SPOT program. Sleep screening and education should be available to parents and young children who may be at risk for chronic sleep difficulties. School teachers and other health professionals will benefit from evidence-based sleep knowledge and early identification of poor habits and routines. If teachers are better informed of the OT's role in sleep health, children's sleep problems can be more effectively examined. Consequently, it may prompt a change in teachers' teaching and learning practice; the increased understanding of sleep will better prepare school-based OTPs to provide holistic care through school accommodations and parental consultation. Understanding the stakeholders' interests and needs is critical. Promoting sleep health will build the foundation for academic learning and mental health wellness in young children. School-based OTPs can improve daytime alertness and regulation by collaborating with teachers to enhance learning outcomes and social participation.

The Medium

The author will use a 2-page brief to present the program results with concise

interpretation and simple messages. The primary purpose of this shortened report is for teachers and parents to understand the program objectives and outcomes. The author will use a storytelling method to disseminate the evaluation results. It will comprise video quotes from the participating OTPs to encapsulate the essential themes from the pilot study.

When presenting more substantial evidence of study findings to school administrators, a more detailed research brief will be prepared to summarize the results. This report will include an executive summary with infographics. The infographic will also be available separately and translated into Chinese for easy distribution across the local schools in Hong Kong to promote school-based sleep education.

CHAPTER SIX – Dissemination Plan

Summary of the Program

Sleep Practice in Occupational Therapy is an educational program for OTPs to increase their knowledge base in sleep screening, intervention, and health education for autistic children in school settings. Parents frequently report sleep problems in the autistic community (Couturier et al., 2005; Jan et al., 2008; Kotagal & Broomall, 2012; Reynolds et al., 2012). OTPs are encouraged to proactively engage in schoolwide activities to promote physical and mental health in a population health approach (AOTA, 2014). By increasing the awareness and understanding of sleep practice, the program author hopes to advocate for school-based OT service in sleep health education for teachers and parents to improve sleep quality for autistic children.

Dissemination Goals

The main dissemination goal is for the primary audience, OTPs, to adopt sleep screening and OT-led sleep consultation. Through this program, OTPs will be empowered to address sleep disturbances in autistic children within schools. The goals for the program dissemination are outlined as follows:

- *Long-term goal:* By disseminating the training program to primary and secondary audiences, the school-based practice of OT-led sleep screening, intervention, and sleep health education will be increased for autistic children in Hong Kong.
- *Short-term goal:* Disseminating the program to the primary audience will increase the knowledge base on sleep difficulties and disorders in autistic children.
- *Short-term goal:* Disseminating the program to the primary audience will increase

confidence in the implementation of sleep screening and consultation in the school setting.

- *Short-term goal:* Disseminating the program results to the secondary audience of teachers and school administration will increase the awareness of OT scope of practice and collaboration with other health professionals in school sleep health education.

Target Audiences

The primary audience for the dissemination plan is school-based OTPs who serve within the ESF in Hong Kong. Some OTPs are hired directly under ESF, whereas others are contracted OTPs through private therapy agencies. All school-based OT providers for the ESF schools are eligible for this continuous professional development (CPD) opportunity. The secondary audience for this plan includes teachers, educational psychologists, and school administrators within the ESF community. The tertiary audiences are the autistic students and their families who will benefit from the sleep knowledge adopted in their everyday lives.

Key Messages

Autistic children who experience sensory modulation issues are particularly vulnerable to sleep difficulties and require additional structured day and nighttime activities (Kotagal & Broomall, 2012). Also, children's sleep problems could lead to increased parental stress and negatively impact family functions (Malow et al., 2014). However, many OTPs do not feel equipped to address sleep difficulties in school (Fung et al., 2013). There is an urgent need to deepen sleep health knowledge, integrate it

into practice, and facilitate interdisciplinary collaboration with other health disciplines (Tester & Foss, 2018).

Key Messages to Primary Audience

1. School-based OTPs are becoming aware of sleep as an occupational need. However, sleep problems are often assessed using non-standardized assessments with no progress tracking and data collection (Tester & Foss, 2018).
2. Many OTPs are not involved in sleep assessment and consultation due to the lack of formal education and clinical training in sleep care (Gruber et al., 2019; Tester & Foss, 2018; Wooster et al., 2015).
3. Evidence has shown that school-based sleep education programs significantly promote sleep health in children and youth (Rigney et al., 2021). Sleep health education is often the first line of treatment for children who suffer from chronic sleep deprivation and their families (Malow et al., 2014).

Key Messages to Secondary Audience

1. An association between sleep and poor daytime performance is commonly found in autistic children (Tzischinsky et al., 2018). Children with poor sleep habits would exhibit dysregulation in their daytime wakefulness, affecting their academic performance and social participation at school (Taylor et al., 2012; Deliens & Peigneux, 2019).
2. Evidence shows that school-based sleep health education programs implemented in the United States, Canada, and Australia have demonstrated positive outcomes in improving the quality of sleep in children and daytime performance (Gruber et

al., 2016; Rigney et al., 2021).

3. OTPs can offer sleep screening, consultation, and sleep health education to teachers and parents to cope with sleep difficulties and quality of life in autistic children.

Sources/Messengers

In the ESF school system, educational psychologists coordinate all the special education needs (SEN) services, i.e., occupational and speech therapy programs within the 22 schools. They also work closely with the special education needs coordinators (SENCOs) to arrange for contracted therapy services in the ESF mainstream schools. The program author works closely with the head of the educational psychology department and SENCOs that serve at the ESF kindergartens and primary schools. The ESF educational psychology department reaches out to all international schools for teaching and learning collaboration opportunities and organizes annual SEN conferences jointly. The key messages of this program can be spread through the ESF SEN newsletters and communication with the contracted therapy service providers through the ESF connections.

Externally, the Hong Kong Occupational Therapy Association (HKOTA) is another critical source for the dissemination of this project. As a member of the Special Interest Group (SIG) (<https://hkota.org.hk/sig>) of the school-based OTPs, the program author will reach out to a wider OT community and share the soft launch of this pilot study in one of their monthly meetings. In year two of this project, the author intends to distribute short teaching videos on the HKOTA website to promote this project in

Chinese.

Regarding the secondary audience, teachers and other health professionals can be reached via the Special Needs Advisory Group (SNAG) under the ESF teaching community. This group consists of SEN specialists from every ESF school. The role of the SNAG is to collaborate and develop SEN teaching and learning practices for children with diverse needs. The program author attends the termly meetings to report and reflect on the current therapy services within the foundation and has presented short courses related to school-based therapy practices for learners with developmental challenges. The SNAG platform is ideal for disseminating key messages and extending professional collaboration.

Another source to share information with parents and caregivers of autistic children is the support group called Special Needs Network Hong Kong (<https://www.snnhk.org/about-us>). The founder of this support group is one of ESF's parents and an SEN advocate Ms. Kim Anderson. The program author has collaborated with Ms. Anderson previously in providing training for domestic helpers in caring for children with special needs in Hong Kong. She is also a teaching professional and will be able to connect to international schoolteachers' unions in Hong Kong. This support group will be another valuable platform to spread the messages of the SPOT project.

Dissemination Activities, Tools/Techniques, Timing, and Responsibilities

The dissemination of this project is guided by the conceptual model of Knowledge to Action (Graham et al., 2006). This model has contributed to the success of sleep education programs in Canada and Australia (Gruber, 2017; Rigney et al., 2021).

Through knowledge creation, translation, transfer, and implementation stages, the proposed practical strategies are relevant and applicable to the key stakeholders, including clients, policymakers, and pertinent healthcare professionals (Graham et al., 2006). The program author will identify barriers to knowledge use and tailor the implementation strategies to the local context. Assessing the current level of sleep knowledge, the utilization of sensory integration in pediatric practice, and the attitude toward sleep are essential considerations in disseminating school-based sleep health education programs (Gruber 2017). Translating the scientific sleep knowledge with respect to the social and cultural elements of the Hong Kong family dynamics is also important when sharing key messages with primary and secondary audiences. The dissemination plan will begin in the spring of 2023. The program author will be responsible for most of the dissemination activities detailed in Table 6.1. The OT students will assist with video editing, creating posters, and posting videos on social media.

Table 6.1

Proposed Dissemination Activities

Written Information

- A Special Issue/Article: an article will be written to address the scientific evidence of sleep function for the development and learning of children and the gap in OT pediatric practice in sleep consultation and wellness education. The article will briefly describe the current evidence and barriers to OT school-based practice in health education. Besides, OTPs are encouraged to collaborate by forming an interest group to extend OT practice in pediatric sleep and mental wellness programs.
- Brochure: A brochure will be created targeting OTPs and highlighting the importance and evidence in sleep screening, intervention, and sleep health education in school settings. It will describe the prevalence of sleep problems and offer solutions in school-based practice. Information will be presented in graphs and tables with clear messages. A QR code will be available for course registration and to contact the program author.

Dissemination Platform	Description	Timing
ESF SNAG Committee	<ul style="list-style-type: none"> The SNAG committee is the primary platform to connect all the SEN specialists, including all in-house OTPs. The newsletter shares current school development for students with SENs and disseminates internal CPD courses. 	<ul style="list-style-type: none"> The article will be submitted in February 2023. A soft copy of the brochure will be distributed to all ESF schools via email in February 2023.
<p>Two leading private therapy organizations that serve international schools in HK E.g., Watchdog Early Education Center (https://www.watchdog.org.hk/en) and the Child Development Center Hong Kong (https://www.cdchk.org/get-involved/be-our-partner/)</p>	<ul style="list-style-type: none"> The two organizations have an online website that can distribute information on local professional training courses; the article can be published through their newsletters or as a standalone downloadable soft copy on their resources page. 	<ul style="list-style-type: none"> The article will be submitted to these two organizations in February 2023. A soft copy of the brochure will be distributed to all the local private pediatric therapy centers via email in February 2023.
<p>Hong Kong OT Association (HKOTA) (https://hkota.org.hk/poster)</p> <ul style="list-style-type: none"> HKOTA newsletter is issued every other month through the member's section on their website 	<ul style="list-style-type: none"> The association offers CPD dissemination opportunities via poster and newsletter publication to members only. 	<ul style="list-style-type: none"> The program author will seek approval from HKOTA in Jan 2023. The article is anticipated to be published in the March issue of 2023.
<p>Electronic Media (Description)</p> <p>A series of informational videos will be created in stages and will cover the following topics:</p> <ul style="list-style-type: none"> How do we define sleep problems in children? How does sleep relate to academic learning? Why and how can OT contribute to sleep health in children? What is unique about sleep problems in autistic children compared to other children? What is sleep hygiene? How can OTs be sleep health educators in schools? <p>Each video will be created for no more than three minutes using the Doodly software. An animated OT character will introduce the training program, covering a range of topics from identifying sleep problems and the practice gap to offering solutions.</p>		

Dissemination Activity	Target Audience	Timing
Informational Videos Personal and Private Facebook group	School-based OTPs	<ul style="list-style-type: none"> Videos will be released in February 2023. One video per feed, and it will be released every two weeks. The program author will respond to questions and comments.
Informational Videos Special Needs Network Hong Kong https://www.snnhk.org/su_bmit-an-event	SEN service providers in the international school community (E.g., teachers and therapy service providers)	<ul style="list-style-type: none"> The informational videos and poster can be downloaded after simple steps of signing in. The videos will be available in February 2023.
Informational Videos HKOTA Poster Presentation at the Special Interest Group (SIG) general meeting https://hkota.org.hk/sig	OTPs in school-based practice	<ul style="list-style-type: none"> The informational videos and poster can be downloaded after simple steps of signing in. The English version will be released in February 2023. The Chinese version will be released in February 2024.
Person-to-Person Contact (Description) A poster will be created emphasizing qualitative and quantitative data on pediatric sleep assessment and intervention to advance OT pediatric practice. The Sleep Practice in Occupational Therapy educational modules will also be listed on the poster to promote the course. The poster will be presented electronically at the venues indicated below.		
Dissemination Platform	Target Audience	Timing
ESF SNAG committee meetings	OT service providers within the ESF community	This committee will meet monthly, and agenda will be drafted to invite interested ESF SEN educators and OT service providers. The program author will arrange 30 minutes to present the poster in March 2023.
Special Needs Network Hong Kong https://www.snnhk.org/su_bmit-an-event	SEN service providers in the international school community	<ul style="list-style-type: none"> An in-personal or virtual presentation will be scheduled for March 2023.

		<ul style="list-style-type: none"> • The informational videos and poster will be used during the live presentation and discussion.
<p>HKOTA Poster Presentation at the Special Interest Group (SIG) general meeting (https://hkota.org.hk/sig)</p>	<p>Local OTPs in school-based practice</p>	<ul style="list-style-type: none"> • An in-person presentation will be arranged during one of the SIG meetings for the school-practice OTPs in March 2023. • Due to the Hong Kong pandemic restrictions, if an in-person presentation is not feasible, it will change to an online live session.

Budget

Time invested through the dissemination phase will be substantially greater than the financial cost in the budget. The estimated expenses associated with the dissemination activities are summarized in Table 6.2.

Table 6.2*Proposed Budget for Dissemination Activities*

Dissemination Activity	Estimated Time & requirements	Estimated Costs
<p>Written Information: Special article on sleep health in autistic children to be published in the newsletter on the following platforms:</p> <ul style="list-style-type: none"> • ESF SNAG committee • HKOTA • Child Development Centre Hong Kong • Watchdog Early Education Centre 	<ul style="list-style-type: none"> • Ten hours of program author's time: from preparation to the publication of the article for the listed platforms, including time for revisions and formatting based on feedback from project advisors. • The article is a summary of chapters one to five of this project as part of the Boston University post-professional occupational therapy doctorate program. 	<ul style="list-style-type: none"> • The average OT salary/hour in Hong Kong is HKD 250 (Equivalent to USD 32), therefore the cost would be HKD 2,500 • The actual expenses are \$0 as it has already been completed. • It is free to publish in the listed newsletters • This article will only be available under resources for HKOTA members on its website.
<p>Written:</p> <p>Brochure</p>	<ul style="list-style-type: none"> • 5 hours for drafting, editing, and designing the electronic copy of the brochure using Microsoft Word. • The brochure is generated by completing chapters one to five of this project as part of the Boston University post-professional occupational therapy doctorate program. 	<ul style="list-style-type: none"> • The average OT salary/hour in Hong Kong is HKD 250 (Equivalent to USD 32); the cost would be HKD 1,250. • Actual expenses: \$0.
<p>Electronic Media:</p> <p>Informational videos</p>	<ul style="list-style-type: none"> • The program author will provide the content, and OT students will produce the videos using the Doodly software. • Year 1: 20 hours of video production time by the OT students. 	<ul style="list-style-type: none"> • Actual expenses: \$0 The cost for the Doodly software subscription has already been counted under the technology resources budget.

	<ul style="list-style-type: none"> Year 2: 20 hours of video translation from English to Chinese by the OT students. 	
<p>Electronic Media:</p> <p>Facebook, SNNHK & HKOTA websites</p>	<p>Membership is required to access the HKOTA member's benefits in course promotion and posting OT educational resources.</p>	<ul style="list-style-type: none"> Annual HKOTA membership is Year 1: HKD 350 Year 2: HKD 350 No other cost is involved in posting informational resources on the listed websites
<p>Person-to-Person</p> <p>Contact:</p> <p>ESF SNAG committee meetings</p> <p>Special Needs Network Hong Kong professional briefing</p> <p>HKOTA Poster Presentation at the Special Interest Group (SIG) general meeting</p>	<ul style="list-style-type: none"> The poster is generated by completing chapters one to five of this project as part of the Boston University post-professional occupational therapy doctorate program. Create a project poster with free online templates (https://www.posterpresentations.com/free-poster-templates.html). Anticipating in-person delivery in year two (as Covid restrictions are lifted), there will be costs for renting a conference room and serving tea and coffee for meeting at the ESF center. 	<ul style="list-style-type: none"> Online free video conferencing platforms \$0 Year 1- The cost for the Zoom subscription is listed under technology resources in the funding plan. Year 2- Conference room rental is HKD 200 per hour Year 2 – Meeting travelling, and printing brochure expenses will be HKD 500
		<p>Year 1: HKD 350 Year 2: HKD 1,050 Total: HKD 1,400</p>

Evaluation

The success of dissemination efforts will be measured by the following criteria described in Table 6.3.

Table 6.3*Criteria for Measuring Success for Dissemination Activities*

Dissemination Activity	Measurement of Program Success
<p>Written Information: Special issue article on sleep health in autistic children to be published in the newsletter on the following platforms: ESF SNAG committee, HKOTA, Child Development Centre Hong Kong, and Watchdog Early Education Centre</p>	<ul style="list-style-type: none"> • The acceptance of the article for publication within the first six months after the completion of this educational program. • The number of OTPs who contact the program author for course information
<p>Written Information: Brochure</p>	<ul style="list-style-type: none"> • Distribution of at least 50 brochures (soft copy) to the ESF schools and major private therapy service providers within the first three months before the program's launch. • The number of OTPs registering for the online educational program
<p>Electronic Media Informational Videos</p>	<ul style="list-style-type: none"> • The number of requests for the videos • The number of OTPs contacting the program author for additional information • The number of OTPs registering for the online educational program
<p>Person-to-Person Contact:</p> <ul style="list-style-type: none"> • ESF SNAG committee meetings • Special Needs Network Hong Kong- professional briefing • HKOTA Poster Presentation at the Special Interest Group (SIG) general meeting 	<ul style="list-style-type: none"> • The number of OTPs attending each presentation • The number of OTPs requesting course registration information • The number of individuals who contacted the program author to request additional information.

Conclusion

Sleep Practice in Occupational Therapy is an educational program to enhance sleep knowledge and evidence-based practice for OTPs in school settings. The program participants will learn how to be effective health educators by translating the knowledge

of neuroscience into health information and sharing it with other stakeholders, such as teachers and school administrators. OT participants will use practical strategies to promote sleep hygiene in schools and deliver parental and teacher sleep education workshops. The program author plans to extend the preliminary evaluation data results to the development of this program. It is anticipated that the primary audience of this program can be further expanded to the OTPs serving in the local inclusive kindergarten and primary schools in Hong Kong. Furthermore, through the dissemination activities in the SEN community, the program author seeks to increase awareness of interprofessional collaboration to enhance teaching and learning outcomes and improve the quality of life for autistic children.

CHAPTER SEVEN – Funding Plan

The Proposed Program

Sleep Practice in Occupational Therapy is an evidence-informed sleep health educational program that advances the current occupational therapy scope of practice within schools. Many OTPs do not address sleep concerns in their practice (Richardson et al., 2020; Tester & Foss, 2018). This educational program aims to fill this gap by increasing the knowledge base of OT practitioners and, in turn, improving the learning outcomes and quality of life of autistic children. Furthermore, extending this program to other Hong Kong local schools and therapy settings (e.g., integrated early childhood centers and local and international special education providers) would positively raise awareness of the role and scope of the occupational therapy profession.

This course consists of four 1-hour virtual learning modules. The program author has identified a list of potential funding resources to implement this training course to cover the expenses for creating and implementing the modules. The funding will support the personnel costs, the production of online course materials, online survey forms, school-based sleep health educational and promotional videos, supplementary sleep hygiene resources for autistic children in early intervention and preschool settings, and gift vouchers for guests sharing their lived experiences via pre-recorded video segments. The personnel expenses for the program author will primarily be covered during year one.

Expenses

Based on the continuous professional development guidelines of the English School Foundation (ESF), all teaching and professional staff are entitled to the preparation time for course development. The program author will devote approximately 10% of the weekly billable hours (i.e., 4 hours out of the 40 hours per week to be estimated as CPD preparation time) for the launch of this project. In addition to the CPD time allowance, the program author will apply for four weeks of paid study leave. The time will be used to complete the course handouts, PowerPoint presentation materials for delivering school-based workshops, teaching videos, and Padlet resources for OTPs, teachers, and parents. The proposal for this course will first be approved by the school council and be granted paid study leave. Salary and benefits will continue to be covered through the senior OT position.

In addition to personnel costs for program development, there are other course materials expenses. The pre-recorded interviews with a clinical psychologist and a parent with an autistic child will be used for group discussion in the course. These video segments will be generated via the Zoom platform and edited by the OT students as part of their fieldwork assignment. Besides, different teaching, promotional, and marketing videos will be produced through a video animation software. The SPOT program will be implemented through an online learning Zoom platform. Additional expenses for the teaching and marketing resources are outlined in Table 7.1.

Available Local Resources

This program will be embedded into the current professional training scheme under the English School Foundation. This school foundation is the largest English-standard international school organization in Hong Kong, comprising twenty-two schools and over 18,000 students in kindergarten, primary, and secondary schools. ESF adopts inclusive education across all its schools and provides professional training opportunities for all teaching and therapy staff. This chapter will describe this integrated approach through the budget plan of needed resources and funding sources for the first two years of implementation.

The ESF Teaching and Learning Committee supports continuous professional learning opportunities by offering professional education courses and research project opportunities (English Schools Foundation, n.d.). Every year the committee calls for interest and opens the application to present relevant educational topics through the ESF CPD platform. All teaching professionals are strongly encouraged to share their specialized skills and knowledge and contribute to developing the school curriculum and improving learning outcomes. The SPOT program author will submit the application for approval from the committee and plan for implementation in the following year.

The program developer will take advantage of the early-release school days for staff development within the ESF schools. All therapy practitioners are entitled to at least five hours of professional training annually under the ESF CPD scheme. Therefore, no costs are anticipated for ESF therapy practitioners to join in the first year of implementation. The SPOT program will be open to non-ESF school-based OTPs with

limited seats for up to two participants in the soft launch of this program. The standard registration fee for non-ESF staff members joining any ESF courses is HKD 500 per contact hour. In year two of this program, the budget will be revised to reflect the revenue of non-ESF OT participants. With the projection of 10 non-ESF participants, the revenue is estimated at HKD 5000 in year two.

In addition to the resources provided by the ESF teaching and learning committee, the program will also be funded by an external source from the Hong Kong Polytechnic University. By providing clinical instruction and supervision to OT students in school settings, the program author will be reimbursed by the Hong Kong Polytechnic University based on the clinical hours. Given the approval from the ESF school council, this clinical teaching compensation is being allocated as supplementary OT continuous education assistance. This allowance is budgeted each fiscal year to offer professional learning opportunities for the OT staff within the ESF organization.

Needed Resources: Budget

Although the costs associated with the SPOT program have been reduced and supported by the external fund, it is important to manage a low-cost budget in the initial soft launch of this project. In the first year of this program, program resources will be available online to eliminate the cost of travelling and renting spaces. In the second year of this program, promotional videos and printed materials will be made available in Chinese. It is anticipated that the number of OT program participants will increase after the first year with the effort to extend it to the local Chinese OTPs who serve autistic children in special schools. The year 1 budget estimation is based on the soft launch of

this program with five OT participants. In year 2, the program author hopes to expand the participant capacity to ten local school-based OTPs. Table 7.1 summarize the proposed budget items, expenses, and justifications for years 1 and 2, respectively.

Table 7.1

Proposed Program Budget – Years 1 & 2

Budget Item	Expense		Justification
	Year 1 (2022–23)	Year 2 (2023–24)	
Personnel			
Program development	HKD 250,000.00 Actual expense \$0	\$0	<ul style="list-style-type: none"> • The average OT salary/hour in Hong Kong is HKD 250 (Equivalent to USD 32). • A total of 1000 hours of creating content and developing handout materials and program activities. • This is considered a sunk cost and is not included in this budget. Such cost is already incurred by completing this project as part of the Boston University post-professional OTD program and thus cannot be recovered.
Program Implementation and Data Collection (Pre- and post-training)	HKD 8,500.00	HKD 11,000.00	<ul style="list-style-type: none"> • Projecting a rate of 250 HKD/hour for 4 hours to implement the four online sessions. • 30 hours- Projecting time for course registration, marketing, survey design, data collection via post-training interviews with individual program participants, data analysis, and program evaluation. Program participants are limited to <u>five</u> OTPs in the soft launch. • 40 hours for the second year - projecting program participants up to <u>ten</u> OTPs.

Consultants			
Academic Advisor	USD 5000 Actual expense \$0	\$0	<ul style="list-style-type: none"> • Estimating a rate of USD 100/hour for 50 hours of Boston University doctoral project advisory. • Cost to be covered in the 2-year Boston University post-professional OTD program (not included in the program tuition)
Project Advisor	N/A	HKD 3,000 (2 hours)	<ul style="list-style-type: none"> • Project consultant fee: HKD 1500/hour for expert knowledge consultation and program evaluation • Program author's circle of advisors has agreed to provide research assistance and future collaborations.
Equipment			
Computer	HKD 6000 Actual expense \$0	\$0	<ul style="list-style-type: none"> • Laptop for project material production, online communication, and delivery of the program • The program author owns an HP laptop and a desktop computer with a monitor.
Sleep tracking device	HKD 1248 <u>Sleep tracking mattress</u>	\$0	Require for program activity and loan for trial
Sensory compression blanket	HKD 700 <u>Compression Blanket</u>	\$0	Require for program activity
Sensory assessments	HKD 200 \$18/ digital copy Ten copies available	HKD 200 \$18/ digital copy Ten copies available	Sensory Profile 2: Q-global Administration/Report (Digital) <ul style="list-style-type: none"> • Use for program activities and training.
	HKD 220 Ten digital copies	HKD 220 Ten digital copies	Sensory Processing Measure 2: Preschool and Child home and school online forms <ul style="list-style-type: none"> • Use for program activities and training.
Sleep surveys and questionnaire	Free to download	Free to download	<i>Children's Sleep Habits Questionnaire</i>

			<ul style="list-style-type: none"> It has been validated for autistic children ages 2- 10 in a recent study (Katz et al., 2018). <p><i>Family Inventory of Sleep Habits</i></p> <ul style="list-style-type: none"> This questionnaire is specifically designed for parents of autistic children ages 3 to 10 (Malow et al., 2009).
Office Supplies	HKD 200	HKD 300	Use for printer or postage as needed
Technology			
Microsoft Office 365 for Business Standard	HKD 1200/year	HKD 1200/year	Require for creation of teaching PowerPoint, sleep hygiene handouts, flyers, and data collection and analysis
Zoom	HKD 1200/year	HKD 1200/year	Require for course delivery
SurveyMonkey	HKD 2000 billed annually	HKD 2000 billed annually	Use for pre- and post-training surveys and provide data for program evaluation.
Doodly	HKD 1000 Billed annually	HKD 1000 Billed annually	This animation video online software is used to create promotional and teaching videos.
Padlet	HKD 378 Billed annually	HKD 378 Billed annually	Use for online and course-related literature resources. The initial three pages of Padlet are free <ul style="list-style-type: none"> The program author intends to extend the usage of this online platform for future teaching purposes
Boardmaker	HKD 100 1-month Online subscription	N/A	Use for creating program activities, e.g., visual and bedtime schedules.
Sub-total	Year 1: HKD 16,946	Year 2: HKD 20,498	
Dissemination Expenses:	HKD 350	HKD 1050	
TOTAL	HKD 17,296	HKD 21,548	

Potential Funding Sources for the Program

The program author aims to keep the running costs minimal during the first year of implementation. As mentioned previously in this chapter, the SPOT program will be integrated into the CPD scheme under the ESF professional learning platform. Although the primary target audience of this learning platform is the ESF staff members, the foundation welcomes professional collaboration with other universities and research projects. It is anticipated that there will be a growing need to extend this training to the non-ESF OTPs in year two of this program. There are limited school-based OT training opportunities in Hong Kong, especially during the last two years of the pandemic. Also, most professional training courses are primarily led by a medical model. They do not address the importance of improving the educational system and providing a more child-friendly learning environment. The SPOT program embraces inclusivity and diversity in teaching OTPs to adopt evidence-based sleep knowledge and strengthen our understanding of sleep health in autistic children. School-based OTPs can further contribute to mental health education and wellness activities in all children. This ethos of providing professional training sits well with the ESF mission and vision of nurturing a diverse, equitable, and inclusive learning environment.

The OT clinical teaching remuneration from the Hong Kong Polytechnic University will assist the start-up of this program. In reference to the program author's previous clinical teaching record in 2020, the remuneration fee for one OT level II 8-week student placement was HKD 36,120 (based on a total of 280 clinical hours with HKD 129 per hour). During the clinical placement, the OT students will gain essential

research experience in preparing for the soft launch of this program. The program author will seize this opportunity to promote clinical research and impact the future OT generation in advocating for our profession in school-based practice.

In the second year of program implementation, the partnership with the HKOTA will be anticipated to boost this project in the local OT learning community. The program author will translate all the promotional and marketing materials into Chinese and support the delivery of sleep health education in the local schools in Hong Kong. As an HKOTA member, financial assistance in registration and marketing of the SPOT will be offered via their official website and HKOTA newsletter at a minimal cost. As described in Table 7.2, the program author will seek other local non-charitable grants and university funds to assist with program development, implementation, dissemination, and evaluation costs. In year two, the program author intends to partner with her circle of advisors for further collaboration in the local OT community in Hong Kong. The Hong Kong University Grants Committee (UGC) resources will be a sustainable funding source for this project for future development.

Table 7.2

Other Funding Sources

Funding Source	Description	Application Requirements
Queen Elizabeth Foundation for the Mentally Handicapped	<ul style="list-style-type: none"> • The Hong Kong Jockey Club funds this foundation to support the welfare, education, and training of individuals with mental health challenges (Labour and Welfare Bureau, 2022). • Projects can be public education-related programs to promote understanding and 	<ul style="list-style-type: none"> • Applications for grants are called once a year • Applicants must be made in the name of the head of the non-profit organization • A dissemination plan must be submitted in the application

	<p>positive attitudes toward individuals with disabilities</p> <ul style="list-style-type: none"> • Service offered must be targeted to improve and upgrade services for individuals with intellectual disabilities 	<p>for a grant application that sought to exceed \$200,000.</p> <ul style="list-style-type: none"> • Offers grants from HKD 5000 up to 500,000 • A standardized template is available on their website
Quality Education Fund	<ul style="list-style-type: none"> • This fund is established by the Hong Kong government to support meaningful educational pilot studies. • The fund aims to improve the quality of school education and promote learning in children with all abilities. • Projects should aim to enable schools to enhance staff development or other school improvement projects (Quality Education Fund, n.d.). 	<ul style="list-style-type: none"> • Use the online templates to apply for grants either below the amount of HKD 200,000 or exceeding that amount. • The fund is open for application twice a year. • It offers a one-off funding opportunity for all publicly funded schools • The duration of the project must not exceed three years.
University Grants Committee (UGC)- Early Career Scheme	<ul style="list-style-type: none"> • This university grant is available for all researchers in Hong Kong universities. Given the financial support from the Hong Kong government, the UGC offers a range of funds for research studies locally and encourages international collaboration (University Grants Committee, 2022). • One of the funds available is called Early Career Scheme, designed to nurture junior academics in their education and research path. 	<ul style="list-style-type: none"> • The principal researcher must be an academic staff member of a UGC-funded university. • The project must have a significant contribution to academic/professional development • The grant size per project is typically up to HKD 2 million. • Projects should have the potential for social, cultural, and economic applications.

Conclusion

During the soft launch of the SPOT program, all teaching and learning materials will be available digitally. OT participants are encouraged to practice using the resources to deliver sleep health education for teaching staff and parents in their respective schools. The program author may assist OT participants in school presentations or consultations

and collect feedback if feasible. The input will further inform the development of this program during year two.

Using an integrated approach to embark on this project will help to reduce the operational cost of this project. It is an excellent opportunity to practice a workload practice model in school-based service delivery. OTPs are encouraged to be involved in staff training, advocacy, evidence-based research studies, and health education in school settings (AOTA et al., 2014; Seruya & Garfinkel, 2020). The program author will continue to seek government funds and support by collaborating with other local universities, such as the Hong Kong University or the Chinese University of Hong Kong, to sustain this project development and related research study.

CHAPTER EIGHT – Conclusion

Purpose of Doctoral Project

Sleep preparation and performance in autistic children is a crucial element of their everyday life skills, significantly impacting their daytime functions for social and emotional regulation (Johnson et al., 2017). Researchers have consistently identified that autistic children are likely to experience more sleep disturbances than typically developing children (Malow & McGrew, 2020; Reynolds et al., 2018). Sleep difficulties in autistic children may be related to brain wave organization and maturation differences, gene anomalies, abnormal melatonin levels, sensory dysregulation, and anxiety (Souders et al., 2017). Evidence supports basic medical practitioners to conduct sleep screening for all autistic children as a proactive measure to promote healthy sleep habits and enhance an optimal quality of life for children and their families (Franklin et al., 2015).

School-based OTPs are beginning to embrace scientific evidence about sleep to promote optimal sleep quality in children (Clark & Kingsley, 2020). In fact, the quality of sleep health and hygiene of autistic students may be considered through the process of OT assessment, intervention, and family education to improve the quality of life for autistic children (Reynolds et al., 2012). School-based OTPs are strongly encouraged to adopt the role of a health educator in providing sleep health education in school settings (Tester & Foss, 2018). This project has been developed and designed to address this need within OT practice and is based on the current sleep research studies focusing on autistic children.

SPOT is an evidence-informed educational program to enhance sleep knowledge

and evidence-based practice for OTPs in school settings. The program participants will learn how to be effective health educators by translating the knowledge of neuroscience into health information and sharing it with other stakeholders, such as teachers and school administrators. OT participants will employ practical strategies to promote sleep hygiene in schools by offering sleep consultation, delivering sleep education workshops for parents and teachers, and providing wellness programs to autistic children.

Application of Theories

The ELT was used to guide the SPOT program from its initial development through the stages of professional learning, reflective observation, critical thinking, and developing new strategies or ideas to aid clinical reasoning (Fewster-Thuente & Batteson, 2018; Lee et al., 2016). The ELT serves as the lens to deepen the understanding of the current challenges for school-based OTPs in promoting sleep health in the school environment. School-based OTs are encouraged to adopt a continuous professional reflection to scaffold their lived experiences and inform contemporary practice to promote sleep health as a mental health initiative. In addition, the dissemination plan for this project is guided by the conceptual model of Knowledge to Action (Graham et al., 2006). This model has contributed to the success of sleep education programs in Canada and Australia (Gruber, 2017; Rigney et al., 2021). Through knowledge creation, translation, transfer, and implementation stages, the proposed practical strategies are relevant and applicable to the key stakeholders, including clients, policymakers, and pertinent healthcare professionals (Graham et al., 2006). Translating the scientific sleep knowledge with respect to the social and cultural elements of the Hong Kong family

dynamics is essential when sharing key messages with primary and secondary audiences.

Integration of Evidence

A thorough literature review was performed to identify studies and reveal relevant evidence on sleep health management and intervention for children in clinical and community settings, such as schools. Evidence indicated that autistic individuals are more susceptible to sleep dysregulation, possibly due to the pathophysiology of autism (Schreck & Richdale, 2020; Malow & McGrew, 2020; Rana et al., 2020), and interactive parental sleep education by trained health professionals leads to improved parenting competency and quality of life for autistic children and their parents (Stuttard et al., 2015; Hunter et al., 2020). Addressing sleep dysregulation falls within the scope of OT practice for all ages (Weaver, 2015; Gronski & Doherty, 2020). The reciprocal relationship between sleep and daytime functioning has become a strong argument that pediatric OTPs should incorporate sleep screening and consultation when working with children with additional needs (Franklin et al., 2015). Moreover, the growing evidence of sleep-promoting daytime physical activity intervention facilitates a comprehensive approach to planning for school-based wellness programs (Franklin et al., 2015). Sleep health education is critical in public health measures as it will improve sleep knowledge, attitudes, and related daytime health outcomes (Gruber, 2017).

Program Planning

The SPOT program author envisioned bridging the knowledge gap in the current school-based OT practice with the support of quantitative and qualitative research evidence. The program was tailored as an easy-access online learning platform for

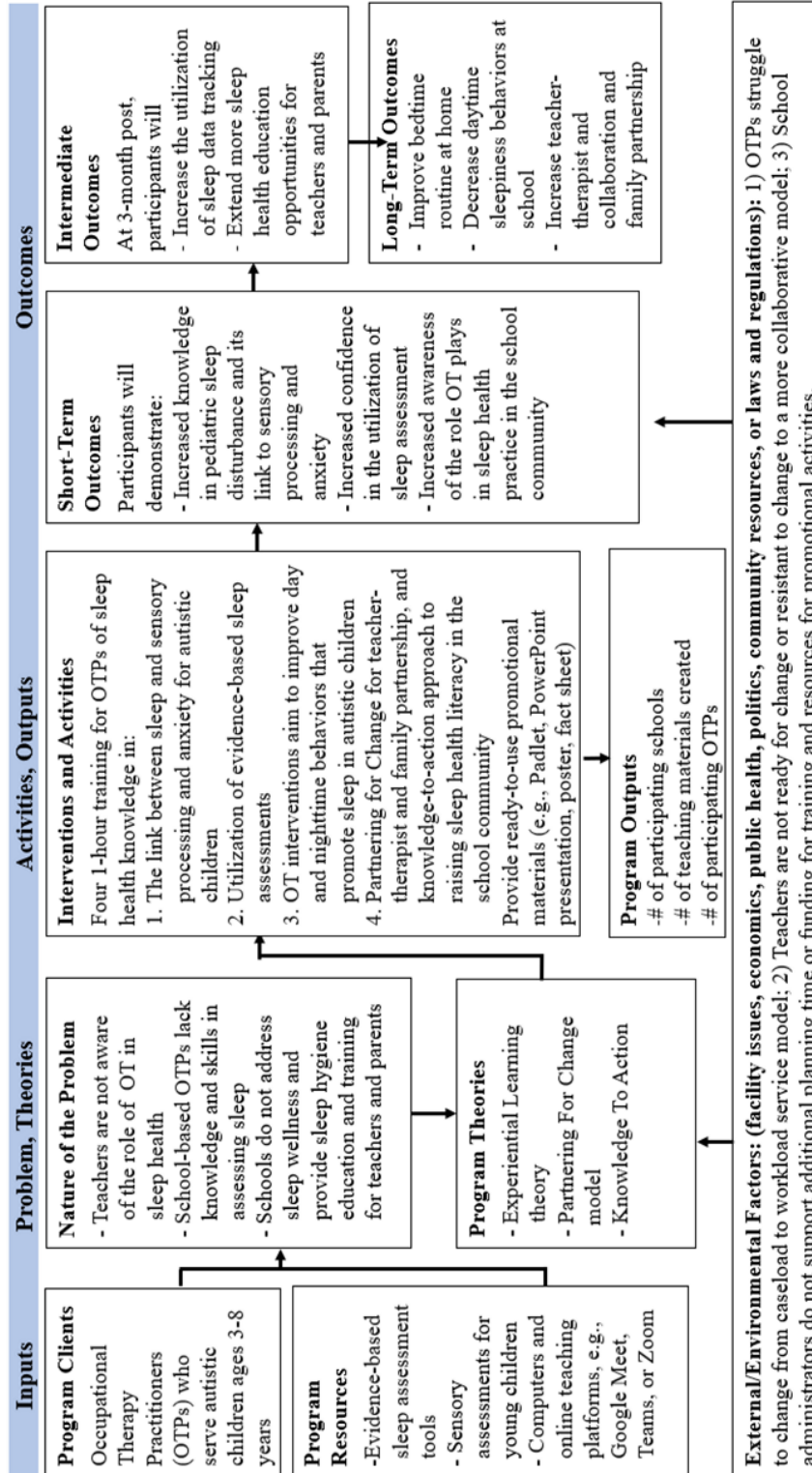
school-based OTPs. This course consists of four 1-hour virtual learning modules. The program author has identified a list of potential funding resources to implement this training course to cover the expenses for creating and implementing the modules. The SPOT program will be embedded into the existing professional training scheme under the ESF in Hong Kong. In addition to the funds provided by the ESF teaching and learning committee, the program will also be funded by an external source from the Hong Kong Polytechnic University.

Implications

With the increasing evidence of an association between sensory sensitivity and sleep in autistic children (Reynolds et al., 2012; Rajaei et al., 2020), OTPs should emphasize the importance of sleep health and its relationship with daytime wakefulness and school participation in school-based practice. Emerging evidence suggests that autistic children suffer from alterations in the neurobiological processes, which affect the sleep-wake cycle (Moore et al., 2017). Practitioners must advocate for our role in sleep health and contribute to sleep assessment and intervention in pediatric OT practice. Sensory tools, strategies, and environmental adaptations should be carefully tailored and monitored through evidence-based measures. The overall evidence poses an imperative need to improve pediatric sleep literacy among health professionals (Rigney et al., 2015; Gruber et al., 2019; Richardson et al., 2020). Teacher-therapist collaboration and family partnership must be emphasized throughout school-based sleep health education. It is hoped that OT-led sleep screening, intervention, and health education can positively impact autistic children and their families through early intervention programs and

primary education.

APPENDIX A: Full Logic Model



APPENDIX B: SPOT Questionnaire for OTPs

1. During the initial assessment for autistic children, do you assess their sleep habits and routine? If yes, please share the tool(s) you will use or questions you might ask. If not, would you briefly explain your reasoning?
2. “It is critical for therapists to spend time developing strong relationships with educators and to become a part of the school community to establish trust and clarify expectations (Kennedy et al., 2019). What is your experience in working with teachers and school administrators?
3. Do you think your teachers know the OT scope of practice?
4. Can you describe your partnership with teachers and parents in school-based practice?
5. Can you share your experience of parent education or consultation on sleep-related topics, (e.g., sleep hygiene, sleep problems, or daytime sleepiness?) Would you agree that school-based OTs should engage in sleep education in a school setting? If yes, what are your suggestions? If not, why, and what are the concerns or barriers?
6. This question is added to the post-training data collection:
Would you agree that these assessments are suitable for OTPs to use in school settings? Choose “agree”, “not sure”, or “disagree”, and briefly explain.

<u>Sleep screening/ assessment tools</u>	<u>Agree</u>	<u>Disagree</u>	<u>Not sure</u>	<u>Briefly explain (e.g., usefulness, usability, valuableness, accessibility, satisfaction & credibility of the tool)</u>
<u>Children’s Sleep Habits Questionnaire</u>				
<u>BEARS Sleep Screening Tool</u>				
<u>Family Inventory of Sleep Habits</u>				
<u>Sleep Questionnaire</u>				

APPENDIX C: Competency Rating Scale for SPOT program

Sample questions

Critical Thinking – to examine the child’s sleep problem(s) and investigate the causes and impact of sleep disruption on the child’s daily function. Understand that there might be no definitive answers. Goal is to use the appropriate evidence to draw conclusions

5 Fully prepared <input type="radio"/>	4 Fairly prepared <input type="radio"/>	3 Somewhat prepared <input type="radio"/>	2 Slightly prepared <input type="radio"/>	1 Not prepared <input type="radio"/>
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Collaboration – to work with teachers and parents to understand the problem effectively and respectfully to reach a common goal, while assuming shared responsibility to complete the task

5 Fully competent <input type="radio"/>	4 Fairly competent <input type="radio"/>	3 Somewhat competent <input type="radio"/>	2 Slightly competent <input type="radio"/>	1 Not competent <input type="radio"/>
--	---	---	---	--

Communication – to process information, data and to share the findings effectively using a variety of formal or informal opportunities including written reports, team meetings, parents consultation, workshop presentations, film, etc.

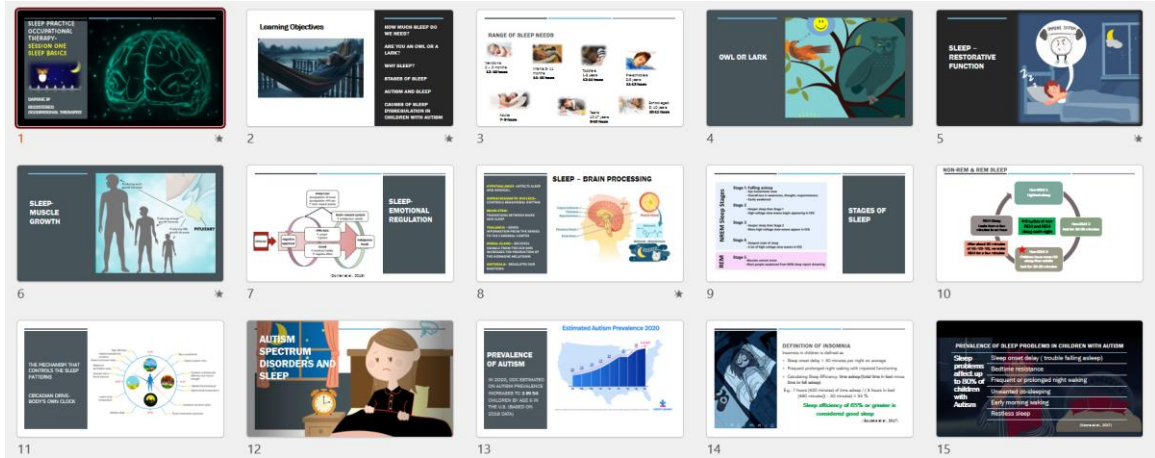
5 Fully competent <input type="radio"/>	4 Fairly competent <input type="radio"/>	3 Somewhat competent <input type="radio"/>	2 Slightly competent <input type="radio"/>	1 Not competent <input type="radio"/>
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Reference:

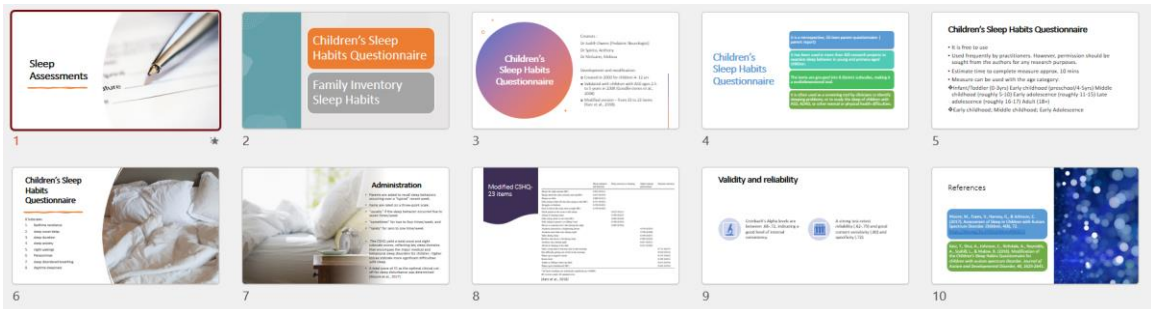
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APPENDIX D: Teaching PowerPoint Presentation

Sample pages of teaching PowerPoint presentation (Module One)



Sample pages of teaching PowerPoint Presentation (Module Two)



APPENDIX E: SPOT Brochure

Being stressed is a common cause of sleep problem (Mazurek & Petroski, 2015). Try these:

- Relaxation e.g. yoga or breathing exercises
- Mental health support from teachers or therapists

A Child who has Sensory Difficulties

References

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Resources:

[Cognitive behavioral therapy for insomnia](#)

[A sensory life.com](#)

[Sleepfoundation.org](#)

Ask your school district administrator on how to get in contact with your school OT if you have concerns about your child's sleep or other sensory difficulties

For more information, contact Daphne Ip, OTR/L daphnemy@bu.edu

Sleep Better Learn Better

School-based Occupational Therapy

We offer health-related services at schools by supporting students in learning, social life, and other activities of daily living.

Working closely with teachers, we create active learning spaces for students to achieve their unique learning goals.

Our job is to promote physical and mental health wellness for all children.

Sleep health is vital for growth and learning

Good sleeping habits can help students to learn better, feel better and enjoy school

Sleep problems include:

- Difficult to fall asleep
- Unsettled sleep patterns
- Waking up too early
- Sleep terror & sleepwalking
- Snoring and short pause in breathing

(Katz & Malow, 2014)

According to the Centers for Disease Control and Prevention (2020), autistic children experience sleep problems 50%- 80% of the time.

Daytime activities matter

- ❖ Improve physical activities, e.g. yoga, dance, sports
- ❖ Bring on the sunshine
- ❖ Avoid foods with caffeine
- ❖ Avoid late afternoon naps
- ❖ Limit screen time

What your child does during the Day might affect sleep at night

Do they have

- ❖ Regular exercises?
- ❖ Natural light?
- ❖ Caffeine in foods/drinks?
- ❖ Long naps?
- ❖ Stress/anxiety?

How long does it take your child to fall asleep?

Sensory Sensitivities

Children with sensory differences might experience more sleep problems (Reynolds et al., 2012).

Understand the sensory needs

- Observe your child's sensory behaviors
- Children can show various sensory needs
- Monitor your child's emotions and respect them
- Provide a suitable sensory environment for daily activities

A child who is sensitive to touch, sounds or lights

A child who needs a lot of sensory inputs, e.g. jumping, crashing, and falling

What about the bedroom?

Consider the lights, sounds, scents, textures of bedding; is the room too hot or too cold?

How does your child fall asleep at night?

Jimmy is a 7-year-old boy with a diagnosis of autism. His mom reported that he needs "a lot of help" to go to bed.

- ❖ Jimmy appears very sensitive to the noises around the house, always refuses to brush his teeth and wears the same pyjamas every night.
- ❖ Mom reached out to Jimmy's teacher and occupational therapist(OT) at the IEP meeting. She now understands more of Jimmy's sensory needs. Mom makes gradual changes at home, e.g., rearranging his bedroom, setting up a regular bedtime routine, taking him to the playground regularly, and using firm earmuffs if the noise level is high.
- ❖ After a few weeks, Jimmy takes less time to get ready for bed and is willing to stay in bed with a weighted blanket. "It is a lot calmer at night", according to mom.

APPENDIX F: Executive Summary

Introduction

Occupational therapy is a health profession that promotes healthy habits, participation in daily activities, and performance across the lifespan (AOTA, 2020). OT practitioners are specialized in analyzing people's lifestyles, roles, and habits while considering their environment and cultural background. Sleep and rest are vital to support daily participation and performance (AOTA, 2014). Current medical findings frequently emphasize the importance of sleep in fostering healthy mental and physical growth and development in children (Richdale & Schreck, 2018). Sleep-wake regulation is a complex neurophysiological process, and it changes over time, especially in the early years of children (Bathory & Tomopoulos, 2017).

In early childhood centers and school environments, OTPs provide therapeutic services to children with diverse needs to increase their access to learning. Through a whole-school approach, OT consultation and education are provided to teachers and parents to facilitate healthy lifestyles and create an optimal learning environment for children (Beisbier & Cahill, 2021; Gronski & Doherty, 2020). Children with poor sleep habits experience disruption of their daytime wakefulness, affecting their academic performance and social participation at school (Taylor et al., 2012; Deliens & Peigneux, 2019). Studies suggest that sensory dysregulation is closely associated with circadian rhythm, which affects sleep quality (Reynolds et al., 2012; Rajaei et al., 2020).

Autism refers to an array of neurological and developmental differences that are described by challenges with social skills, behaviors, and communication (CDC, 2022). It

was estimated that around 50% to 83% of autistic individuals experience sleep difficulties (Ballester et al., 2020). Common sleep problems include the inability to get to sleep, stay asleep, and irregular circadian rhythm/sleep-wake cycle (Souders et al., 2017). Autistic children impacted by poor sensory regulation may also experience fluctuations in their level of alertness and challenges in their social participation (Hazen et al., 2014).

Researchers consistently identified that autistic children are likely to experience more sleep disturbances than typically developing children (Malow & McGrew, 2020; Reynolds et al., 2018). Sleep difficulties in autistic children may be related to brain wave organization and maturation differences, gene anomalies, abnormal melatonin levels, sensory dysregulation, and anxiety (Souders et al., 2017). A recent longitudinal study further suggested a close link between sensory hypersensitivity and sleep disturbance in autistic preschool children (Manelis-Baram et al., 2022).

OTPs are beginning to embrace scientific evidence about sleep to promote optimal sleep quality in children (Clark & Kingsley, 2020). Sleep health and hygiene must be considered through the process of OT assessment, intervention, and family education to improve the quality of life for autistic children. This project was designed as an evidence-informed educational program based on the current sleep research studies focusing on autistic children. School-based OTPs are strongly encouraged to adopt the role of a health educator in providing sleep health education in school settings.

Project Overview

This doctoral project, the Sleep Practice in Occupational Therapy program, is focused on developing an online educational program in sleep practice for OTPs who

serve autistic children in an inclusive school environment. Sleep function is an important everyday activity that needs to be measured using evidence-based assessments. Sleep intervention and health education have been identified as successful through collaborative efforts with teachers, parents, and other school professionals (Kingsley et al., 2020). The program training materials were created based on thorough literature reviews. The primary goal of this project is to enhance sleep knowledge, confidence, and competence of OTPs in school-based sleep health practice.

A series of three literature reviews yielded important findings related to the current OT sleep practice. Firstly, the searches revealed OT knowledge and perception of sleep health practice. Secondly, OT participation in sleep screening and health education in school settings was examined. Finally, the searches investigated the need for interprofessional collaboration to address sleep health for autistic children.

Key Findings

In the autistic community, sleep problems are one of the most common concerns identified by parents in settings such as hospitals and early intervention clinics (Halliwell et al., 2021; Little et al., 2018). However, sleep assessment, intervention and education have not been widely addressed to meet the needs of children with special learning needs (Faulkner & Mairs, 2015; Tester & Foss, 2018). Many school-based OTPs are not involved in sleep assessment and promotion (Wooster et al., 2015; Gruber et al., 2019). According to the reviews, there is minimal sleep education in the OT curricula and post-professional learning in assessing sleep function (Fung et al., 2013). When encountering sleep problems, health professionals may rely on common beliefs rather than evidence-

based knowledge and resources (Boerner et al., 2015).

Furthermore, data indicated that predominantly non-standardized sleep assessments were utilized during the OT assessment process (Ganjikia & Gansor, 2015). The lack of addressing sleep occupation in school practice could potentially become a barrier to OT clinical and professional growth. Sleep continues to be considered an activity of daily living, not an occupation (Tester & Foss, 2018). To demonstrate the value of the OT profession, we are encouraged to raise awareness about establishing healthy sleep habits in children in their schools, communities, and non-traditional settings (Persch et al., 2015).

Over the past decade, OT researchers have identified a close link between physiologic reactions to sensation and sleep in children who experience sensory challenges (Reynolds et al., 2012; Reynolds et al., 2015; Applegate et al., 2020). OT-led sleep health education in early childhood practice has shown positive outcomes with a focus on teaching consistent day and nighttime routines, sensory-based strategies, and environmental adaptation (Gronski, 2022). Several studies provided moderate to high strength of evidence in family training to improve sleep in young children (Gronski & Doherty, 2020). However, research in sleep health continues to be lacking in school-based practice. In a systematic review examining interventions to address activities of daily living, sleep, and rest in OT practice, only five out of 28 studies related to sleep and rest for children aged 5 to 21 (Beisbier & Laverdure, 2020). Sleep care in children has yet to be acknowledged as a widely researched topic in the OT field.

In school settings, teachers, school psychologists, and social workers are not fully

aware of the OT scope of practice, leading to the slow progression of interdisciplinary collaboration (Bradley et al., 2020; Cahill & Egan, 2017). Researchers reported that the barriers to effective teacher-therapist collaboration included inconsistent therapist support, insufficient teacher training, and lacking awareness of the OT scope of practice (Wilson & Harris, 2018; Phoenix et al., 2020).

Recommendations

In an effort to provide evidence-based sleep practice resources for pediatric OT practitioners, the Sleep Practice for Occupational Therapy program was developed to enhance sleep knowledge of OTPs and improve the sleep quality of autistic children in early childhood and school settings.

This educational program is to advance OT school-based practice in sleep assessment, intervention, interprofessional collaboration, and family partnership in the autistic student population. This training will be offered online and incorporate mini-lecture and group discussions for knowledge consolidation. The program author will provide OT participants with presentation materials to deliver school-based sleep health education. Other resources for teachers and parents will be shared, such as activity guides for sleep and daytime routine for autistic children, a fact sheet on the role of OT practitioners in sleep health, and brochures and posters to be distributed to early intervention clinics and elementary schools.

Collaboration with sleep specialists (pediatricians or clinical psychologists) is encouraged to strengthen the delivery of comprehensive sleep intervention in the OT practice. Through a pre-recorded interview with a medical practitioner, participants will

learn how sleep problems in children are evaluated and diagnosed. Program participants will also learn to raise sleep health awareness as part of mental health promotion for autistic children in schools.

General Conclusions

Sleep problems can impede the daily participation and performance of children. Current data revealed that OTPs are feeling unprepared to assess sleep functions and deliver sleep intervention and consultation in school settings. Sleep Practice in Occupational Therapy is an evidence-informed educational program to advance school-based OT service delivery by increasing OTPs' sleep knowledge and competence in providing sleep intervention and consultation. Sensory evaluation and sleep screening are essential in examining the sleep problems of autistic children. OT consultation must entail recommendations to facilitate optimal daytime alertness and sensory regulation, promote a consistent bedtime routine, and support sensory-friendly environmental adaptations.

Sleep health education is often the first line of treatment for children who suffer from chronic sleep deprivation and their families (Malow et al., 2014). OTPs can be health educators to promote sleep health knowledge to teachers and parents by hosting workshops and wellness programs in schools. Consequently, the long-term outcomes of the Sleep Practice in Occupational Therapy program aim to improve sleep quality and promote healthy sleep habits for autistic children.

APPENDIX G: Fact Sheet (PAGE 1)



Sleep Practice in Occupational Therapy

A sleep health education program for occupational therapy practitioners to improve sleep functions for autistic children

Man-Yee Daphne Ip, B.S., OTR/L
OTD Candidate

Introduction to the Problem

Autistic children are more susceptible to sleep problems and sensory modulation is found to be closely associated with sleep-wake regulation (Schreck & Richdale, 2020; Reynolds et al., 2012).

Children with poor sleep habits would exhibit dysregulation in their daytime wakefulness which affects their academic performance and social participation at school (Taylor et al., 2012).

The occupational need for sleep is under-addressed by occupational therapy practitioners (OTPs) due to a lack of clinical training and formal occupational therapy educational programs (Tester & Foss, 2018).

Research Question

Will sleep screening, health education, and wellness programs help to improve sleep knowledge and facilitate sleep quality in autistic children?



https://images.app.goo.g/urGpLYVz2A6UxSyKA

Supportive Evidence

All autistic children should have a sleep health screening by their general pediatricians or healthcare providers (Malow et al., 2014).

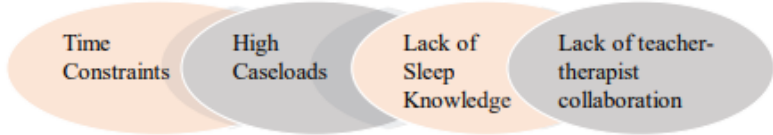
Sleep disturbances are associated with sensory hypersensitivity and anxiety; thus, sensory assessment and consultation should be included in the sleep intervention (Reynolds et al., 2012; Souders et al., 2017).

Physical activity interventions for autistic children have shown a positive impact on sleep enhancement (Tse et al., 2019).

School-based sleep education programs show their significance in promoting sleep health in all children and youth (Rigney et al., 2021).

The provision of parental education should be considered the first line of sleep intervention for autistic children (Reynolds et al., 2019).

Barriers to Occupational Therapy Practice in Sleep Intervention



(Seruya & Garfinkel, 2020; Tester & Foss, 2018)

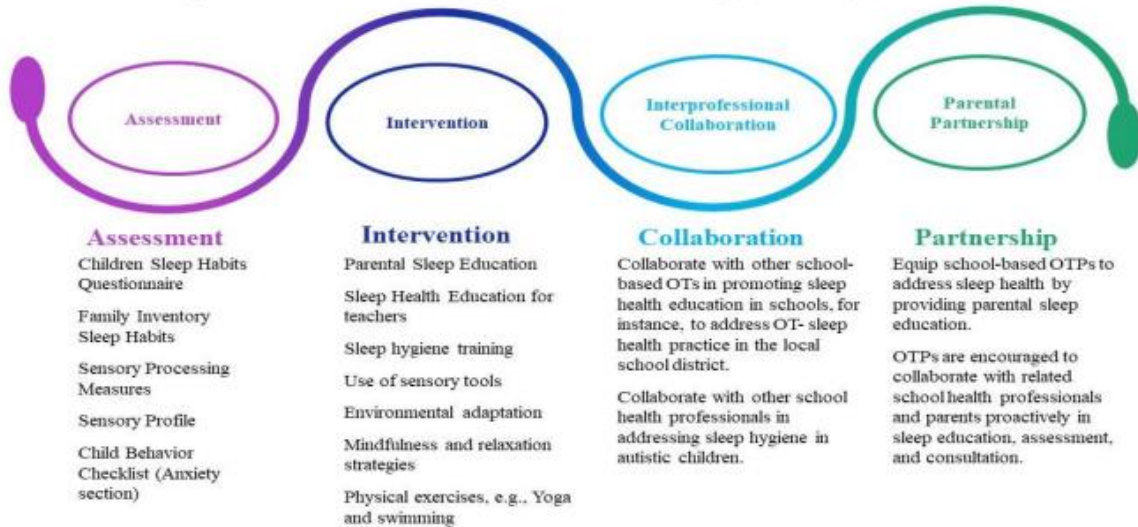
APPENDIX G- Fact Sheet (Page 2)

The Proposed Solution: *Sleep Practice in Occupational Therapy for Autistic Children*

A 4-week online educational program designed for school-based OT practitioners to enhance sleep knowledge and sleep health practice for autistic children ages 3 to 8 years old



Sleep Practice in Occupational Therapy – Key Elements



Sleep Health and Occupational Therapy

- ❖ Sleep is an essential function and vital occupation for all children at the early stages of development.
- ❖ OT practitioners can address emotional regulation and sensory processing to improve daytime behaviors at school and tailor specific home activities for bedtime preparation.
- ❖ School-based sleep education will increase sleep health knowledge; teachers and parents will be better informed of OT service provision at school.

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Please refer to the QR code for the complete list of references for this doctoral project.



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CURRICULUM VITAE

