Exploration of Sleep Habits of Children with Cerebral Palsy: A Cross-Sectional Study

By

Nazmun Nahar

February 2022, held in March 2023

This thesis is submitted in total fulfilment of the requirements for the subject RESEARCH 2 & 3 and partial fulfilment of the requirements for the degree of

Bachelor of Science in Occupational Therapy

Bangladesh Health Professions Institute (BHPI)
Faculty of Medicine
University of Dhaka

Thesis completed by:

Nazmun Nahar
4th year, B.Sc. in Occupational Therapy
Bangladesh Health Professions Institute (BHPI)
Centre for the Rehabilitation of the Paralysed (CRP) ……
Chapain, Savar, Dhaka: 1343 Signature

Supervisor's Name, Designation, and Signature:

Sk. Moniruzzaman
Associate Professor & Head
Department of Occupational Therapy
Bangladesh Health Professions Institute (BHPI)
Centre for the Rehabilitation of the Paralysed (CRP) ……..
Chapain, Savar, Dhaka: 1343 Signature

Co-Supervisor Name, Designation, and Signature:

Khadija Akter Lily
Lecturer
Department of Occupational Therapy
Bangladesh Health Professions Institute (BHPI)
Centre for the Rehabilitation of the Paralysed (CRP) ……...
Chapain, Savar, Dhaka: 1343 Signature

Head of the department's name, designation, and signature:

Sk. Moniruzzaman
Associate Professor & Head
Department of Occupational Therapy
Bangladesh Health Professions Institute (BHPI)
Centre for the Rehabilitation of the Paralysed (CRP) ……..
Chapain, Savar, Dhaka: 1343 Signature

Board of Examiners

Sk. Moniruzzaman
Associate Professor and Head
Department of Occupational Therapy
Bangladesh Health Professions Institute (BHPI)
CRP, Savar, Dhaka-1343

.....
Signature

Dr. Md. Shakhaoat Hossain
Associate Professor
Department of Public Health and Informatics
Jahangirnagar University
Savar, Dhaka -1342

.....
Signature

Statement of Authorship

Except where it is made in the text of the thesis, this thesis contains no material published elsewhere or extracted in whole or in part from a thesis presented by me for any other degree or seminar. No other person's work has been used without due acknowledgement of the award of the main text of the thesis. This thesis has not been submitted for any other degree in any other tertiary institution. The ethical issue of the study has been strictly considered and protected. In case of dissemination of the findings of this project for future publication, the research supervisor will be highly concerned, and it will be duly acknowledged as an undergraduate thesis.

Nazmun Nahar
4th year, B.Sc. in Occupational Therapy
Bangladesh Health Professions Institute (BHPI)
Centre for the Rehabilitation of the Paralysed (CRP)
Chapain, Savar, Dhaka: 1343

…...……
Signature

Acknowledgement

I am very happy that I could complete my thesis. Alhamdulillah all praise goes to the almighty Allah who made me capable of doing this research. My gratitude to my parents and my family members from the core of my heart who have always been supportive and my mental relief throughout my education journey. Without my family members and their support, completing would not be possible. During this journey, I am cordially grateful to many people. I would like to dedicate my acknowledgement to my honourable supervisor & Head of the Occupational Therapy Department Sk. Moniruzamman and co-supervisor Khadija Akter Lily for their support, guidance, and continuous encouragement in my research. I am also thankful to my respected teacher Mohuya Akhter, Shamima Akter, Arifa Jahan Ema, and Md. Saddam Hossain for their support and guidance in my research. I would like to thank Anthony Spirito, Ph.D. ABPP, Professor of Psychiatry and Human Behavior, Alpert Medical School of Brown University, sir, for giving me permission to use the Children Sleep Habits Questionnaire tool and its manual.

Thanks to my mentor and all my teachers for guiding me throughout my study. I am also thankful to the review board, the Department of Occupational Therapy, and the Paediatric department for helping me by giving their valuable information.

Thanks to my study participants who gave their time and responded to my study. Finally, thanks to my friends for helping me at different times. I am thankful to my junior Md. Tahidur Jaman Khan for his help in doing the Bangla backwards and forward translation of my Children Sleep Habits Questionnaire tool.

Dedication

Dedicated to my almighty Allah who keeps me well and on the right track and helps me to keep patience during the work period. I also dedicate my thesis to my honourable and beloved parents, my respected teachers at Bangladesh Health Professions Institute, and my siblings.

Table of Contents

List of Tables

List of Figures

List of Abbreviations

ADL	Activities of Daily Living
BHPI	Bangladesh Health Professions Institute
CRP	Centre for the Rehabilitation of the Paralysed
CI	Confidence Interval
CSHQ	Children Sleep Habits Questionnaire
CWCP	Children with Cerebral Palsy
DOES	Disordered of excessive somnolence
DIMS	Disordered of initiating and maintaining sleep
IRB	Institution Review Board
NGO	Non-Government Organisation
OT	Occupational Therapy
SD	Sleep disturbances
SBD	Sleep Breathing Disorder
SDSC	Sleep Disturbances Scale for Children
SWTD	Sleep-wake transition disorder

Abstract

Background: Sleep disturbance is very common in children with cerebral palsy. Sleep disturbances can negatively affect children's growth and development. Moreover, children's sleep disturbance influence on the psychological and physical functioning of the child's family. However, according to the context of Bangladesh, there is a lack of evidence about sleep disturbance among children with cerebral palsy. Besides, there is a lack of evidence from other developing and low-and-middle-income countries.

Aim: This research aimed to explore the sleep habits of children with Cerebral Palsy.

Methods: The study followed a cross-sectional quantitative study design by conducting a survey among 175 participants aged 3.5-12 years, children with cerebral palsy were recruited from outpatient and inpatient units of Savar and Mirpur CRP. Child sleep disturbances were assessed with Children Sleep Habits Questionnaire (CSHQ) scale. Data were analysed with descriptive analysis, chi-square test, and Fisher's exact test using SPSS version 26.

Results: 86 preschool-aged and 89 school-aged mothers of children with Cerebral Palsy responded to the survey. 75.4% of children with cerebral palsy reported sleep disturbance. This study showed that 52.8% of school-aged and 44.3% of preschool-aged children with cerebral palsy get an adequate amount of sleep. School-aged children with cerebral palsy get an adequate amount of sleep more than preschool-aged children with cerebral palsy. This study also showed that gender is significantly associated with sleep, where girls reported more sleep disturbance than boys with cerebral palsy. On the other

hand, age groups (preschool and school-age), epilepsy, medication, and types of cerebral palsy were not significantly associated with the sleep of children with cerebral palsy.

Conclusions: Children with cerebral palsy have more sleep problems. Children with cerebral palsy sleep disturbances can be identified and treated on a routine basis during clinical implementation. Occupational therapists should raise awareness among the caregivers of children with cerebral palsy about their children's sleep disturbances.

Keywords: Sleep Habit, Sleep Disturbance, Sleep Disorder, and Children with Cerebral Palsy.

CHAPTER I: INTRODUCTION

1.1 Background

One of the basic physiological requirements for brain and body development is sleep, which is also vital for the maturation of children's behaviours, memories, and social skills (Türkmen, 2021). Our body works to support proper brain function and maintain our physical health when we sleep, which is crucial for overall health and well-being (*How Sleep Works - Why Is Sleep Important?*, March 2022). The brain is very active while we sleep, contrary to our quiet physical state, performing many crucial tasks that are vital to every bodily process, including our capacity to fight off illness and develop immunity (Jansen, 2020). Over time, getting a little amount of sleep can raise the chance of developing chronic (long-term) health problems, which can also affect how well we think, act, work, learn, and get along with others. Sleep is also important for children's and teenagers' growth and development (*How Sleep Works - Why Is Sleep Important?*, March 2022). Children's quality of life and development are impacted by sleep issues (Türkmen, 2021).

Sleep disturbances can negatively affect children’s growth and development as well as behaviour and cognition. The impact of children’s sleep problems may have a significant influence on the psychological and physical functioning of the child’s family. literature also shows that sleep problems in children with neurodevelopmental disorders (Cerebral Palsy is one of them) are higher than in normal typical developmental children and those children are particularly interested in sleeping medicine (Horwood et al., 2019). Children

with cerebral palsy (CWCP) experience sleeping issues four times more frequently than children who are normally developing (Türkmen, 2021).

According to Hulst et. al. (2021) one of the most prevalent physical childhood disabilities globally is cerebral palsy cerebral palsy. Cerebral palsy is an immutable, non-progressive and set of neuromotor conditions that primarily affect posture, muscle tone, muscle coordination, and development of movement caused to abnormalities in the developing prenatal or neonatal brain; and those difficulties are arising from a lesion of the brain, its prevalence of about 2 in per 1000 children (Horwood et al., 2019; Hulst et al., 2021; Obrecht et al., 2021; Patel et al., 2020; Türkmen, 2021; Zuculo et al., 2014**).** Approximately 17 million people have cerebral palsy globally and the prevalence of cerebral palsy in Bangladesh is 3.4 per 1000 children with cerebral palsy, there are estimated 233514 children with cerebral palsy (Khandaker et al., 2019). Several phenotypes of cerebral palsy exist such as spastic (quadriplegic, triplegic, hemiplegic, diplegic, and monoplegia), hypotonic, ataxic, and athetoid, these phenotypes depend on the location and extent of the brain damage (Horwood et al., 2019; Patel et al., 2020). Although motor dysfunction is the primary feature of cerebral palsy, it usually coexists with a wide range of health conditions, including seizures, sleeping disorders, impairments of sensory, cognitive, perception, speech, and language, as well as auditory, visual, behavioural, learning difficulties and also affect their ability to perform daily activities; and sleep-related issues may also be regarded based on the diagnosis, spasms, breathing difficulties, pain, incontinence, trouble moving or rolling over in bed, use of night orthosis, and epilepsy (Obrecht et al., 2021; Simard-Tremblay et al., 2011; Türkmen, 2021**).** It has been noted that the quality of sleep is hampered due to children

with cerebral palsy having a greater impairment of gross motor function and its prevalence has very high (Obrecht et al., 2021).

Many Studies reported that children with cerebral palsy have comorbidities, such as epilepsy, which can lead to sleep problems; having seizures may make it harder for children with cerebral palsy to fall asleep or stay asleep, and anti-epileptic medication use can also make children drowsy and make them sleep during the day and some studies have also stated that children with cerebral palsy have an abnormal secretion of melatonin, pain from their muscles or discomfort from their orthotics, which can lead to sleep problems (Horwood et al., 2019; Türkmen, 2021).

Parents stated that 23% - 46% of children with cerebral palsy had at least one sleep issue that happened frequently or always and they are more likely to have trouble falling asleep, frequent night time awakening, sleep-related breathing disorders, early morning waking, and excessive daytime fatigue (Hulst et al., 2021). Insomnia, which is the most prevalent sleep issue in children with cerebral palsy and it refers to “a persistent issue with sleep initiation, duration, consolidation, or quality that persists despite age-appropriate opportunities and times for sleep and impairs the child's ability to function during the day” (Horwood et al., 2019). According to studies, the severity of cerebral palsy would be raised due to difficulty in initiating or maintaining sleep (Türkmen, 2021). Sleep-disordered breathing, which encompasses a range of sleep-related breathing problems (the least severe condition is primary snoring, the most severe is obstructive sleep apnea), is also a prevalent issue with sleep (Horwood et al., 2019; Simard-Tremblay et al., 2011). Parasomnia, is another most prevalent sleep issue in children with cerebral palsy; Disorders of arousal (parasomnias) are characterized by “insufficient awakenings

from the deep sleep that take the form of a wide range of emotional and physical actions, such as sleepwalking, sleep terrors, and awakenings from sleep in a state of increased perplexity" and sleep-wake transition disorders (parasomnia), which can take the form of aberrant activities, can occur during the transition from waking to sleep or between stages of sleep-in conditions and Sleep talking; sleep talking is the most prevalent sleep-wake transition condition, not only those but also sleep hyperhidrosis is a common sleep issue in children with cerebral palsy, which is characterized by excessive sweating before going to sleep or while asleep (Horwood et al., 2019).

Children age 0 to 3 spend 50% of their waking hours (daytime) sleeping, so they require uninterrupted, good-quality sleep at night to grow and develop normally (Türkmen, 2021). According to the National Sleep Foundation child's sleep duration was recommended for pre-school aged (3-5 years) 10-13 hours and school-aged (6-13 years) 9-11 hours (Hirshkowitz et al., 2015).

In many articles it was found that children with cerebral palsy have more sleep problem than typically developing children, sleeping problem not only negatively impacts the development and quality of life of children with cerebral palsy, but also negatively impacts their parents' quality of life; so it is important to look into the underlying causes of sleep issues in both parents and children with cerebral palsy, as well as to create appropriate screening tools and therapeutic strategies. Not only worldwide but also in Bangladesh and even the ASIA region, there had no exact estimates about the sleep problem of children with cerebral palsy. So, exploring sleep-related issues in children with cerebral palsy is very important. Therefore, in this study, I explored the sleep habits of children with cerebral palsy and identified that these habits hamper their sleep whether

or not. This study will create a new insight into the field of sleep-related issues of children with cerebral palsy in Bangladesh.

1.2 Justification of the Study

Through the literature review, student researcher reveals that sleep disturbances are prevalent among children with cerebral palsy and have a negative impact on their overall well-being. These disturbances not only affect the children but also their families and can lead to negative daytime behaviour (Simard-Tremblay et al., 2011).

The focus of this research is to explore the sleep habits of children with cerebral palsy and informing occupational therapists about children with cerebral palsy sleep habits. Occupational therapists can utilise the study findings to enhance their understanding regarding children with cerebral palsy's sleep disturbance issues, which will also lead the therapists to develop a comprehensive treatment strategy or plan. While occupational therapists play a crucial role in improving the physical, mental, and social well-being of individuals, and therefore they can provide effective interventions to children with cerebral palsy for improving their healthy sleep habits. Therapists can also provide caregiver education to enhance the children's sleep quality, ultimately leading to improved engagement and performance in daily activities. Even caregivers of children with cerebral palsy will feel mentally and physically stress-free and leads a healthy life.

While there have been studies conducted on sleep problems in children with cerebral palsy in other countries, there is a study gap in Bangladesh. This study will provide new insights into the prevalence of sleep problems among children with cerebral palsy and highlight the critical role of occupational therapy professionals in managing sleep

problems in children with cerebral palsy for enhance their overall health and quality of life and also encourage occupational therapists to develop sleep-related assessment forms. The study will also benefit NGOs and organizations working with cerebral palsy children in Bangladesh. The findings will be helpful for future researchers and practitioners in this field.

1.3 Operational Definition

1.3.1 Cerebral Palsy

Cerebral Palsy can be defined as a group of neurological conditions caused by a non-progressive lesion or abnormalities of the developing brain that happens before (utero) birth, during birth, or after birth, which manifests as a variety of difficulties in the coordination of muscle action, physical mobility, and sensation (Patel et al., 2020).

1.3.2 Sleep Habit

Sleep habits were defined as routines for going to bed, getting out of bed, drinking caffeine at night, sleeping for a certain amount of time, and using sleeping medicines (Sweileh et al., 2011).

1.3.3 Sleep Disturbances

Sleep disturbances are referred to as Disorders of excessive somnolence (DOES), disorders of the sleep-wake cycle, and dysfunctions related to sleep, sleep stages, or partial arousals (parasomnias) (*Sleep Disturbances - Clinical Methods - NCBI Bookshelf*).

1.3.4 Sleep Disorder

A sleep disorder is any ailment that impairs a person's capacity to function normally when they are awake and affects the quantity, timing, or quality of sleep (Danielle, 16 May 2022).

1.4 Study Question, Aim, and Objectives

1.4.1 Study Question

How are the sleep habits of children with cerebral palsy?

1.4.2 Aim

The aim of the study was to explore the sleep habits of children with cerebral palsy.

1.4.3 Objectives

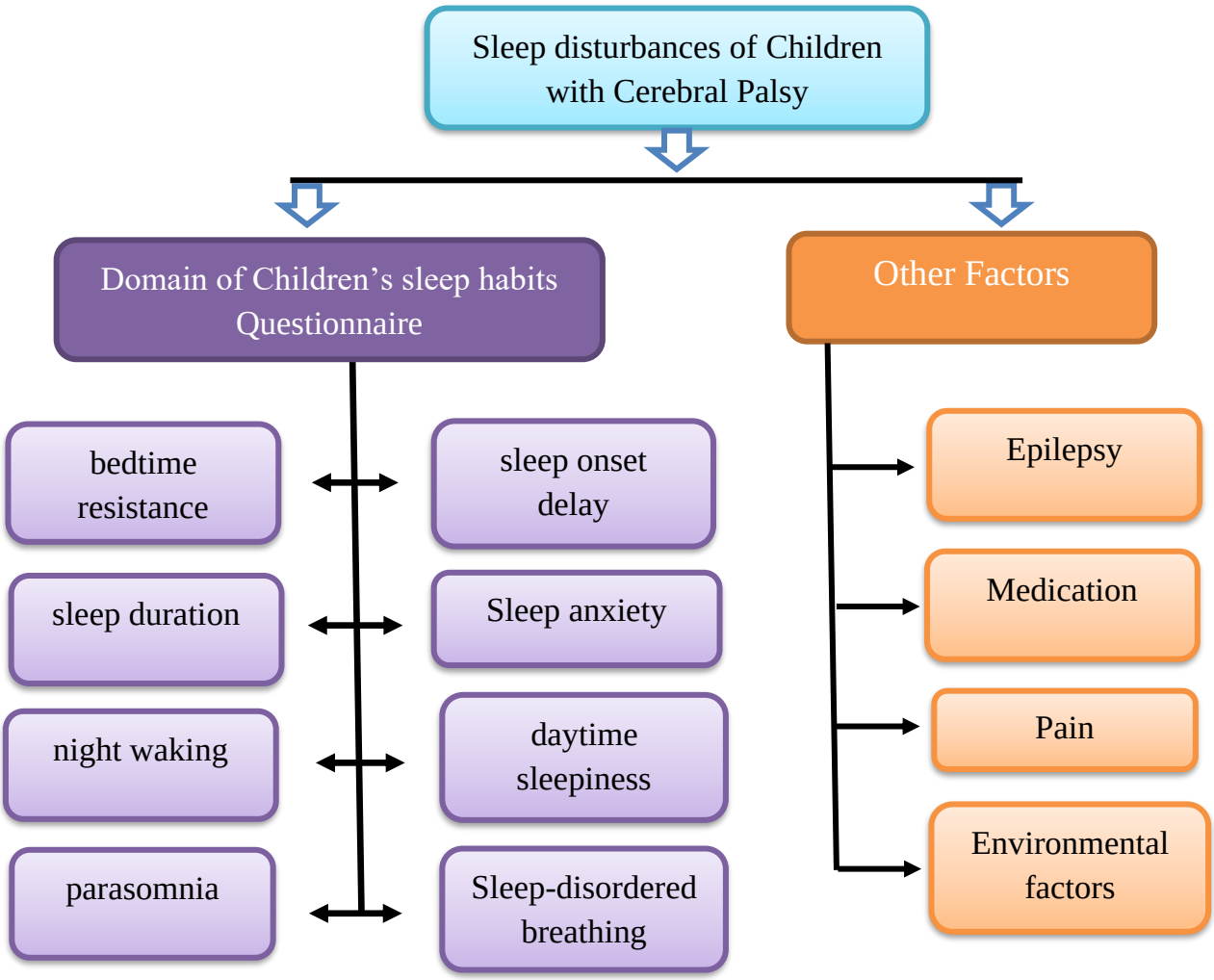
- To identify the frequency of sleep disturbance among children with cerebral palsy.
- To find out the level of sleep duration among age group children with cerebral palsy.
- To identify the association between sleep and demographic information (gender, age groups, epilepsy, medication and types of cerebral palsy).

CHAPTER II: LITERATURE REVIEW

This chapter covers the information regarding sleep disturbances in children with cerebral palsy. In the term sleep disturbances, this chapter has information from the existing literature about bedtime resistance, sleep onset delay, sleep duration, sleep anxiety, night waking, parasomnias, sleep-disordered breathing, daytime sleepiness, epilepsy, medication, pain, and environmental factors.

Figure 2.1

Overview of literature review findings



2.1 Sleep Disturbance of Children with Cerebral Palsy

Literature shows that sleeping problems are most common and it may be more susceptible in children with cerebral palsy also the frequency of sleep problems is intense in children with cerebral palsy (Atmawidjaja et al., 2014; Badaru et al., 2021; Horwood et al., 2019; Horwood et al., 2018; Karabulut & Şebnem, 2020; Newman et al., 2006; Romeo et al., 2014; Simard-Tremblay et al., 2011; Türkmen, 2021; Wayte et al., 2012; Zuculo et al., 2014). A quantitative study was conducted to identify and connect the sleep pattern and quality of life in children with cerebral palsy and healthy controls among 78 participants, aged between 4-18 years and the study was located Bauru, Brazil. Participants were recruited from a school, clinic, and healthcare institutions in the cities of Marília, Ourinhos, Bauru, and Santa Bárbara d'Oeste (SP) and they found that 60.4% of children with cerebral palsy had present sleep disorders (Zuculo et al., 2014). A cross-sectional study was conducted with the aim of identifying the frequency of sleep disorders of children with cerebral palsy among 135 participants aged between 2 – 12 years and the study was located in Kampala, Uganda. Participants were recruited from the cerebral palsy rehabilitation clinic or the Paediatric Neurology clinic in Kampala, Uganda and they found that 32% of children with cerebral palsy had a sleep disorder (Munyumu et al., 2018); another cross-sectional study found that 31.5% children with cerebral palsy had sleep disturbances (Badaru et al., 2021). Obrecht et al. (2021) found that 16.1% of children were identified as at risk for sleep disturbances, 8.4%-23.8% given the margin of error and 51.7% of children & adolescents had at least one factor according to the Sleep Disturbance Scale for Children (SDSC). Another researcher Türkmen (2021) showed that 75.4% children with cerebral palsy had a sleep problem among 57 children

with cerebral palsy. In 2006, Newman and colleagues found that 23% of children with cerebral palsy had sleep problems (Simard-Tremblay et al., 2011). The level of sleep disturbance was markedly higher in children aged 7 to 11 years (Halstead et al., 2021). The most common areas of sleep problems are bedtime resistance, sleep onset delay, sleep duration, sleep anxiety, night waking, parasomnias, sleep-disordered breathing, and daytime sleepiness; and epilepsy is another common cause of sleep disturbance (Atmawidjaja et al., 2014; Badaru et al., 2021; Halstead et al., 2021; Horwood et al., 2019; Horwood et al., 2018; Lélis et al., 2016; Munyumu et al., 2018; Newman et al., 2006; Obrecht et al., 2021; Romeo et al., 2014; Simard-Tremblay et al., 2011; Zuculo et al., 2014). This section of the literature review covers the information regarding eight areas of the Children Sleep Habits Questionnaire (CSHQ) that hinder the sleep of children with cerebral palsy found in existing literature and those are shown as follows.

2.1.1 Bedtime Resistance

Bedtime resistance is the term used to describe unwillingness to go to sleep, postponed bedtimes, and repeated night time awakenings (Andrew, 2019). A systemic review and meta-analysis study was conducted to quantify the frequency of sleep problems in children with cerebral palsy among 23 full-text articles (n=2,908 children with cerebral palsy) review which were conducted in Africa, Asia, Australia, Europe, North America, and South America; all studies were cross-sectional and those studies publication year was from 2000 to 2018. The study was located in Canada and studies were taken from the Allied and Complementary Medicine Database (AMED), BIOSIS Previews, Cochrane, Embase, Global Health, MEDLINE/PubMed, and Web of Science. They found that all studies reported the frequency of Disorders of initiation and maintenance of sleep, which

ranged from 11.6% to 50.0% (Horwood et al., 2019). In Parana, a cross-sectional study was conducted to determine the connection between sleep disturbance and impairment of gross motor function among 87 participants (children and adolescents with cerebral palsy), aged between 6-17 years, and the participants were recruited from the Neuropediatric Center of the Hospital of Clinics of the Federal University of Parana; Association for the Motor Disabled; Rehabilitation Association of the State of Parana; and Municipal Educational Center for Specialized Service e CEMAE e Campo Largo by took between 2018 and 2019 patient information and they found that difficulty in initiating and maintaining sleep was the most common (19.5%) in children with cerebral palsy (Obrecht et al., 2021). Another cross-sectional study was conducted in Uganda and they found that 27% had difficulties in initiating and maintaining sleep among 135 children with cerebral palsy (Munyumu et al., 2018). Additionally, a cross-sectional study was conducted in Kano City and found that 21% children with cerebral palsy had difficulties in initiating and maintaining sleep among 200 children with cerebral palsy (Badaru et al., 2021). Halstead et. al. (2021) conducted a study and found that children aged 7 to 11 considerably exceeded children aged 11 to 16, in terms of their ability to have bedtime resistance.

2.1.2 Sleep Onset Delay

In the United Kingdom, a quantitative study was conducted to assess sleep patterns and disturbances using parental reports among a large sample of 601 children with neurodevelopmental conditions, aged between 2-17 years, and the participants were recruited from a UK non-profit organization, Cerebra, and the finding of this study was the sleep onset delay raised significantly with age, although there were no noticeable

differences between age groups (Halstead et al., 2021). Another study found that 48.6% of children with cerebral palsy take more time to initiate sleep (around 21 minutes) (Zuculo et al., 2014).

2.1.3 Sleep Duration

Sleep Duration refers to the total amount of time that an individual sleeps, either during the nocturnal sleep episode or across the 24-hour periods (*Sleep Dictionary: Definitions of Common Sleep Terms*, 2022). A study conducted by Türkmen (2021) and found in his study that the total sleep duration of preschool-aged children with cerebral palsy was 10.2 h which indicated that children with cerebral palsy had sleep problems. Horwood et. al. (2018) found that 12.7% of children with cerebral palsy were not getting an adequate amount of sleep among 150 CWCP. Halstead et. al. (2021) found that there was no connection between age and sleep duration.

2.1.4 Sleep Anxiety

Scare or afraid of falling asleep is referred to as Sleep Anxiety; and for this sleep anxiety people won't be able to fall or stay asleep (*Sleep Anxiety: What is it, Causes, Symptoms & Treatment*, 2021). In the United Kingdom, a cross-sectional study was conducted by Wayte et. al. (2012), to evaluate sleep problems in children with Cerebral Palsy among 40 children with cerebral palsy, aged between 4-12 years, and the participants were recruited from the Solent West Healthcare NHS disability database, and they showed that children with cerebral palsy noticeably more sleep anxiety difficulties than a typical developing child; in the same country researchers Halstead et. al. (2021) found that there was no connection between age and sleep anxiety but if sleep onset delay is considerably exceeded then sleep anxiety also exceeded. In Brazil, a review study was conducted by

Lélis et. al. (2016) to recognize and compile data on the types of sleep disturbances that affect children with cerebral palsy and the factors that are associated with them; they review 12 studies and found that sleep anxiety affects sleep to children with cerebral palsy.

2.1.5 Night Waking

Night waking refers to the act of waking up during the night from sleep, either partially or fully, and often interrupting the natural sleep cycle (*Night wakings: A guide for the science-minded*). In Turkey, a quantitative study was conducted with the aim of determining sleep characteristics of children with cerebral palsy among 114 Participants, aged between 3-6 years and the participants were recruited from rehabilitation centers in Kayseri province and pre-school education centres in the same city and according to statistics they found that children with cerebral palsy woke up more frequently at night than a typical developing child (Türkmen, 2021) and the same findings was found in another literature (Wayte et al., 2012). Additionally, another study found that Children with cerebral palsy reported that waking up in the middle of the night was 23.2% among 43 children with cerebral palsy which is higher than typical developing children (Zuculo et al., 2014).

2.1.6 Daytime Sleepiness

Daytime sleepiness is a feeling of excessive tiredness or drowsiness during the daytime, even after getting a full night's sleep (*Excessive Sleepiness: Causes, Symptoms, and Treatments*, 24 February 2023). A quantitative study was conducted by Halstead et. al. (2021) and they found that with age daytime sleepiness is greatly enhanced and children aged 7 to 11 considerably exceeded children aged 3 to 7. According to Zuculo et. al.

(2014), they found that daytime sleepiness and difficulty in the morning wake-up were not high frequency among children with cerebral palsy.

2.1.7 Parasomnias

Parasomnias is a disruptive sleep-related disorder that cause abnormal behaviours movements and talk while sleeping (*Parasomnias: Types, Symptoms, & Causes*, 9 February 2023). A cross-sectional study was conducted with the aim of determining the frequency of sleep disturbances and how it influences children with cerebral palsy's quality of life and exercise among 200 children with cerebral palsy, aged between 1-15 years and the participants were recruited from the outpatient units of physiotherapy departments of the Aminu Kano Teaching hospital, Murtala Muhammad Specialist Hospital, Hasiya Bayero Paediatric Hospital and Abdullahi Wase Specialist Hospital in Kano City and they found that disorders excessive somnolence was 29.5% and sleep wake transition was 21.0% (Badaru et al., 2021). Another study was conducted by Obrecht et. al. (2021) and they found that 19.5% of Children with cerebral palsy had sleep-waking transition disorder (SWTD), 4.6% had disordered arousal and 2.3% had sleep hyperhidrosis. A systemic review and meta-analysis study found that all studies indicated that the frequency of disorders of excessive somnolence, which ranged from 2.3% to 14.6%, sleep hyperhidrosis, which ranged from 2.4% to 34.9%, sleep-wake transition disorders among school-aged children, which ranged from 11.0% to 31.0%, disorders of arousal among school-aged children, which ranged from 4.4% to 19.5% and parasomnias of preschool-aged children with cerebral palsy was 6.1% and 9.0% (Horwood et al., 2019). Another study was conducted by Lélis et. al. (2016) and they found that sleep-wake transition disorders and sleep hyperhidrosis were high in athetoid

cerebral palsy than in other types of cerebral palsy; researchers Wayte et. al. (2012) also found that children with cerebral palsy noticeably more parasomnia problems than a typical developing child. 13 % of Sleep-Wake Transition Disorder (SWTD) and 10 % of sleep hyperhidrosis was found in 135 children with cerebral palsy which was conducted by (Munyumu et al., 2018). However, Another study also found that over time parasomnias were reduced and also showed that children between the ages of (3 to 11) exhibited greater parasomnia scores than children aged (14 to 16) (Halstead et al., 2021). 34.9% of children with cerebral palsy had sleep hyperhidrosis (SH) among 43 children with cerebral palsy, they also found that teeth-grinding problems and sleep talking were not higher percentage in children with Cerebral Palsy (Zuculo et al., 2014). Additionally, Obrecht et.al. (2021) and Munyumu et. al. (2018) found in their study that children with cerebral palsy had disorder of excessive somnolence, which is respectively 16.1% and 8% among their study participants.

2.1.8 Sleep-Disordered Breathing

Sleep-disordered breathing is a syndrome of upper airway dysfunction during sleep including excessive snoring, increased resistance to airflow through the upper airway, markedly reduced airflow (hypopnea), and breathing repeatedly stops and starts (apnea) (*Sleep Disordered Breathing*). A systemic review and meta-analysis study found that all review studies indicated the frequency of sleep breathing disorders, ranged from 9.6% to 25.6% (Horwood et al., 2019). Another reviewing study found that obstructive sleep apnea was presented in children with cerebral palsy (Lélis et al., 2016). A cross-sectional study was conducted in Uganda and researchers found that 10% had presented SDB among 135 CWCP (Munyumu et al., 2018); another cross-sectional study was conducted

in Kano City and found that 16.5% children with cerebral palsy had sleep-disordered breathing among 200 CWCP (Badaru et al., 2021). Zuculo et. al. (2014) found that 25.6% of children with cerebral palsy had respiratory sleep disorders and 37.2% of them snoring among 43 children with cerebral palsy. According to Newman and colleagues, they found that 14.5% of children with cerebral palsy had SDB (Simard-Tremblay et al., 2011). 18.4% of children with cerebral palsy had SDB and children with cerebral palsy noticeably more SDB problems than typical developing child found by (Obrecht et al., 2021; Wayte et al., 2012).

2.2 Epilepsy

A cohort study was conducted with the aim of comparing the types and frequency of sleep problems and determining the causes of these sleep problems among 109 children with cerebral palsy and their siblings, aged between 4-18 years, and the participants were recruited from the University Kebangsaan Malaysia Medical Centre paediatric neurology clinic and they found that epilepsy was not significantly associated with total sleep score (Atmawidjaja et al., 2014). Epilepsy was a common factor, and it was linked to the sleeping problem in children with cerebral palsy (Lélis et al., 2016; Munyumu et al., 2018; Obrecht et al., 2021). Simard-Tremblay et. al. (2011) found that the prevalence of seizures was 15% to 55% in children with cerebral palsy. However, Badaru et. al. (2021) and Newman et. al. (2006) conducted a cross-sectional study and they found that epilepsy was significantly associated with sleep disturbances. Nonetheless, Wayte et. al. (2012) found that 25% of children with cerebral palsy had epilepsy who had a sleep problem and also found that epilepsy was not significantly associated with total sleep score.

2.4 Medication

Obrecht et. al. (2021) found that at least one drug was consumption 64.4% children and adolescents and 43.7% were consumption two or more drugs that occur disruption of sleep; they mainly used antipsychotics, anticonvulsants, centrally acting muscle relaxants drugs and the other drug they are being used were antidepressants, anti-parkinsonians, psychostimulants, antihistamines, anticholinergics, anti-asthmatics, and herbal medicines. However, Lélis et. al. (2016) found in 3 studies that anticonvulsant drugs were linked to sleep disturbances. The majority of children with cerebral palsy (65.1%) reported taking medications such as antipsychotics, anticonvulsants, etc. that might disrupt their sleep (Zuculo et al., 2014). Additionally, Bardaru et. al. (2021) and Romeo et. al. (2014) found that medications were significantly associated with sleep disturbances.

2.5 Environmental Factors

Single-parent status and caregiver job status were linked with sleep disturbance, moreover, parents' bed sharing or other family member room sharing was also linked with sleep disturbance (Lélis et al., 2016; Zuculo et al., 2014). Nonetheless, Munyumu et. al. (2018) and Atmawidjaja et. al. (2014) found that bed-sharing was not linked with sleep disturbance.

2.6 Pain

A cross-sectional study was conducted with the aim of determining the frequency of sleep disorders and finding out the association between children features and sleep disorders among preschool and school-aged children with cerebral palsy, aged between 3-12 years, and the participants were recruited from neurology clinics and provincial cerebral palsy registry and study period was May 2013 to September 2016 and they found

that 14.5% children with cerebral palsy had pain which is one of the common factors for a sleep disorder (Horwood et al., 2018). Additionally, Lélis et. al. (2016) found that body pain is linked with sleep disturbances.

2.7 Gender, Age Groups and Types of Cerebral Palsy

A cross-sectional study was conducted with the aim of determining the frequency of sleep disturbances and how it influences children with cerebral palsys' quality of life and exercise among 200 children with cerebral palsy, aged between 1-15 years, and the participants were recruited from the outpatient units of physiotherapy departments of the Aminu Kano Teaching hospital, Murtala Muhammad Specialist Hospital, Hasiya Bayero Paediatric Hospital and Abdullahi Wase Specialist Hospital in Kano City and they found that gender, age groups (1-5 years, 6-10 years and 11-15) and types of CP were not significantly associated with sleep disturbance (Badaru et al., 2021).

2.8 Occupational Therapy for Sleep Disturbance

A systemic review study was conducted in Kowloon, Hong Kong with the aim of identifying a comprehensive evaluation of the literature on occupational therapy theories, practice, and research evidence for patients with sleep disturbances that have been published within the last ten years (2007 to 2017) and find out the main efficient intervention strategies and elements of sleep management which provided by occupational therapists; they found 4 effective intervention for sleep disturbance such as (1) using assistive technology or aid or equipment (the Dream pad pillow, weighted blankets, and sleep tools including eye masks, earplugs, and white noise machines) (2) engaging in activities such as iRest meditation, yoga, and breathing, (3) treating insomnia with cognitive behavioural therapy, and (4) changing one's lifestyle (Ho & Siu, 2018).

2.9 Key Gaps of the Study

- Most of the study was conducted by using the Sleep Disturbance Scale for Children (SDSC) and few studies use the Children Sleep Habits Questionnaire (CSHQ) scale.
- Enough evidence did not find about the association between sleep disturbance and gender, age groups, and types of CP.
- In some articles it does not mention its study approach and sampling.
- Most of the study does not mention study settings.
- Though some of the study is cross-sectional but does not mention its study periods.
- In Bangladesh, no study has been conducted regarding sleep-related problems of Children with Cerebral Palsy.

CHAPTER III: METHODS

3.1 Study Design

Quantitative study design

Approach: The study followed the descriptive-analytical cross-sectional study approach of quantitative design.

Descriptive cross-sectional studies are used for describing and evaluating the prevalence, and distribution of one or more health outcomes in a specific population. Analytical cross-sectional studies look into the relationship between two variables. To quantify the relationship between an exposure and a condition within a specified population, they gather data on exposures and outcomes at a single moment in time (Simkus, 2021).

The student researcher selected this method because the researcher selected a population from Savar (head office) and Mirpur (branch) Centre for the Rehabilitation of the Paralysed (CRP) for a specified period (2022). Student researcher used cross-sectional study to obtain the study aim and objectives. Firstly, it was used to determine to explore their sleep habits, the prevalence of sleep disturbance of cerebral palsy, and then, this study design helps to identify the association between sleep disturbance and gender, age groups, types of cerebral palsy, epilepsy and also identify the level of sleep duration among age group children with cerebral palsy at a specific point in a short period of time. The aim of the study could be achieved with a cross-sectional approach; so, the student researcher chose the design of this study.

3.2 Study Setting and Period

3.2.1 Study Setting

This study was conducted at the Paediatric department of Savar and Mirpur CRP.

CRP's journey began in 1979 to meet the critical needs of people with disabilities. The founder of CRP was a British Physiotherapist, Valerie Ann Taylor. CRP has 13 subcentres, with the head office in Savar. CRP provides services through a comprehensive rehabilitation and community reintegration process. CRP has grown into a well-known organization that assists persons and children with disabilities in their rehabilitation (*CRP Bangladesh*; *CRP Bangladesh: CRP - Centre for the Rehabilitation of the Paralysed*).

There are two different service categories offered in the paediatric department of CRP, including inpatient and outpatient care. An interdisciplinary team provides the services (which includes physiotherapists, occupational therapists, speech and language therapists & paediatricians). The main responsibility of In-Patient Service is to manage a two-week residential program created to help children with cerebral palsy to adapt to family and community life. There are numerous services offered here, including (morning group therapy, balance & coordination therapy, hydrotherapy, caregiver training, and health education, feeding classes, dressing & toileting classes, back care education, outreach programs, communication groups, preverbal skill groups, and inclusion planning). Various paediatric conditions, including cerebral palsy, down's syndrome, erb's Palsy, clubfoot, flat feet, congenital deformities, autism spectrum disorder, learning disabilities, behavioural issues, muscular dystrophy, spina bifida, myopathy, intellectual impairment,

peripheral neuropathy, and others, are treated in the outpatient service (*Pediatric Unit - CRP Bangladesh*).

3.2.2 Study Period

The study period was between April 2022 to February 2023.

Data collection period: 18 October 2022 – 24 November 2022

3.3 Study Participants

3.3.1 Study Population

For this study, the study population were children with cerebral palsy, but data were taken from their caregivers. This population was selected for getting accurate information about children's sleep habits.

3.3.2 Sampling Techniques

The student researcher used a purposive sampling method to collect the sample by following the inclusion and exclusion criteria in this study.

Researchers utilise purposive sampling to access a specific subset of people. (Purposive Sampling 101). Purposive sampling is utilised because it is based on the characteristics of a population and the goal of the study (Crossman, 19 March 2020). Purposive sampling is chosen based on the objectives of the study with the expectation that each participant would contribute unique and detailed information that will be useful to the study (Etikan, January 2016). Therefore, purposive sampling was the best way to select the population of the study.

3.3.3 Inclusion Criteria

- ✓ The population will be mothers of children with Cerebral Palsy who are aged 3.5-12 years and who also attended the paediatric department of CRP, Savar, and Mirpur CRP during data collection.
- ✓ Mothers of both male and female children with Cerebral Palsy.
- ✓ Mothers of all types of children with Cerebral Palsy.

3.3.4 Exclusion Criteria

- ✓ Severely ill children's populations with chronic health problems (bronchial asthma, cardiac impairment, severe chest infections with coughs or severe musculoskeletal pain).
- ✓ Secondary caregivers and other family members were excluded from this study.

3.3.5 Sample Size

In any survey, the design of the study includes a broad research sample to generalize the analysis to the selected population. The larger sample represents the entire population, so it is critical that the sample is representative of the population. While a larger sample is more likely to be taken where,

Percentage of population, P= 0.34

Prevalence, q= 1-P

q= 1-0.34

= 0.66 Confidence level, Z= 1.96 at 95% (Standard value)

Degree of accuracy, d=0.05

Required sample size, n=?

Here, the standard normal deviation is (z) = 1.96 and the degree of accuracy required (level of significance/ margin of error) is d = 0.05, precise number of children with cerebral palsy was known as well as the prevalence was p=0.34, where q=0.66 (1-p) and then the sample size (n) it stood for

$n=Z^2 x\ p\ x\ q\ /\ d^2$

$= (1.96)^2 \times 0.34 \times 0.66 / (0.05)^2$

$= 0.862/0.0025$

$= 344.82$

According to the equation, the sample should be 344 population, but the student researcher could collect 175 data from the population of the study because of the short time duration and cost limitation of the study. All participants willingly participated in this study. So, the response rate of this study was satisfactory.

3.4 Ethical Considerations:

3.4.1 Informed Consent

- The ethical clearance has been sought from the Institutional Ethical Review Board by explaining the purpose of the research, through the Department of Occupational Therapy, Bangladesh Health Professions Institute (BHPI). Then the student researcher took a consent form from the Institutional Review Board (IRB). IRB form number: CRP/BHPI/IRB/09/22/639
- Student researcher took permission from the author to use the Children Sleep Habits Questionnaire (CSHQ) scale before conducting the survey.
- Student researcher took permission from the Paedictric Department of Savar and Mirpur CRP for data collection.
- Participant explanatory statement provided to all population where have detailed information about the Study (aim & purpose). After reading this form those who wanted to participate willingly, only their data was collected. Verbal and written consent was taken from all children with cerebral palsy caregiver, written consent was taken from on the consent sheet.

3.4.2 Right of Refusal to Participate or Withdraw

Withdrawal form provided all population if anyone wants to withdrawal their information, they were free to choose, whether to participate or not.

3.4.3 Confidentiality

The entire population was also informed that their information would be used for the study, but their name and address will be confidential only student researcher and

supervisor knew about that, and it was stated on the participant explanatory statement. The participants were also informed that their identity will remain confidential for future uses such as publication, conference, further study, and verbal discussion.

3.4.4 Unequal or Power Relationship

- The population participated voluntarily.
- Student researcher did not have any unequal or power relationship with the population.

3.4.5 Risk and Beneficence

- The population did not have any risk to participate in the study.
- The population did not get any beneficence for giving data.

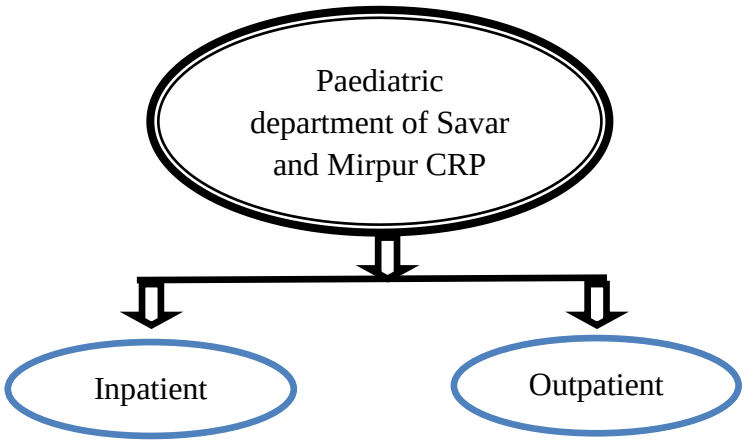
Note: All sheets and scale are given in the appendix below

3.5 Data Collection Process

3.5.1 Participant Recruitment Process

Figure 3.1

Overview of participant recruitment process



Student researcher took study population from the paediatric department at CRP (Savar and Mirpur) by talking inpatient therapists and who came to take intervention from out-patient during my data collection period.

3.5.2 Data Collection Method

Firstly, student researcher introduced the populations before data collection. Student researcher informed all populations about the aim, objectives, and purpose of the study and clarified that the populations had the right to refuse to answer of the questions during the data collection period. When the populations were agreed with the student researcher, then the student researcher took permission from each population by using a written consent form and start to collect data through closed ended questionnaire by using Children Sleep Habits Questionnaire scale from the parents by face-to-face conversation.

The student researcher took approximately 25-30 minutes for interview (each participant) in the rehabilitation centre (Savar and Mirpur CRP).

3.5.3 Data Collection Instrument

Children Sleep Habits Questionnaire scale is a retrospective, 45 items, parent-reported tool which was developed in United State to assess sleep behaviours of school-age children over the past week (or the most recent more typical week, if the last week was unusual) which is widely accepted as both valid and reliable. 33 items out of its 45 initial items were further conceptually grouped into eight subscales, reflecting the following sleep domains: bedtime resistance (items 1, 3, 4, 5, 6 and 8), sleep onset delay (item 2), sleep duration (items 9, 10 and 11), sleep anxiety (items 5, 7, 8 and 21), night wakings (items 16, 24 and 25), parasomnias (items 12, 13, 14, 15, 17, 22 and 23), sleep-disordered breathing (items 18, 19 and 20) and daytime sleepiness (items 26, 27, 28, 29, 30, 31, 32 and 33). Total sleep disturbance score included 33 items of the eight subscales but two of the items (5, 8) included on the bedtime resistance and sleep anxiety subscales, they should be counted once in the total score. The scoring of some items was reversed (items 1, 2, 3, 10, 11 and 26). This 33-items structure was validated for the screening of sleep disturbances in preschool and school-aged children (4 to 10 years old). Children Sleep Habits Questionnaire scale is scored from a 3–point scale with the response option rarely (never or 1 time during a week, scored as 1 point), sometimes (2–4 times per week, scored as 2 points) and usually (5 or more times in a week, scored as 3 points). A total score of 41 or higher suggests the presence of a sleep disturbance. The total score of full Children Sleep Habits Questionnaire scale showed adequate internal consistency was 0.68 for the community sample and o.72 for the clinical sample; subscales score adequate

internal consistency ranged from 0.36 to 0.70 for the community sample and from 0.56 to 0.93 for the clinical sample (using the Cronbach's alpha coefficient). Test-retest reliability for subscale ranged from 0.62 to 0.79 (Pearson's and Spearman's rank order correlations). According to the cut-off score of 41, the sensitivity and specificity of the Children Sleep Habits Questionnaire scale was 0.80 and 0.72 (Boergers et al., 2007; Owens et al., 2000)

3.5.4 Field Test

The student researcher conducted a pilot test with 3 participants before starting the collection of data. Pilot test is the preparation for initiating final data collection. The student researcher had informed the participant about the aim and objectives of the study during the data collection. It was important to carry out a pilot test before collecting the final data because it helped the student researcher to purify the plan of data collection procedure, sorting out the challenges of questioning, identifying strategies about how to establish rapport to bring out actual response. The student researcher used the selected demographic question and Bengali version of CSHQ scale for the pilot test and from the findings, student researcher decided to use this tool for further data collection. Additionally, no adaption or modification was needed for CSHQ scale and demographic question as it was developed in the perspective of Bangladesh.

3.6 Data Management and Analysis

Data analysis is a vital part of any study or research. Study data were input and managed using Statistical Package for Social Science (SPSS) version 26, Microsoft office word and Microsoft office excel.

At first, the variables were labelled in the list and the student researcher established a computer-based data definition record file consisting of a list of the order variables. The student researcher puts the name of the variables in the variable view of the SPSS and defines the types of values, and decimal values, alignment of the label and the level of measurement of the data. The next move was to check the data view, whether the variables were set correctly or not. Then input raw data and test the data into the SPSS. Data was analysed by concise statistics and calculated as percentages. Descriptive statistics analysis used for demo-graphical data such as gender, aged groups, education, mother occupation, mother educational level, living area, types of cerebral palsy, taking sleeping medication and epilepsy. The chi-square test, commonly known as Pearson's chi-square test of association, is used to determine whether or not two categorical variables have an association. This test was done to measure the association among related variables. By chi-square test, the researcher determines the association among sleep and gender, aged groups, epilepsy, medication. Student research also used fisher's exact test to the association among sleep and types of cerebral palsy, because if more than 20% of cell have expected frequency less 5 then fisher's exact test should apply (Kim, 2017). Then the document was presented in Microsoft office word and Microsoft office excel to make pic chart and tables. Eventually, the findings of this survey were quantitative evidence.

There are many statistical methods available for data analysis, but the student researcher used descriptive statistical analysis. It analyses complete data or a sample of summarized numerical data. It shows mean and deviation for continuous data whereas percentage and frequency for categorical data (Johnson, 14 July 2022). Descriptive statistics are numerical and graphical tools for organizing, presenting, and analysing data (Fisher & Marshall, 2009). As a result, the student researcher used descriptive methods to interpret the results of this research as a survey. Descriptive statistics were used to analyse the data by using the Statistical Package for Social Science (SPSS) v26.

3.7 Quality Control and Quality Assurance

The proper quality of data was assured and managed by the student researcher. The entire study was conducted in a systemic way by following research steps under the supervision of an experienced supervisor. Firstly, the data was input in SPSS v26. Missing data/ errors was checked properly. At the time of data collection and data analysis, the student researcher never tries to influence the result by her own value or perspectives. The student researcher accepted answers of the participants whether they would deliver. All the data was input properly and assured by the student researcher. The student researcher also checked the data with her responsible supervisor.

CHAPTER IV: RESULTS

This chapter represents the findings of the study. The chapter contains the study findings in the tables and figures focusing the socio-demographic information, sleep behaviour of children with cerebral palsy, level of sleep duration among age group children with cerebral palsy and association between sleep behaviour and epilepsy, types of cerebral palsy, school grade.

4.1 Socio-Demographic Characteristics

Table 4.1

Socio-demographic characteristics of the participants (N=175)

Variable	**N=175 (%)**
Gender	
Boys	95 (54.3%)
Girls	80 (45.7%)
Age Group	
Preschool aged	86 (49.1%)
School aged	89 (50.9%)
Child Education	
Yes	25 (14.3%)
No	150 (85.7%)
Mother Educational level	
Illiterate	7 (4.0%)
Primary	30 (17.1%)
Secondary	81 (46.3%)
Higher secondary	29 (16.6%)
Graduated	26 (14.9%)

N/A (dead)	2 (1.1%)
Mother Occupation	
Housewife	163 (93.1%)
Job holder	10 (5.7%)
N/A(dead)	2 (1.1%)
Living area	
Urban	69 (39.4%)
Rural	106 (60.6%)
Types of Cerebral Palsy	
Quadriplegic	82 (46.9%)
Hemiplegic	35 (20.0%)
Diplegic	25 (14.3%)
Triplegic	5 (2.9%)
Monoplegia	3 (1.7%)
Athetoid	21 (12.0%)
Ataxic	2 (1.1%)
Hypotonic	2 (1.1%)
Taking medication	
Yes	84 (48.0%)
No	91 (52.0%)
Epilepsy	
Present	76 (43.4%)
Absent	99 (56.6%)

Table 4.1 shows an overview of socio-demographic information of children with Cerebral Palsy including the participants gender, school grade, children educational information, child's mother occupational and educational status, living area, types of Cerebral Palsy, consumption of sleeping medicine and epilepsy history. This table showed that boys were more than girls in this study respectively 54.3% and 45.7%. Children School grade

were categories in preschool aged (3-5 years) and school aged (6-13 years). School-aged children with cerebral palsy were more participated than preschool-aged children with cerebral palsy in this study, which is respectively 50.9% and 49.1**%.** Moreover, another finding of this study is the number of schools going children with cerebral palsy (14.3%) was much lower than the number of children with cerebral palsy not going to school (85.7%), which is a very concerning issue. This study found that most of the mothers of the CWCP's educational background was secondary level 46.3% and only 4% were illiterate. Majority of the mother of the CWCP's were housewife which is 93.1%. Most of the children with cerebral palsy lived in rural areas (60.6%) rather than urban areas (39.4%). Another prior finding of this study is quadriplegic types of cerebral palsy (46.9%) were more responded than other types of cerebral palsy. However, all most half of the children with cerebral palsy (52.0%) did not take any kind of medication. Additionally, the mothers of children with cerebral palsy reported that 43.4% children with children with cerebral palsy had epilepsy and 56.6% children with cerebral palsy had no epilepsy.

4.2 Overview of Sleep among Children with Cerebral Palsy

Figure 4.1

Frequency of sleep disturbance among children with cerebral palsy

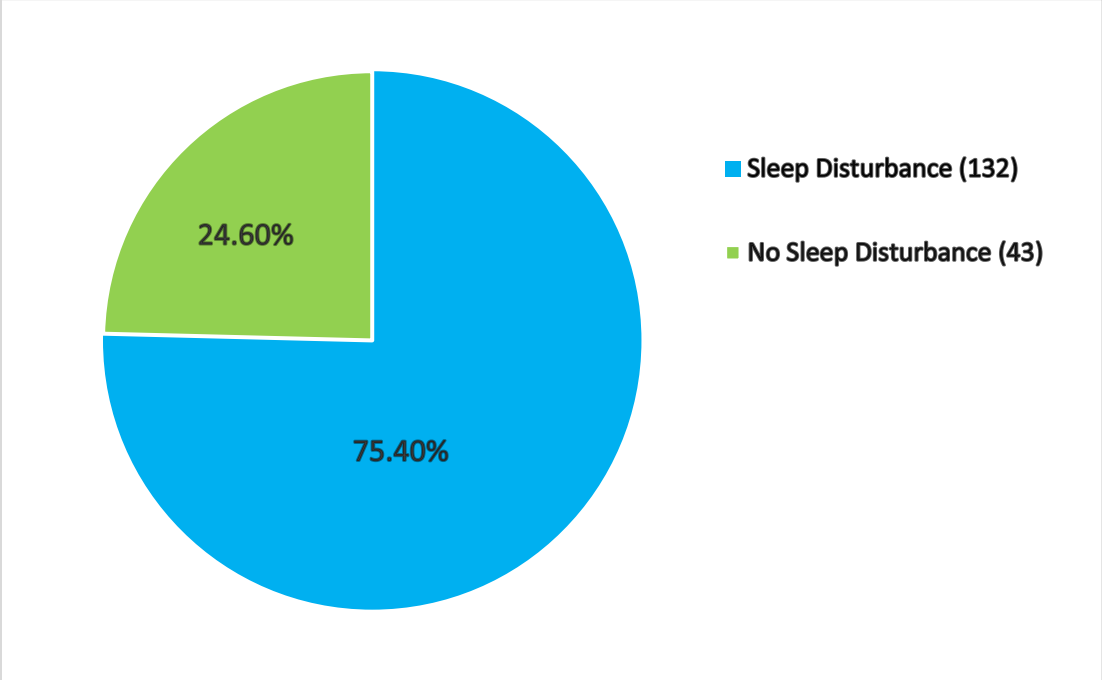


Figure 4.1 presents the overview of sleep among children with Cerebral Palsy which is reported by mothers. Based on Children Sleep Habits Questionnaire scale, 75.4% of children with cerebral palsy reported sleep disturbance, which is a concerning issue.

4.3 The level of sleep duration among age group children with Cerebral palsy

Table 4.2

The level of sleep duration among age group children with Cerebral palsy

Variables		According to national sleep foundation, adequate amount of sleep of preschool (10hr-13hr) and school age (9hr-11hr)	Inadequate amount of sleep	Above the range
Preschool aged (3-5 years)	N= 86 (%)	38 (44.3%)	44 (51.2%)	4 (4.7%)
School aged (6-13 years)	N= 89 (%)	47 (52.8%)	36 (40.5%)	6 (6.7%)

Table 4.2 showed that 85 children with cerebral palsy met the recommendation of the national sleep foundation among 175 children with cerebral palsy. The result also found that school-aged children with cerebral palsy (52.8%) get more adequate amount of sleep than preschool-aged children with cerebral palsy (44.3%).

4.4 Association between Sleep and gender, age groups, epilepsy, medication, types of Cerebral Palsy

Table 4.3

Association between sleep and gender, age groups, epilepsy, medication, types of cerebral palsy

Variable	Category	Sleep		Chi-Square Test	P Value
		Sleep Disturbance N=132 (%)	No Sleep Disturbance N=43 (%)		
Gender	Boys	66 (69.5%)	29 (30.5%)	3.976	**0.046**
	Girls	66 (82.5%)	14 (17.5%)		
Age Groups	Preschool aged	64 (74.4%)	22 (25.6%)	0.093	0.760
	School aged	68 (76.4%)	21 (23.6%)		
Epilepsy	Present	62 (81.6%)	14 (18.4%)	2.742	0.098
	Absent	70 (70.7%)	29 (29.3%)		
Medication	Yes	66 (78.6%)	18 (21.4%)	0.861	0.353
	No	66 (72.5%)	25 (27.5%)		
				Fisher's Exact Test	
Types of cerebral palsy	Quadriplegia	62 (75.6%)	20 (24.4%)	5.365	0.577
	Hemiplegia	27 (77.1%)	8 (22.9%)		
	Diplegia	19 (76.0%)	6 (24.0%)		
	Athetoid	17 (81.0%)	4 (19.0%)		
	Triplegic	2 (40.0%)	3 (60.0%)		

Monoplegia	2 (66.7%)	1 (33.3%)
Ataxic	2 (100%)	0 (0%)
Hypotonic	1 (50.0%)	1 (50.0%)

Note. According to 95% confidential Interval, statistically significant = when *p*-value < 0.05 and statistically not significant = when *p*-value > 0.05

Table 4.3 showed that there was a statistically significant among gender and sleep (*p*-value < 0.05). This table also showed that among 95 boys with cerebral palsy 69.5% had a sleep disturbance and 82.5% of girls with cerebral palsy had sleep disturbance among 80 girls with cerebral palsy, which means sleep disturbance of girls with cerebral palsy was higher than boys with cerebral palsy. The result also showed that age groups, epilepsy, medication, and types of cerebral palsy were not statistically significant with sleep (*p*-value > 0.05)**.**

CHAPTER V: DICUSSION

This study was conducted in Bangladesh with 175 children with cerebral palsy and the aimed of this study to explore the sleep habits of children with cerebral palsy. In this study participants' response rate was satisfactory.

The findings of this study were 75.4% children with cerebral palsy had sleep disturbances among 175 children with cerebral palsy which is very concerning issue, and the same findings was found in other previous study (Türkmen, 2021). Zuculo et. al. (2014) and Wayte et. al. (2012) was also found the similar findings in their previous study that 60% and 70% of children with cerebral palsy had sleep disturbances. Nonetheless, another previous studies showed that 32% of children with cerebral palsy (Munyumu et al., 2018), 31.5% of children with cerebral palsy (Badaru et al., 2021), 23% of children with cerebral palsy (Newman et al., 2006), 20.7% of children with cerebral palsy (Horwood et al., 2018) and 13% of children with cerebral palsy (Romeo et al., 2014) had sleep disturbance, which percentage were much less than this current study. Additionally, 86.7% children with cerebral palsy was abnormal sleep score (Karabulut & Şebnem, 2020), which was higher than this current study.

Other findings of this study were school-aged children with Cerebral Palsy (52.8%) getting adequate amount of sleep more than preschool aged children of Cerebral Palsy (44.3%). The similar findings were found in previous study that 91.7% school-aged and 81.3% preschool aged children with Cerebral Palsy getting adequate amount of sleep (Horwood et al., 2018). Moreover, this study also found that 55.9% of preschool aged among 86 preschool aged children with cerebral palsy and 47.2% school aged among 89

school- aged children with cerebral palsy was not getting age-specific amount of sleep. The frequency of meeting age-specific amount of sleep is less than not meeting age-specific amount of sleep among preschool aged children with cerebral palsy. This finding was also similar in same previous study, where is 18.1% among 64 preschool aged and 8.3% among 84 school-aged children with cerebral palsy (Horwood et al., 2018). Another studies find out a different findings that children age was significantly correlated with total sleep time (p-value < 0.001) which was conducted among normal developing child (Meltzer & Mindell, 2007) but Halstead et. al. (2021) found age and sleep duration of children with neurodevelopmental conditions have not significantly correlation.

In this study, it was also found that gender was significantly associated with sleep (p-value < 0.05) but same finding was not found the previous study. Opposite finding was found in another previous study that gender was not significantly associated with sleep disturbances (Badaru et al., 2021). Nonetheless, other finding was found in previous study that there was no significant difference between gender and total sleep score (Wayte et al., 2012). Another finding of this study was sleeping disturbance of girls with Cerebral Palsy (82.5%) was higher than boys with Cerebral Palsy (69.5%) but gender sleep disturbance ratio related any study were not found.

Another finding in this study, is about there was no significant association between sleep disturbance and aged group (p-value > 0.05). The same finding was found in previous study that there were no significant association between sleep disturbances and age group (Badaru et al., 2021) and other studies as found the same result that there was no correlation between sleep disturbance scores and age (Wayte et al., 2012). Different finding did not find in any study.

Moreover, this study also found that there was no significant association among epilepsy and sleep (*p*-value > 0.05). The same finding was found in previous study that epilepsy was not significantly associated with total sleep score (Atmawidjaja et al., 2014; Wayte et al., 2012). Nonetheless, opposite findings were found in another previous study that epilepsy was significantly associated with sleep disturbances (Badaru et al., 2021; Newman et al., 2006; Romeo et al., 2014).

However, in this study also found that there was no significant association among medication and sleep (*p*-value > 0.05), same finding was not found the previous study. Nonetheless, opposite findings were found in another previous study that medications were significantly associated with sleep disturbances (Badaru et al., 2021; Romeo et al., 2014)

Additionally, in this study found that there was no significant association between sleep and types of Cerebral Palsy (*p*-value > 0.05), same finding was found in previous study that there were no significant association between sleep disturbances and types of cerebral palsy (Badaru et al., 2021). Another study found a different finding that there were no significant differences between abnormal total sleep score and types of cerebral palsy (Romeo et al., 2014).

CHAPTER VI: CONCLUSION

6.1 Strength and Limitation

6.1.1 Strength of the Study

- Author permitted to use CSHQ scale for this study.
- Ethical approval for the study was granted by the Institutional Review Board (IRB), BHPI.
- This research followed the proper method to achieve the aim and objectives.
- The participants (mother of children with cerebral palsy) were very cooperative when information was taken from them.
- This study was time effective.
- This research will help in future research.

6.1.2 Limitation of the Study

There are some limitations of the study. They are,

- According to the Bangladesh context, Children Sleep Habits Questionnaire scale reliability and validity did not check before conducting this study due to time limitation, but in Bangladesh one study also used this scale in their study for Autism children.
- Studies only used subjective measures, such as questionnaires, but did not used objective sleep patterns measures such as actigraphy (motion sensors that

differentiate sleep and wake), which have indicated that parents may overreport sleep difficulties in their children.

- The participants were based on a specific rehabilitation centre (2 sub-centre), so could not reached all districts children with Cerebral Palsy of Bangladesh because of time limitation.
- The study was conducted by 175 children with cerebral palsy which was half of total sample size calculation, which was not enough to generalise the main frequency of sleep problem of children with cerebral palsy in Bangladesh.
- The sample was selected by purposive sampling rather than randomly.
- Reliance on parent reports increases the potential for research bias.
- There would be any mistakes due to little experience of student researcher.

6.2 Practice Implication

6.2.1 Institution-based Practice Implication

Sleep is an essential daily activity that is crucial for a person's well-being and occupational therapists focus on improving patients' self-care, productivity, and leisure. This study will acknowledge the occupational therapist with their role in the management of sleep problems among children with cerebral palsy. As “sleep and rest” is an important working area for occupational therapists so that, after knowing the current situation about the sleep disturbances among children with cerebral palsy they will give more concern of this area during treatment session. By developing a sleep assessment form, occupational therapists easily address children with cerebral palsy’s sleep problem and plays a vital role in managing their sleep disturbances. Occupational therapist applies many sleep

management techniques such as regularly or routinely inquiries sleep habits, to provider equipment and caregiver education during treatment sessions. Without it, this research will also help the academic faculty to add sleep-related content to the occupational therapy curriculum.

6.2.2 Community-based Practice Implication

Occupational Therapists should advocate to the mothers of children with Cerebral Palsy about children sleeping behaviours such as the appropriate amount of sleep duration according to age, giving some idea about sleep routine, negative behaviour during sleep and sleep hygiene. They should also raise awareness among family members of children with cerebral palsy about children's sleeping environment and sleep hygiene.

6.2.3 Recommendation for Future Research:

- Further studies using objective measures such as actigraphy.
- Explore the sleep habits of other neurodevelopmental conditions.
- Identify the Musculo-skeletal pain, and the decreased ability to change body position during the night are associated with sleep disturbances of children with cerebral palsy.
- Find out an association between sleep disturbance of children with cerebral palsy and environmental factors.
- Find out the effective treatment technique of sleep disturbance among children with cerebral palsy in Bangladesh.
- Identify an association between sleep disturbances of children with cerebral palsy and their maternal depression.
- Explore the sleep quality of mothers of children with cerebral palsy.

6.3 Conclusion

The aim of this study was to explore the sleeping habits of children with cerebral palsy. This is the first report in Bangladesh on the sleep problems of children with cerebral palsy. The study enhances our understanding of this population's sociodemographic features and current situation. The study has found that a greater number of children with CP have sleep problems. The current data highlights that these children with cerebral palsy have greater sleep disturbances. This study showed that School-aged children with Cerebral Palsy get an adequate amount of sleep more than preschool-aged Children with cerebral palsy. This study also showed that sleep is not significantly associated with preschool and school aged group, types of cerebral palsy, medication and epilepsy but it is significantly associated with gender of children with cerebral palsy. Importantly, behavioural management practices can help children's who facing sleep disturbances (Wayte et al., 2012). Occupational Therapists must emphasize the treatment of sleep disturbances in children with cerebral palsy because it has the potential to improve not only the child's well-being but also the well-being of the child's caregiver. So, Occupational Therapists and caregivers of children with cerebral palsy should be more aware about their sleep disturbance.

LIST OF REFERENCE

Andrew, K. (2019). *Bedtime resistance and parenting in early childhood: a self-determination perspective* http://hdl.handle.net/1828/10795

Atmawidjaja, R. W., Wong, S. W., Yang, W. W., & Ong, L. C. (2014). Sleep disturbances in Malaysian children with cerebral palsy. *Developmental Medicin & Child Neurology*, *56*(7), 681-685. https://doi.org/10.1111/dmcn.12399

Badaru, U. M., Hassan, A. M., Ahmad, R. Y., Nuhu, J. M., & Lawal, I. U. (2021). Prevalence, pattern and impact of sleep disturbance on quality of life and exercise participation among children with cerebral palsy in Kano city. *Sleep science*, *14*(4), 348. https://doi.org/10.5935/1984-0063.20200108

Boergers, J., Hart, C., Owens, J. A., Streisand, R., & Spirito, A. (2007). Child sleep disorders: associations with parental sleep duration and daytime sleepiness. *Journal of Family Psychology*, *21*(1), 88. https://doi.org/10.1037/0893-3200.21.1.88

Crossman, A. (19 March 2020). *Purposive Sampling Definition and Types*. ThoughtCo. https://www.thoughtco.com/purposive-sampling-3026727

CRP Bangladesh. https://www.crp-bangladesh.org/about-crp

CRP Bangladesh: CRP - Centre for the Rehabilitation of the Paralysed. https://www.crp-bangladesh.org/

Danielle, P. (16 May 2022). *Sleep Disorders – Common Types, Symptoms, Treatments*. Sleep Foundation. https://www.sleepfoundation.org › Sleep Disorders

Etikan, I. (January 2016). Comparison of Convenience Sampling and Purposive Sampling. *American Journal of Theoretical and Applied Statistics*. https://doi.org/10.11648/j.ajtas.20160501.11

Excessive Sleepiness: Causes, Symptoms, and Treatments. (24 February 2023). Sleep Foundation. https://www.sleepfoundation.org/excessive-sleepiness

Fisher, M. J., & Marshall, A. P. (2009). Understanding descriptive statistics. *Australian critical care*, *22*(2), 93-97. https://doi.org/10.1016/j.aucc.2008.11.003

Halstead, E. J., Joyce, A., Sullivan, E., Tywyn, C., Davies, K., Jones, A., & Dimitriou, D. (2021). Sleep disturbances and patterns in children with neurodevelopmental conditions. *Frontiers in pediatrics*, *9*, 637770. https://doi.org/10.3389/fped.2021.637770

Hirshkowitz, M., Whiton, K., Albert, S. M., Alessi, C., Bruni, O., DonCarlos, L., Hazen, N., Herman, J., Hillard, P. J. A., & Katz, E. S. (2015). National Sleep Foundation's updated sleep duration recommendations. *Sleep health*, *1*(4), 233-243. https://doi.org/10.1016/j.sleh.2015.10.004

Ho, E., & Siu, A. M. (2018). Occupational therapy practice in sleep management: A review of conceptual models and research evidence. *Occupational therapy international, 2018*. https://doi.org/10.1155/2018/8637498

Horwood, L., Li, P., Mok, E., Shevell, M., & Constantin, E. (2019). A systematic review and meta-analysis of the prevalence of sleep problems in children with cerebral palsy: how do children with cerebral palsy differ from each other and from typically developing children? *Sleep health*, *5*(6), 555-571. https://doi.org/10.1016/j.sleh.2019.08.006

Horwood, L., Mok, E., Li, P., Oskoui, M., Shevell, M., & Constantin, E. (2018). Prevalence of sleep problems and sleep-related characteristics in preschool-and school-aged children with cerebral palsy. *Sleep Medicine, 50,* 1-6. https://doi.org/10.1016/j.sleep.2018.05.008

How Sleep Works - Why Is Sleep Important? (March 2022). NHLBI. https://www.nhlbi.nih.gov/health/sleep/why-sleep-important

Hulst, R. Y., Gorter, J. W., Voorman, J. M., Kolk, E., Van Der Vossen, S., Visser-Meily, J. M., Ketelaar, M., Pillen, S., & Verschuren, O. (2021). Sleep problems in children with cerebral palsy and their parents. *Developmental Medicin & Child Neurology, 63*(11), 1344-1350.

Jansen, E. (2020). Sleep 101: Why Sleep Is So Important to Your Health. https://sph.umich.edu/pursuit/2020posts/why-sleep-is-so-important-to-your-health.html

Johnson, D. (14 July 2022). *What is Data Analysis? Research, Types & Example*. Guru99. https://www.guru99.com/what-is-data-analysis.html

Karabulut, D., & Şebnem, A. (2020). Relationship Between Sleep Problems and Gross Motor Function in Children with Cerebral Palsy and Investigation of their Parents' Quality of Life. *Türk Fizyoterapi ve Rehabilitasyon Dergisi, 31*(2), 180-187. https://doi.org/10.21653/tjpr.535131

Khandaker, G., Muhit, M., Karim, T., Smithers-Sheedy, H., Novak, I., Jones, C., & Badawi, N. (2019). Epidemiology of cerebral palsy in Bangladesh: a population-based surveillance study. Developmental Medicin & *Child Neurology, 61*(5), 601-609. https://doi.org/10.1111/dmcn.14013

Kim, H.-Y. (2017). Statistical notes for clinical researchers: Chi-squared test and Fisher's exact test. *Restorative dentistry & endodontics*, *42*(2), 152-155. https://doi.org/10.5395/rde.2017.42.2.152

Lélis, A. L. P., Cardoso, M. V. L., & Hall, W. A. (2016). Sleep disorders in children with cerebral palsy: An integrative review. *Sleep Medicine Reviews*, *30*, 63-71. https://doi.org/10.1016/j.smrv.2015.11.008

Meltzer, L. J., & Mindell, J. A. (2007). Relationship between child sleep disturbances and maternal sleep, mood, and parenting stress: a pilot study. *Journal of Family Psychology*, *21*(1), 67. https://doi.org/ 10.1037/0893-3200.21.1.67

Munyumu, K., Idro, R., Abbo, C., Kaddumukasa, M., Katabira, E., Mupere, E., & Kakooza-Mwesige, A. (2018). Prevalence and factors associated with sleep disorders among children with cerebral palsy in Uganda; a cross-sectional study. *BMC pediatrics*, *18*(1), 1-7. https://doi.org/10.1186/s12887-018-0996-z

Newman, C. J., O'Regan, M., & Hensey, O. (2006). Sleep disorders in children with cerebral palsy. *Developmental medicine and child neurology*, *48*(7), 564-568. https://doi.org/10.1017/S0012162206001198

Night wakings: A guide for the science-minded. Parenting Science. https://parentingscience.com/night-wakings/

Obrecht, A., de Almeida, M. F., Maltauro, L., da Silva, W. D. L., Zonta, M. B., & de Souza Crippa, A. C. (2021). The relationship between gross motor function impairment in cerebral palsy and sleeping issues of children and caregivers. *Sleep Medicine*, *81*, 261-267. https://doi.org/10.1016/j.sleep.2021.02.055.

Owens, J. A., Spirito, A., & McGuinn, M. (2000). The Children's Sleep Habits Questionnaire (CSHQ): psychometric properties of a survey instrument for school-aged children. *Sleep-New York-*, *23*(8), 1043-1052. https://doi.org/10.1037/t33022-000

Parasomnias: Types, Symptoms, & Causes. (9 February 2023). Sleep Foundation. https://www.sleepfoundation.org/parasomnias

Patel, D. R., Neelakantan, M., Pandher, K., & Merrick, J. (2020). Cerebral palsy in children: a clinical overview. *Translational pediatrics*, *9*(Suppl 1), S125. https://doi.org/10.21037/tp.2020.01.01

Pediatric Unit - CRP Bangladesh. https://www.crp-bangladesh.org/therapy/pediatric-unit

Purposive Sampling 101. Alchemer. https://www.alchemer.com/resources/blog/purposivesampling101/#:~:text=What%20is%20Purposive%20Sampling%3F,to%20participate%20in%20their%20surveys.

Romeo, D. M., Brogna, C., Musto, E., Baranello, G., Pagliano, E., Casalino, T., Ricci, D., Mallardi, M., Sivo, S., & Cota, F. (2014). Sleep disturbances in preschool age children with cerebral palsy: a questionnaire study. *Sleep Medicine*, *15*(9), 1089-1093. http://dx.doi.org/doi:10.1016/j.sleep.2014.05.008

Simard-Tremblay, E., Constantin, E., Gruber, R., Brouillette, R. T., & Shevell, M. (2011). Sleep in children with cerebral palsy: a review. *Journal of child neurology*, *26*(10), 1303-1310. https://doi.org/10.1177/0883073811408902

Simkus, J. (2021). *Cross-Sectional Study | Definition, Designs & Examples*. Simply Psychology. https://www.simplypsychology.org/what-is-a-cross-sectional-study.html

Sleep Anxiety: What is it, Causes, Symptoms & Treatment. (2021). Cleveland Clinic. https://my.clevelandclinic.org/health/diseases/21543-sleep-anxiety

Sleep Dictionary: Definitions of Common Sleep Terms. (2022). Sleep Foundation. https://www.sleepfoundation.org/how-sleep-works/sleep-dictionary

Sleep Disordered Breathing. American Thoracic Society - Quality of Life Resource. https://qol.thoracic.org/sections/specific-diseases/sleep-disordered-breathing.html

Sleep Disturbances - Clinical Methods - NCBI Bookshelf. NCBI. https://www.ncbi.nlm.nih.gov/books/NBK401/

Sweileh, W. M., Ali, I. A., Sawalha, A. F., Abu-Taha, A. S., Zyoud, S. e. H., & Al-Jabi, S. W. (2011). Sleep habits and sleep problems among Palestinian students. *Child and adolescent psychiatry and mental health*, *5*(1), 1-8. https://doi.org/10.1186/1753-2000-5-25

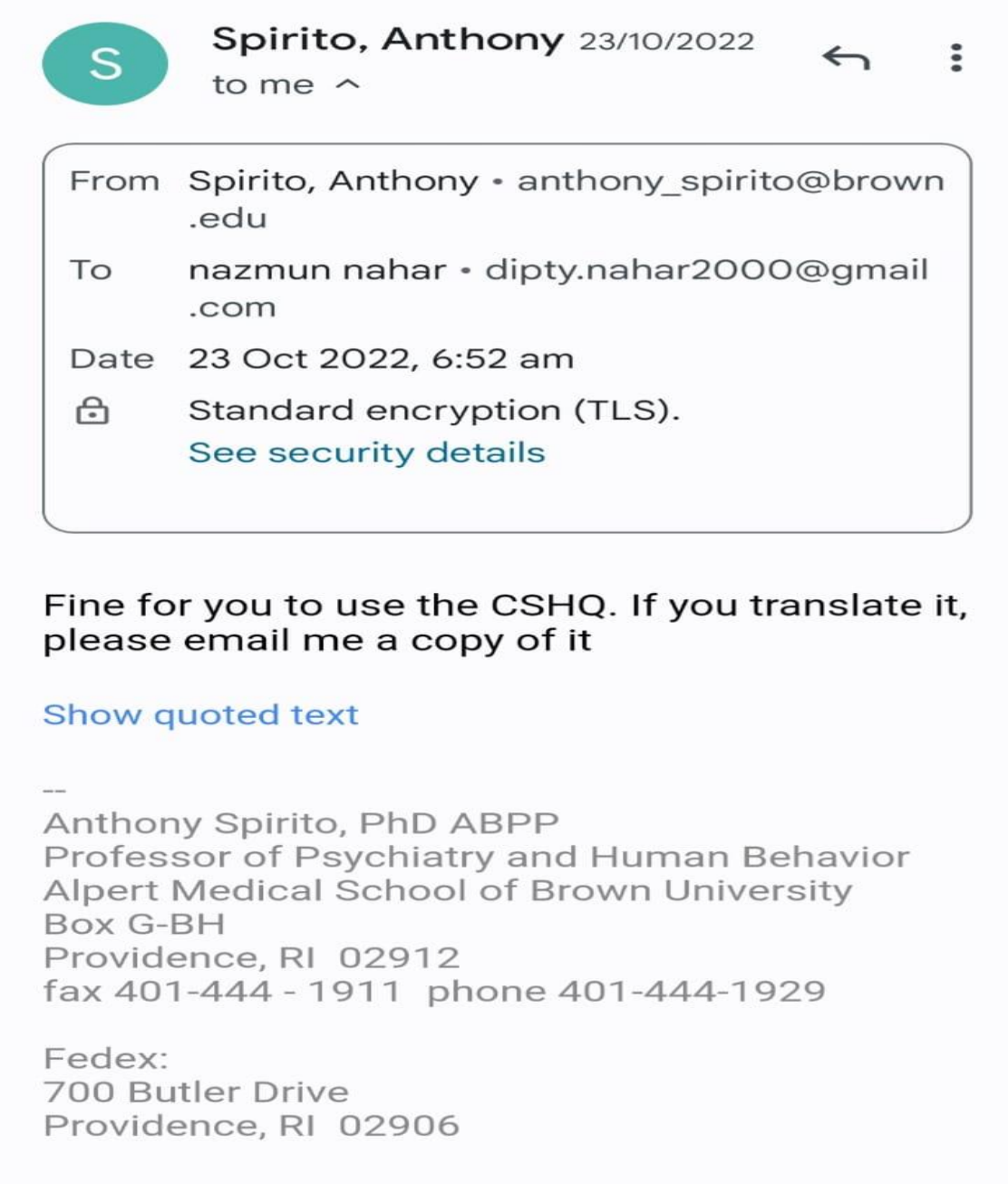
Türkmen, M. C. (2021). Investigating the association between using night braces and sleep habits of children with cerebral palsy and parental quality of Life. *Journal of Developmental and Physical Disabilities*, *33*(3), 413-427. https://doi.org/10.1007/s10882-020-09755-9

Wayte, S., McCaughey, E., Holley, S., Annaz, D., & Hill, C. M. (2012). Sleep problems in children with cerebral palsy and their relationship with maternal sleep and depression. *Acta Paediatrica*, *101*(6), 618-623. https://doi.org/10.1111/j.1651-2227.2012.02603.x

Zuculo, G. M., Knap, C. C. F., & Pinato, L. (2014). Correlation between sleep and quality of life in cerebral palsy. Codas,

APPENDICES

Appendix A: Ethical Approval / Permission Letter



Spirito, Anthony 23/10/2022
to me

From Spirito, Anthony • anthony_spirito@brown.edu
To nazmun nahar • dipty.nahar2000@gmail.com
Date 23 Oct 2022, 6:52 am
Standard encryption (TLS).
See security details

Fine for you to use the CSHQ. If you translate it, please email me a copy of it

Show quoted text

--
Anthony Spirito, PhD ABPP
Professor of Psychiatry and Human Behavior
Alpert Medical School of Brown University
Box G-BH
Providence, RI 02912
fax 401-444 - 1911 phone 401-444-1929

Fedex:
700 Butler Drive
Providence, RI 02906

BANGLADESH HEALTH PROFESSIONS INSTITUTE

বাংলাদেশ হেল্‌থ প্রফেশন্স ইনস্টিটিউট (বিএইচপিআই)
Bangladesh Health Professions Institute (BHPI)
(The Academic Institute of CRP)

Ref: CRP/BHPI/IRB/09/22/639

Date: 28th September, 2022

Nazmun Nahar
4th Year B.Sc. in Occupational Therapy
Session: 2017- 18, Student ID: 122170293
BHPI, CRP, Savar, Dhaka-1343, Bangladesh

Subject: Approval of the thesis proposal "Exploration of Sleep Habits of Children with Cerebral Palsy" by ethics committee.

Dear Nazmun Nahar,
Congratulations.
The Institutional Review Board (IRB) of BHPI has reviewed and discussed your application to conduct the above-mentioned dissertation, with yourself, as the principal investigator and SK. Moniruzzaman, Associate Professor, Head of the Department of Occupational Therapy at Bangladesh Health Professions Institute (BHPI) as thesis supervisor. The Following documents have been reviewed and approved:

Sr. No.	Name of the Documents
1	Thesis Proposal
2	Questionnaire
3	Information sheet & consent form.

The purpose of the study is to explore the sleep habits of Children with cerebral palsy. The study involves use of a standardized questionnaire instruments to find out the sleep habits and sleep disturbance among children with Cerebral Palsy that may take 45 to 50 minutes to answer a Children Sleep Habits Questionnaire (CSHQ) scale and there is no likelihood of any harm to the participants in the study. The members of the Ethics committee have approved the study to be conducted in the presented form at the meeting held at 8.30 AM on 27th August, 2022. at BHPI (32nd IRB Meeting).

The institutional Ethics committee expects to be informed about the progress of the study, any changes occurring in the course of the study, any revision in the protocol and patient information or informed consent and ask to be provided a copy of the final report. This Ethics committee is working accordance to Nuremberg Code 1947, World Medical Association Declaration of Helsinki, 1964 - 2013 and other applicable regulation.

Best regards,

Muhammad Millat Hossain
Associate Professor, Dept. of Rehabilitation Science
Member Secretary, Institutional Review Board (IRB)
BHPI, CRP, Savar, Dhaka-1343, Bangladesh

সিআরপি-চাপাইন, সাভার, ঢাকা-১৩৪৩, বাংলাদেশ। ফোন: +৮৮ ০২ ২২৪৪৪৫৪৬৪-৫, +৮৮ ০২ ২২৪৪৪১৪০৪, মোবাইল: +৮৮ ০১৭৩০ ০৫৯৬৪৭
CRP-Chapain, Savar, Dhaka-1343, Bangladesh. Tel: +88 02 224445464-5, +88 02 224441404, Mobile: +88 01730059647
E-mail : principal-bhpi@crp-bangladesh.org, Web: bhpi.edu.bd

Date: 31. 08. 2022

The Chairman
Institutional Review Board (IRB)
Bangladesh Health Professions Institute (BHPI)
CRP-Savar, Dhaka-1343, Bangladesh

Subject: **Application for review and ethical approval.**

Sir,

With due respect I would like to draw your kind attention that I am a student of B.Sc. in Occupational Therapy student at Bangladesh Health Professions Institute (BHPI), Centre for the Rehabilitation of the Paralysed (CRP). I would like to conduct a research titled, **"Exploration of Sleep Habits of Children with Cerebral Palsy"** with myself, as the principal investigator and SK. Moniruzzaman, Associate Professor, Head of the Department of Occupational Therapy at Bangladesh Health Professions Institute (BHPI) as my thesis supervisor. The purpose of the study is to explore the sleep habits of Children with cerebral palsy.

Children Sleep Habits Questionnaire (CSHQ) Scale will be used in the study that will take 45 to 50 minutes. Other related information will be collected from the participants. Data collectors will receive informed consents from all participants. Any data collected will be kept confidential.

Therefore, I look forward to having your approval for the thesis proposal and to start data collection. I also assure you that I will maintain all the requirements for study.

Sincerely yours,

Nazmun Nahar
Signature
Nazmun Nahar
4th Year, B.Sc. in Occupational Therapy
Session: 2017- 18, Student ID: 122170293
Bangladesh Health Professions Institute (BHPI)
CRP, Savar, Dhaka-1343, Bangladesh

Recommendation from the thesis supervisor:

Sk. Mnir 31/08/2022
Signature
SK. Moniruzzaman
Associate Professor,
Head of the Department of Occupational Therapy,
Bangladesh Health Professions Institute (BHPI)
CRP, Savar, Dhaka- 1343, Bangladesh

15 October 2022

To

Head of Department

Department of Paediatric

Centre for the Rehabilitation of the Paralyzed (CRP)

Chapain, Savar, Dhaka-1343

Subject: Prayer for seeking permission to collect data from PaediatricDepartment, CRP.

Madam,

I beg most respectfully to state that, I am a student of 4th year Occupational Therapy Department of Bangladesh Health Professions Institute (BHPI). I am interested to conduct a quantitative study on Paediatric Department. My research title is " Exploration of Sleep Habits of Children with Cerebral Palsy" The aim of the study isto explore the sleep habits of children with Cerebral Palsy. Now I am looking for your kind approval to start my data collection and I would like to assure that anything of my research period will not be harmful for the participants and also for the Paediatric Department. Informed consent will be filled up by the mother forethical consideration.

So, I therefore, pray and hope that you would be kind enough to grant me the permission of collecting the data and will help me to conduct a successful study as a part of my course.

Sincerely,

Nazmun Nahar
Nazmun Nahar

Roll: 28

Session: 2017-18

4th year, B. Sc. in Occupational Therapy

Bangladesh Health Professions Institute (BHPI)

CRP-Chapain, Savar, Dhaka-1343

Forwarded for your kind consideration and permission for data collection to conduct the research.
15/10/2022

She will collect data from this Department. please help her.
Thanks
15-10-22

Mosneara Pervin
Head of Department
Department of Paediatric
CRP Savar, Dhaka

12 November 2022

To

Center Manager

CRP- Mirpur, Dhaka-1206

Through proper channel

Subject: Prayer for seeking permission to collect data for research project.

Sir,

I beg most respectfully to state that, I am a student of 4th year Occupational Therapy Department of Bangladesh Health Professions Institute (BHPI). I am interested to conduct a quantitative study on Paediatric Department. My research title is " Exploration of Sleep Habits of Children with Cerebral Palsy " The aim of the study is to explore the sleep habits of children with Cerebral Palsy. Now I am looking for your kind approval to start my data collection and I would like to assure that anything of my research period will not be harmful for the participants and also for the Paediatric Department. Informed consent will be filled up by the mother for ethical consideration.

So, I therefore, pray and hope that you would be kind enough to grant me the permission of collecting the data and will help me to conduct a successful study as a part of my course.

Sincerely,

Nazmun Nahar

Nazmun Nahar

Roll: 28

Session: 2017-18

4th year, B. Sc. in Occupational Therapy

Bangladesh Health Professions Institute (BHPI)

CRP-Chapain, Savar, Dhaka-1343

Forwarded for your kind consideration and permission for data collection to conduct her research.

12/11/2022

Dr. Moniruzzaman
Associate Professor & Head
Dept. of Occupational Therapy
BHPI, CRP Savar, Dhaka-1343

Appendix B: Information Sheet & Consent Form

Participant explanatory statement

I am Nazmun Nahar, student at the Bangladesh Health Professions Institute (BHPI) is the academic institute of the Centre for the Rehabilitation of the Paralyzed (CRP), Savar, Dhaka. I am studying 4th year B.Sc. in Occupational Therapy. In regard to the fulfilment of B.Sc. Degree, it is compulsory to conduct research in 4th year of study. I would like to invite you to take part in my research study and the title is "Exploration of Sleep Habits of Children with Cerebral Palsy". The aim of the study to explore the sleep habits of children with cerebral palsy.

It is up to you whether or not you want to participate in this study. If you do not wish to take part, then there is an opportunity to withdraw your participation at any time and contact this phone no: 01717295096. This will not hamper access to services and will not affect the treatment of your child. There is no incentive for participation in the study. May be there is no direct benefit for you at present. However. The study results obtained from the research will help the authorities to understand the cause of the child's sleep disturbances, which will help in the future to provide intervention of other children with sleep disturbance problems like your child. A standard questionnaire will be conducted with some questions regarding the study that will be filled up in question paper and also recorded by tape recorder. The confidentiality of all records will be highly maintained, and all details will be kept on a confidential database that is only accessible to me and my supervisor. The identity of you not to be disclosed in any presentation or publication without your agreement. If you have any queries regarding this study, please feel free to ask. I am accountable to answer all questions regarding this study.

Nazmun Nahar
B. Sc. in Occupational Therapy, 4th year
Department of Occupational Therapy
BHPI, CRP, Chapain, Savar, Dhaka-1343.

Parental Consent form

For Parents who are taking part in interviews:

Please read the following statements and put tik (✓) on yes or no to say that you understand the content of the information sheet, your involvement, and that you agree to take part in the above-named study.

1. I confirm that I have read and understood the information Sheet for the study or that it has been explained to me and I have had the opportunity to ask questions. ----------Yes / No

2. I have satisfactory answers to my questions regarding with this study. ----------Yes / No

3. I understand that participation in the study is voluntary and that I am free to end my involvement till January, or request that the data collected in the study be destroyed without giving a reason. ----------Yes / No

4. Information from interviews and question, those will be collected by the investigator might be examined by research supervisor. However, all personal details will be treated as highly confidential. I have permitted the investigator and supervisor to access my recorded information. ----------Yes / No

5. I have sufficient time to come to my decision about participation----------Yes / No

6. I agree for quotations from my interviews to be used in the above study-------Yes / No

7. I agree to take part in the above study----------Yes / No

Participant's signature_____ Date_____

Witness signature _____ Date _____

Investigator

I have explained the study to the above participant precisely and he/she has indicated a willingness to take part.

Investigator's signature_____ Date_____

Withdrawal Form

Can you withdraw from this study:

You can cancel any information collected for this research project at any time. After the cancellation, whether the data can be used or not should be mentioned in the participants withdrawal form.

Participants Name: …………………………………………………………

Reason of withdraw:
………………………………………………………………………………………………………
………………………………………………………………………………………………………..
………………………………………………………………………………………………………
………………………………………………………………………………………………………..
………………………………………………………………………………………………………..
………………………………………………………………………………………………………
………………………………………………………………………………………………………
………………………………………………………………………………………………………

Whether the use of previous data will be allowed?

Yes/No

Participant signature: …………………………………………………………

Date: …………………………

তথ্য পত্র

আমি নাজমুন নাহার, বাংলাদেশ হেল্‌থ প্রফেশন্স ইনস্টিটিউট (বিএইচপিআই) এর ছাত্রী যা পক্ষাঘাতগ্রস্থদের পুনর্বাসন কেন্দ্র (সিআরপি) এর একটি শিক্ষা প্রতিষ্ঠান। আমি বি.এস.সি ইন অকুপেশনাল থেরাপি বিভাগের ৪র্থ বর্ষে অধ্যয়নরত আছি। এই কোর্সের অংশ হিসাবে চুড়ান্তবর্ষে আবশ্যকভাবে একটি গবেষণা কর্ম সম্পন্ন করতে হয়। আমি আপনাকে এই গবেষণায় অংশগ্রহন করার জন্য আমন্ত্রন জানাচ্ছি। গবেষণার উদ্দেশ্য হচ্ছে "সেরিব্রাল পাল্‌সি বাচ্চাদের ঘুমের অভ্যাস অন্বেষণ করা"।

এই গবেষণায় অংশগ্রহন সম্পূর্ণ আপনার ইচ্ছাকৃত। আপনি যে কোন সময় আপনার অংশগ্রহণ প্রত্যাহার করতে পারবেন, এবং প্রত্যাহার করতে চাইলে ০১৭১৭২৯৫০৯৬ এই নাম্বারে যোগাযোগ করুন। ইহা আপনার শিশুর চিকিৎসা সেবায় কোনরূপ ব্যাঘাত ঘটাবে না। গবেষণায় অংশগ্রহণের জন্য কোন উপহারের ব্যবস্থা নাই। আপনি এই গবেষণা থেকে সরাসরি উপকৃত নাও হতে পারেন। তবে গবেষণা থেকে প্রাপ্ত ফলাফল কর্তৃপক্ষকে শিশুর ঘুমের সমস্যা কারন সম্পর্কে জানতে সাহায্য করবে যা ভবিষ্যতে আপনার শিশুর মতো অন্য শিশুদের ঘুমে ব্যাঘাত সংক্রান্তসমস্যার চিকিৎসা প্রদানে সহায়ক হবে।

গবেষণার সাথে সম্পর্কিত কিছু প্রশ্ন নিয়ে আপনার একটি সাক্ষাৎকার নেয়া হবে। আপনার কাছ থেকে প্রাপ্ত তথ্য গোপনীয়তার সাথে রাখা হবে । শুধুমাত্র গবেষক এবং তার তত্ত্বাবধায়ক তথ্য গুলো ব্যবহার করতে পারবেন। আপনার পরিচয় গবেষণার কোথাও প্রকাশ করা হবে না। গবেষণা সংক্রান্ত আপনার যদি কোনরূপ প্রশ্ন থাকে তাহলে আমাকে দ্বিধাহীনভাবে জিজ্ঞাসা করতে পারেন। গবেষণা বিষয়ক সকল প্রশ্নের উত্তর দেবার জন্য আমি সচেষ্ট থাকবো।

.....

নাজমুন নাহার
বি.এস.সি ইন অকুপেশনাল থেরাপি বিভাগ, ৪র্থ বর্ষ
সেশন- ২০১৭-১৮
বাংলাদেশ হেল্‌থ প্রফেশন্স ইনস্টিটিউট (বিএইচপিআই)
সিআরপি, চাপাইন, সাভার, ঢাকা-১৩৪৩।

সম্মতিপত্র

অংশগ্রহণ কারীর জন্যঃ

দয়া করে নিচের তথ্য গুলো পড়ে হ্যাঁ অথবা না তে টিক ( ) দিন। নিম্নলিখিত তথ্য গুলো প্রকাশ করবে আপনি এই পত্রের তথ্যগুলো বুঝতে পেরেছেন এবং উপরের গবেষণায় আপনার অংশগ্রহণের মতামত।

১. আমি নিশ্চিত করছি যে আমি গবেষণার তথ্য পত্রটি পড়েছি এবং বুঝতে পেরেছি অথবা তথ্য পত্রটি আমার কাছে ব্যাখ্যা করা হয়েছে এবং আমার প্রশ্ন করার সুযোগ আছে।----------হ্যাঁ / না

২. আমি এই গবেষণা বিষয়ক সকল প্রশ্নের সন্তোষজনক উত্তর পেয়েছি।----------হ্যাঁ / না

৩. আমি বুঝতে পেরেছি যে গবেষণায় অংশগ্রহণ সম্পূর্ণ ঐচ্ছিক এবং যে কোন সময় অংশগ্রহণ প্রত্যাহার করতে পারব কারণ পরবর্তীতে তথ্যগুলো নষ্ট করে দেয়া হবে।----------হ্যাঁ / না

৪. প্রশ্নমালা এবং সাক্ষাৎকার থেকে গবেষক কর্তৃক সংগৃহিত তথ্য তত্ত্বাবধায়ক দ্বারা নিরীক্ষণ করা হবে। ব্যক্তিগত তথ্য অত্যাধিক গোপনীয় থাকবে। আমি গবেষক ও তত্ত্বাবধায়ককে আমার তথ্য ব্যবহার করার অনুমতি প্রদান করছি।--------হ্যাঁ / না

৫. অংশগ্রহণের ব্যাপারে সিদ্ধান্ত নেয়ার জন্য আমি পর্যাপ্ত সময় পেয়েছি।----------হ্যাঁ / না

৬. আমার সাক্ষাৎকার থেকে প্রাপ্ত তথ্যাদি গবেষণায় ব্যবহারের ক্ষেত্রে আমি রাজি।----------হ্যাঁ / না

৭. আমি গবেষণায় অংশগ্রহণ করতে রাজি। ----------হ্যাঁ / না

অংশগ্রহণকারীর স্বাক্ষর.....তারিখ.....

গবেষকঃ আমি উপরের অংশগ্রহণকারীকে গবেষণা সম্পর্কে প্রয়োজনীয় বিবরণ দিয়েছি এবং অংশগ্রহনকারী স্বেচ্ছায় গবেষণায় অংশগ্রহণের মতপ্রকাশ করেছেন।

গবেষকের স্বাক্ষর.....তারিখ.....

প্রত্যাহার পত্র

আপনি এই গবেষণা থেকে প্রত্যাহার করতে পারেনঃ

আপনি যেকোনো সময় এই গবেষণা প্রকল্পের জন্য সংগৃহীত তথ্য বাতিল করতে পারেন। বাতিল করার পরে, তথ্য সমূহ কি ব্যবহার করা যাবে কি যাবেনা তার অনুমতি অংশগ্রহণকারীর প্রত্যাহার পত্রে উল্লেখ করা থাকবে ।

অংশগ্রহণকারীর নাম:

.....

প্রত্যাহারের কারণ:

.....
.....
.....
.....
.....
.....

পূর্ববর্তী তথ্য ব্যবহারের অনুমতি থাকবে কিনা?

হ্যাঁ / না

অংশগ্রহণকারীর স্বাক্ষর:

.....

তারিখঃ .....

Appendix C: Questionnaire

Socio-demographic questionnaire

Code no: ☐

1. Sex : Male / Female
2. Child's age :
3. Class :
4. Mother's occupation : Educational background:
5. Father's occupation : Educational background:
6. Siblings :
7. Living area : Rural / Urban
8. Mobile Number :
9. Cerebral Palsy type : Quadriplegic / Hemiplegic / Diplegic / Monoplegia / Triplegic / Hypotonic / Athetoid / Ataxic / Mixed
10. Child takes any pill – Yes / No _____
11. Child has Epilepsy – Yes / No
12. Child has any other physical problem: _____

ASSESSMENT | **SLEEP DISORDERS**

The Children's Sleep Habits Questionnaire (CSHQ) is a parent-report sleep screening instrument designed for children ages 4 to 10. Preliminary evidence of the CHSQ's reliability and validity is based on a study that included parents of 154 children diagnosed with sleep disorders and 469 children from a community sample.[1] In that study, using a cutoff score of 41, the CHSQ correctly identified 80% (ie, sensitivity of .80) of the children with sleep disorders, and correctly identified 72% (ie, specificity of .72) without sleep disorders. Whether or not the total score is elevated, it is important to examine the individual subscales because a child could have a sleep problem in a specific area and not have an elevated total score. The authors conclude that "the CHSQ appears to be a useful sleep screening instrument to identify both behaviorally-based and medically-based sleep problems" for this age group. They comment that the CHSQ could be a particularly useful tool in identifying comorbid sleep disturbances which might complicate the presentation of a variety of underlying medical or mental health conditions in children (eg, chronic illnesses such as juvenile rheumatoid arthritis and psychiatric conditions such as attention-deficit/hyperactivity disorder).

CHILD'S SLEEP HABITS
(Preschool and School-Aged)

The following statements are about your child's sleep habits and possible difficulties with sleep. Think about the past week in your child's life when answering the questions. If last week was unusual for a specific reason (such as your child had an ear infection and did not sleep well or the TV set was broken), choose the most recent typical week. Answer USUALLY if something occurs **5 or more times** in a week; answer SOMETIMES if it occurs **2-4 times** in a week; answer RARELY if something occurs **never or 1 time** during a week. Also, please indicate whether or not the sleep habit is a problem by circling "Yes," "No," or "Not applicable (N/A)."

Bedtime

Write in child's bedtime: _____

	3 Usually (5-7)	2 Sometimes (2-4)	1 Rarely (0-1)	Problem?
Child goes to bed at the same time at night **(R) (1)**	☐	☐	☐	Yes No N/A
Child falls asleep within 20 minutes after going to bed **(R) (2)**	☐	☐	☐	Yes No N/A
Child falls asleep alone in own bed **(R) (3)**	☐	☐	☐	Yes No N/A
Child falls asleep in parent's or sibling's bed **(4)**	☐	☐	☐	Yes No N/A
Child falls asleep with rocking or rhythmic movements	☐	☐	☐	Yes No N/A
Child needs special object to fall asleep (doll, special blanket, etc.)	☐	☐	☐	Yes No N/A
Child needs parent in the room to fall asleep **(5)**	☐	☐	☐	Yes No N/A
Child is ready to go to bed at bedtime	☐	☐	☐	Yes No N/A
Child resists going to bed at bedtime	☐	☐	☐	Yes No N/A
Child struggles at bedtime (cries, refuses to stay in bed, etc.) **(6)**	☐	☐	☐	Yes No N/A
Child is afraid of sleeping in the dark **(7)**	☐	☐	☐	Yes No N/A
Child is afraid of sleeping alone **(8)**	☐	☐	☐	Yes No N/A

Sleep Behavior

Child's usual amount of sleep each day: _____ hours and _____ minutes
(combining nighttime sleep and naps)

	Usually (5-7)	Sometimes (2-4)	Rarely (0-1)	Problem?
Child sleeps too little **(9)**	☐	☐	☐	Yes No N/A
Child sleeps too much	☐	☐	☐	Yes No N/A
Child sleeps the right amount **(R) (10)**	☐	☐	☐	Yes No N/A
Child sleeps about the same amount each day **(R) (11)**	☐	☐	☐	Yes No N/A
Child wets the bed at night **(12)**	☐	☐	☐	Yes No N/A
Child talks during sleep **(13)**	☐	☐	☐	Yes No N/A
Child is restless and moves a lot during sleep **(14)**	☐	☐	☐	Yes No N/A
Child sleepwalks during the night **(15)**	☐	☐	☐	Yes No N/A
Child moves to someone else's bed during the night (parent, brother, sister, etc.) **(16)**	☐	☐	☐	Yes No N/A
Child reports body pains during sleep. If so, where? _____	☐	☐	☐	Yes No N/A
Child grinds teeth during sleep (your dentist may have told you this) **(17)**	☐	☐	☐	Yes No N/A
Child snores loudly **(18)**	☐	☐	☐	Yes No N/A

(continued)

ASSESSMENT | **SLEEP DISORDERS**

Sleep Behavior (continued)

	Usually (5-7)	Sometimes (2-4)	Rarely (0-1)	Problem?
Child seems to stop breathing during sleep **(19)**	☐	☐	☐	Yes No N/A
Child snorts and/or gasps during sleep **(20)**	☐	☐	☐	Yes No N/A
Child has trouble sleeping away from home (visiting relatives, vacation) **(21)**	☐	☐	☐	Yes No N/A
Child complains about problems sleeping	☐	☐	☐	Yes No N/A
Child awakens during night screaming, sweating, and inconsolable **(22)**	☐	☐	☐	Yes No N/A
Child awakens alarmed by a frightening dream **(23)**	☐	☐	☐	Yes No N/A

Waking During the Night

	Usually (5-7)	Sometimes (2-4)	Rarely (0-1)	Problem?
Child awakes once during the night **(24)**	☐	☐	☐	Yes No N/A
Child awakes more than once during the night **(25)**	☐	☐	☐	Yes No N/A
Child returns to sleep without help after waking	☐	☐	☐	Yes No N/A

Write the number of minutes a night waking usually lasts: _____

Morning Waking

Write in the time of day child usually wakes in the morning: _____

	Usually (5-7)	Sometimes (2-4)	Rarely (0-1)	Problem?
Child wakes up by him/herself **(R) (26)**	☐	☐	☐	Yes No N/A
Child wakes up with alarm clock	☐	☐	☐	Yes No N/A
Child wakes up in negative mood **(27)**	☐	☐	☐	Yes No N/A
Adults or siblings wake up child **(28)**	☐	☐	☐	Yes No N/A
Child has difficulty getting out of bed in the morning **(29)**	☐	☐	☐	Yes No N/A
Child takes a long time to become alert in the morning **(30)**	☐	☐	☐	Yes No N/A
Child wakes up very early in the morning	☐	☐	☐	Yes No N/A
Child has a good appetite in the morning	☐	☐	☐	Yes No N/A

Daytime Sleepiness

	Usually (5-7)	Sometimes (2-4)	Rarely (0-1)	Problem?
Child naps during the day	☐	☐	☐	Yes No N/A
Child suddenly falls asleep in the middle of active behavior	☐	☐	☐	Yes No N/A
Child seems tired **(31)**	☐	☐	☐	Yes No N/A

During the past week, your child has appeared very sleepy or fallen asleep during the following (check all that apply):

	1 Not Sleepy	2 Very Sleepy	3 Falls Asleep
Play alone	☐	☐	☐
Watching TV **(32)**	☐	☐	☐
Riding in car **(33)**	☐	☐	☐
Eating meals	☐	☐	☐

Reproduced by permission

Scoring: Items are scored as follows: Usually=3, Sometimes=2, and Rarely=1. **R** after an item indicates reverse scoring such that Usually=1 and Rarely=3. Subscales include the following: (1) Bedtime Resistance: items # 1, 3, 4, 5, 6, 8; (2) Sleep Onset Delay: 2; (3) Sleep Duration: 9, 10, 11; (4) Sleep Anxiety: 5, 7, 8, 21; (5) Night Wakings: 16, 24, 25; (6) Parasomnias: 12, 13, 14, 15, 17, 22, 23; (7) Sleep Disordered Breathing: 18, 19, 20; (8) Daytime Sleepiness: 26, 27, 28, 29, 30, 31, 32, 33.

As a general screen, a Total Sleep Disturbance score of 41 or higher suggests the presence of a sleep disturbance. The total score is based on responses to all 33 items of the eight subscales. Note: Although items #5 and 8 are included in two subscales, they should only be counted once in the total score. In addition to obtaining a total score, it is important to examine the individual subscales because a child could have a sleep disturbance in a specific area and not have an elevated total score.

[1]Owens JA [Pediatric Ambulatory Medicine, Rhode Island Hospital, 593 Eddy St, Potter Bldg, Suite 200, Providence, RI 02903], Spirito A, & McGuinn M. The Children's Sleep Habits Questionnaire (CSHQ): Psychometric properties of a survey instrument for school-aged children. *Sleep*, 23:1043-1051, 2000.

জনসংখ্যা বিষয়ক প্রশ্নাবলী

কোড নংঃ

১। লিঙ্গ ঃ ছেলে / মেয়ে

২। শিশুর বয়স ঃ

৩। শ্রেণী ঃ

৪। মায়ের পেশা ঃ শিক্ষাগত যোগ্যতাঃ

৫। বাবার পেশা ঃ শিক্ষাগত যোগ্যতাঃ

৬। ভাইবোন ঃ হ্যাঁ / না

৭। বসবাসের জায়গা ঃ শহর / গ্রাম

৮। মোবাইল নম্বর ঃ

৯। সেরিব্রাল পালসির ধরণ ঃ কোয়াড্রিপ্লেজিক / হেমিপ্লেজিক / ডায়াপ্লেজিক / মনোপ্লেজিক / ট্রাইপ্লেজিক / হাইপোটনিক / এ্যাথেটয়েড / এটাক্সিক / মিক্সড।

১০। শিশু কোনো ঔষুধ সেবন করে - হ্যাঁ / না _____

১১। শিশুর খিঁচুনি হয় - হ্যাঁ / না

১২। শিশুর অন্যান্য শারিরিক সমস্যা ঃ _____

শিশুর ঘুমের অভ্যাস

(প্রি-স্কুল এবং স্কুল বয়সীদের জন্য)

নিম্নলিখিত বিবৃতিগুলো আপনার সন্তানের ঘুমের অভ্যাস এবং ঘুমের সম্ভাব্য অসুবিধা সম্পর্কিত। প্রশ্নের উত্তরগুলো দেওয়ার সময় আপনার সন্তানের গত সপ্তাহের সংঘটিত ঘুমের অভ্যাসের কথা বলুন। যদি গত সপ্তাহে কোনো নির্দিষ্ট কারণে আপনার সন্তানের ঘুম অস্বাভাবিক হয় (যেমনঃ আপনার সন্তানের কানে ইনফেকশন হয়েছে এবং ভালো ঘুম হয়নি বা টিভি সেট ভেঙ্গে গিয়েছে) তাহলে সাম্প্রতিকতম খুব কাছের সপ্তাহটি বেছে নিন। যদি সপ্তাহে ৫ বার বা তার বেশি বার অভ্যাস গুলো সংঘটিত হয় তাহলে উত্তর দিন "প্রায়"; যদি সপ্তাহে ২-৪ বার সংঘটিত হয় তাহলে উত্তর দিন "মাঝে মাঝে"; যদি সপ্তাহে কখনই না বা ১ বার সংঘটিত হয় তাহলে উত্তর দিন "কদাচিৎ"। এছাড়াও শিশুর ঘুমের অভ্যাসে কোনো সমস্যা আছে কিনা তার উত্তর দিন "হ্যাঁ, "না" বা "প্রযোজ্য নয়"।

ঘুমানোর সময়ঃ

শিশুর ঘুমানোর সময় লিখুন:_____

	৩ প্রায় (৫-৭)	২ মাঝে মাঝে (২-৪)	১ কদাচিৎ (০-১)	সমস্যা?
শিশু প্রতি রাতে একই সময়ে ঘুমাতে যায় (আর)(১)	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
শিশু বিছানায় যাওয়ার ২০ মিনিটের মধ্যে ঘুমিয়ে পড়ে (আর) (২)	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
শিশু নিজের বিছানায় একা ঘুমিয়ে পড়ে (আর) (৩)	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
শিশু মা বাবা বা ভাইবোনের বিছানায় ঘুমিয়ে পড়ে (৪)	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
শিশুকে দোলালে বা ছন্দময় নড়াচড়া করালে ঘুমিয়ে পড়ে	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
শিশুর ঘুমানোর সময় বিশেষ বস্তুর প্রয়োজন হয় (যেমনঃ পুতুল, বিশেষ কম্বল ইত্যাদি)	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
শিশুর ঘুমানোর সময় রুমে বাবা মার সাহায্য প্রয়োজন হয় (৫)	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়

শিশু ঘুমানোর সময় বিছানায় যেতে প্রস্তুত থাকে	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
শিশু ঘুমানোর সময় বিছানায় যেতে অনিহা প্রকাশ করে	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
শিশু ঘুমানোর সময় বিরক্ত করে (কান্না করা, বিছানায় অবস্থান করতে চায় না, ইত্যাদি) (৬)	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
শিশু অন্ধকারে ঘুমাতে ভয় পায় (৭)	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
শিশু একা ঘুমাতে ভয় পায় (৮)	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়

ঘুমের আচরণঃ

শিশুর প্রতিদিনের ঘুমের পরিমাণ:_____ ঘন্টা এবং _____ মিনিট
(রাতের ঘুম এবং দিনের ঘুম একত্রে)

	৩ প্রায় (৫-৭)	**২ মাঝে মাঝে (২-৪)**	**১ কদাচিৎ (০-১)**	**সমস্যা?**
শিশু অনেক অল্প সময় ঘুমায় (৯)	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
শিশু খুব বেশি ঘুমায়	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
শিশু সঠিক পরিমাণ ঘুমায় (আর) (১০)	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
শিশু প্রতিদিন প্রায় একই পরিমাণ ঘুমায় (আর) (১১)	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
শিশু রাতে বিছানায় প্রস্রাব করে (১২)	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
শিশু ঘুমের মধ্যে কথা বলে (১৩)	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
শিশু ঘুমের মধ্যে অস্থির থাকে এবং অনেক নড়াচড়া করে (১৪)	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
শিশু রাতে ঘুমের মধ্যে হাঁটাহাঁটি করে (১৫)	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
শিশু রাতে ঘুমের মধ্যে অন্য কারো বিছানায় চলে যায় (মা বাবা, ভাই, বোন ইত্যাদি) (১৬)	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
শিশু ঘুমের সময় শরীরে ব্যথার কথা বলে, যদি হ্যাঁ হয়, কোথায়?_____	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়

শিশু ঘুমের সময় দাঁত পেষণ করে (আপনার শিশুর দাঁতের ডাক্তার আপনাকে এটি বলে থাকতে পারে (১৭)	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
শিশু জোরে নাক ডাকে (১৮)	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
শিশু ঘুমের সময় শ্বাস বন্ধ হয়ে যায় বলে মনে হয় (১৯)	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
শিশু ঘুমের মধ্যে হাঁপিয়ে ওঠে (২০)	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
শিশু নিজের বাড়ি ছাড়া অন্য কোথাও ঘুমাতে সমস্যা হয় (যেমনঃ আত্মীয় স্বজনের বাড়ি, ছুটিতে অন্য কোথাও গেলে ইত্যাদি) (২১)	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
শিশু ঘুমের সমস্যা সম্পর্কে অভিযোগ করে	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
শিশু রাতে চিৎকার করে, ঘেমে এবং অস্বস্তিকর বোধ করে জেগে ওঠে (২২)	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
শিশু ভয়ঙ্কর স্বপ্ন দেখে শঙ্কিত হয়ে জেগে ওঠে (২৩)	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়

রাতে জেগে ওঠাঃ

	৩ প্রায় (৫-৭)	**২ মাঝে মাঝে (২-৪)**	**১ কদাচিৎ (০-১)**	**সমস্যা?**
শিশু রাতে একবার জেগে ওঠে (২৪)	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
শিশু রাতে একের অধিক বার জেগে ওঠে (২৫)	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
শিশু জেগে ওঠার পর কারো সাহায্য ছাড়াই পুনরায় ঘুমিয়ে পড়ে	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়

শিশু রাতে কয় মিনিটের জন্য জেগে ওঠে, মোট সময় লিখুন _____

সকালে ঘুম থেকে ওঠাঃ

শিশু সাধারণত সকালে কখন ঘুম থেকে ওঠে তার সময় লিখুন_____

	৩ প্রায় (৫-৭)	২ মাঝে মাঝে (২-৪)	১ কদাচিৎ (০-১)	সমস্যা?
শিশু নিজ থেকেই জেগে ওঠে (আর (২৬)	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
শিশু অ্যালার্ম ঘড়ি বাজলে জেগে ওঠে	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
শিশু নেতিবাচক মেজাজ নিয়ে ঘুম থেকে জেগে ওঠে (২৭)	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
পরিবারের প্রাপ্ত বয়স্করা বা ভাইবোনরা শিশুকে জাগিয়ে তোলে (২৮)	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
শিশুর সকালে ঘুম থেকে উঠতে কষ্ট হয় (২৯)	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
শিশুর সকালে ঘুম-ঘুম ভাব কাটিয়ে উঠতে অনেক সময় লাগে (৩০)	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
শিশু খুব ভোরে জেগে ওঠে	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
শিশুর সকালে ভালই ক্ষুধা লাগে	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়

দিনের বেলার ঘুমঃ

	৩ প্রায় (৫-৭)	২ মাঝে মাঝে (২-৪)	১ কদাচিৎ (০-১)	সমস্যা?
শিশু দিনের বেলায় ঘুমায়	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
শিশু হঠাৎ কাজের মাঝে/খেলার মাঝে ঘুমিয়ে পড়ে	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়
শিশুকে ক্লান্ত মনে হয় (৩১)	☐	☐	☐	হ্যাঁ/না/প্রযোজ্য নয়

গত সপ্তাহে, আপনার সন্তানের নিম্নলিখিত কাজগুলো করার সময়ে খুব ঘুম-ঘুম ভাব হয়েছে বা ঘুমিয়ে পড়েছে (সব পরীক্ষা করে দেখুন)ঃ

	১ ঘুম-ঘুম ভাব হয়নি	২ খুব ঘুম-ঘুম ভাব হয়েছে	৩ ঘুমিয়ে পড়েছে
নিজে নিজে খেলা	☐	☐	☐
টিভি দেখা (৩২)	☐	☐	☐
গাড়ি চড়া (৩৩)	☐	☐	☐
খাবার খাওয়া	☐	☐	☐

স্কোরিংঃ আইটেমগুলো নিম্নরূপ স্কোর করা হলোঃ

প্রায় = ৩, মাঝে মাঝে = ২ এবং কদাচিৎ = ১। যে আইটেম গুলোর পর 'আর' আছে সেগুলো বিপরীত স্কোরিং নির্দেশ করে। সাবস্কেল গুলো নিম্নলিখিত অন্তর্ভূক্ত করা হলোঃ

১। ঘুমের সময় বাধা দেওয়া আইটেমগুলো - ১, ৩, ৪, ৫, ৬, ৮;

২। ঘুম আসতে দেরি হওয়া - ২;

৩। ঘুমের স্থিতিকাল - ৯, ১০, ১১;

৪। ঘুমের উদ্বেগ - ৫, ৭, ৮, ২১;

৫। রাত জাগরণ - ১৬, ২৪, ২৫;

৬। প্যারাসোমনিয়াস - ১২, ১৩, ১৪, ১৫, ১৭, ২২, ২৩;

৭। ঘুমের সময় শ্বাসপ্রশ্বাসে ব্যাঘাত ঘটা - ১৮, ১৯, ২০;

৮। দিনের বেলায় ঘুম-ঘুম ভাব - ২৬, ২৭, ২৮, ২৯, ৩০, ৩১, ৩২, ৩৩।

একটি সাধারণ স্ক্রীন হিসেবে, মোট ঘুমে ব্যাঘাত ঘটার স্কোর ৪১ বা তার বেশি হলে ঘুমে অসুবিধা/ব্যাঘাত উপস্থিত আছে তা নির্দেশ করে। মোট স্কোর ৮ টা সাবস্কেলের ৩৩ টা আইটেমের প্রতিক্রিয়ার উপর ভিত্তি করে।

বি.দ্রঃ আইটেম ৫ এবং ৮ দুইটা সাবস্কেলের অন্তর্ভূক্ত রয়েছে, সেগুলিকে মোট স্কোরে একবার গণনা করতে হবে।

মোট স্কোর পাওয়ার পাশাপাশি, প্রত্যেক সাবস্কেল পরীক্ষা করা গুরুত্বপূর্ণ কারণ শিশুর নির্দিষ্ট এরিয়াতে ঘুমের ব্যাঘাত ঘটতে পারে এবং মোট স্কোর বেশি নাও হতে পারে।

Appendix D: Participants Response Rate of Children Sleep Habits Questionnaire Scale's Items

Domain	Items	Usually N (%)	Sometimes N (%)	Rarely N (%)	Not Applicable N (%)
Bedtime	Children goes to bed at the same time at night (R) (1)	8 (4.6%)	9 (5.1%)	158 (90.3%)	
	child falls asleep within 20 minutes after going to bed (R) (2)	75 (42.9%)	10 (5.7%)	90 (51.4%)	
	Child falls asleep alone in own bed (R) (3)	2 (1.1%)			173 (98.9%)
	Child falls asleep in parent's or sibling's bed (4)	172 (98.3%)		3 (1.7%)	
	Child falls asleep with rocking or rhythmic movements	29 (16.6%)	2 (1.1%)	66 (37.7%)	78 (44.6%)
	Child needs special object to fall asleep (doll, special blanket, etc)	78 (44.6%)		97 (55.4%)	
	Child needs parents in the room to fall asleep (5)	131 (74.9%)	7 (4.0%)	37 (21.1%)	
	Child is ready to go to bed at bedtime	135 (77.1%)	9 (5.1%)	31 (17.7%)	
	Child resists going to bed at bedtime	27 (15.4%)	9 (5.1%)	139 (79.4%)	
	Child struggles at bedtime (cries, refuses to stay in bed, etc) (6)	46 (26.3%)	15 (8.6%)	114 (65.1%)	
	Child is afraid of sleeping in the dark (7)	82 (46.9%)	1 (0.6%)	91 (52.0%)	1 (0.6%)
	Child is afraid of sleeping alone (8)	68 (38.9%)	2 (1.1%)	95 (54.3%)	10 (5.7%)
Sleep Behavior	Child sleeps too little (9)	3 (1.7%)	23 (13.1%)	149 (85.1%)	
	Child sleep too much	3 (1.7%)	17 (9.7%)	155 (88.6%)	
	Child sleeps the right amount (R) (10)	71 (40.6%)	9 (5.1%)	95 (54.3%)	
	Child sleeps about the same amount each day (R) (11)	2 (1.1%)	33 (18.9%)	140 (80.0%)	
	Child wets the bed at night (12)	52 (29.7%)	21 (12.0%)	102 (58.3%)	

	Child talks during sleep (13)	4 (2.3%)	8 (4.6%)	163 (93.1%)	
	Child is restless and moves a lot during sleep (14)	69 (39.4%)	8 (4.6%)	98 (56.0%)	
	Child sleepwalks during the night (15)	1 (0.6%)		64 (36.6%)	110 (62.9%)
Domain	**Items**	**Usually N (%)**	**Sometimes N (%)**	**Rarely N (%)**	**Not Applicable N (%)**
Sleep Behavior Continue...	Child moves to someone else's bed during the night (parents, brother, sister, etc) (16)	1 (0.6%)		64 (36.6%)	110 (62.9%)
	Child report body pains during sleep. If so, where?	14 (8.0%)	10 (5.7%)	151 (86.3%)	
	Child grinds teeth during sleep (your dentist may have told you this) (17)	25 (14.3%)	11 (6.3%)	139 (79.4%)	
	Child snores loudly (18)	10 (5.7%)	8 (4.6%)	157 (89.7%)	
	Child seems to stop breathing during sleep (19)	6 (3.4%)	7 (4.0%)	162 (92.6%)	
	Child snorts and/or gasps during sleep (20)	6 (3.4%)	4 (2.3%)	165 (94.3%)	
	Child has trouble sleeping away from home (visiting relatives, vacation) (21)	2 (1.1%)	23 (13.1%)	126 (72.0%)	24 (13.7%)
	Child complains about problems sleeping	3 (1.7%)	18 (10.3%)	150 (85.7%)	4 (2.3%)
	Child awakens during night screaming, sweating, and inconsolable (22)	8 (4.6%)	20 (11.4%)	147 (84.0%)	
	Child awakens alarmed by a frightening dream (23)	6 (3.4%)	20 (11.4%)	149 (85.1%)	
Waking During the Night	Child awakes once during the night (24)	37 (21.1%)	26 (14.9%)	112 (64.0%)	
	Child wakes more than once during the night (25)	21 (12.0%)	12 (6.9%)	142 (81.1%)	
	Child returns to sleep without help after waking	15 (8.6%)	14 (8.0%)	41 (23.4%)	105 (60.0%)
Morning Waking	Child wakes up by him/herself (R) (26)	24 (13.7%)	7 (4.0%)	144 (82.3%)	
	Child wakes up with alarm clock		2 (1.1%)		173 (98.9%)
	Child wakes up in negative mood (27)	32 (18.3%)	23 (13.1%)	120 (68.6%)	

	Adults or siblings wakes up child (28)	19 (10.9%)	7 (4.0%)	149 (85.1%)	
	Child has difficulty getting out of bed in the morning (29)	42 (24.0%)	12 (6.9%)	121 (69.1%)	
	Child takes a long time to become alert in the morning (30)	34 (19.4%)	4 (2.3%)	137 (78.3%)	
	child wakes up very early in the morning	55 (31.4%)	22 (12.6%)	98 (56.0%)	
	Child has good appetite in the morning	60 (34.3%)	3 (1.7%)	112 (64.0%)	
Daytime Sleepiness	Child naps during the day	91 (52.0%)	25 (14.3%)	59 (33.7%)	
	Child suddenly falls asleep in the middle of active behavior	8 (4.6%)	23 (13.1%)	144 (82.3%)	
	Child seems tired (31)	35 (20.0 %)	28 (16.0%)	112 (64.0%)	
Domain	**Items**	**Not Sleepy N (%)**	**Very Sleepy N (%)**	**Falls Asleep N (%)**	**Not Applicable N (%)**
Daytime Sleepiness Continue…	Play alone	125 (71.4%)	27 (15.4%)	23 (13.1%)	
	Watching TV (32)	116 (66.3%)	14 (8.0%)	27 (15.4%)	18 (10.3%)
	Riding in car (33)	90 (51.4%)	16 (9.1%)	68 (38.9%)	1 (0.6%)
	Eating meals	155 (88.6%)	15 (8.6%)	5 (2.9%)	

Appendix E: Supervision Record sheet

Bangladesh Health Professions Institute
Department of Occupational Therapy
4th Year B. Sc in Occupational Therapy
OT 401 Research Project

Thesis Supervisor- Student Contact; face to face or electronic and guidance record

Title of thesis: "Exploration of Sleep Habits of Children with Cerebral Palsy"

Name of student: Nazmun Nahar

Name and designation of thesis supervisor: SK. Moniruzzaman, Associate Professor, Head of the department of Occupational Therapy, Bangladesh Health Professions Institute (BHPI) CRP, Savar, Dhaka- 1343, Bangladesh

Appointment No	Date	Place	Topic of discussion	Duration (Minutes/ Hours)	Comments of student	Student's signature	Thesis supervisor signature
1	20.08.2022	BHPI, Office Building	Introduction and Research title, aim, Objectives	2 hours 30 minutes	effective discussion about Proposal write up	Nazmun Nahar	
2	21.08.2022	BHPI, Office Building	CSHQ Scale discussion	45 min	helpful discussion	Nazmun Nahar	
3	24.08.2022	Library Building	Procedure of email writting to author and discussion about writting background.	40 min	effective discussion about email write up.	Nazmun Nahar	

4	25.08.2022	Library Building	feedback of research aim Objective & Proposal Presentation	45 min	effective feedback about Presentation	Nazmun Nahar	
5	11	BHPI Office Building	Discussion about Process of email sending to author	25 min	helpful discussion about sending mail	Nazmun Nahar	
6	27.08.2022	library Building	Discussion about email sending to author and email write up feedback	~~30~~ min	effective feedback about email write up	Nazmun Nahar	
7	28.08.2022	11	Research Scale Discussion	30 min	effective discussion	Nazmun Nahar	
8	31.08.22	11	Bengali form of scale discussion.	45 min	effective discussion about Bangla scale write up	Nazmun Nahar	
9	03.09.22	11	Research Proposal Submit. & discussion	~~1hr~~ 30min	helpful discussion about Proposal	Nazmun Nahar	
10	10.09.22	11	Research Proposal feedback	1hr 30 min	got effective feedback	Nazmun Nahar	
11	13.09.22	11	feedback on permission letter.	45min	effective feedback on permission letter	Nazmun Nahar	
12	17.09.22	11	feedback on consent form, withdrawal form, and information sheet.	1 hr	Got idea how to write all forms	Nazmun Nahar	
13	22.09.22	11	Discussion on Bengali all form	45 min	Got idea how to write all Bangla form	Nazmun Nahar	
14	11.10.22	11	Field test related sharing and discussion	30 min	effective discussion	Nazmun Nahar	

No	Date	Place	Topic of discussion	Duration (Minutes/ Hours)	Comments of student	Student's Signature	Thesis supervisor signature
15	15.10.22	BHPI Building	Discussion about data collection and get signature on Permission letter.	30min	got idea about write up Permission letter	Nazmun Nahar	
16	18.10.22	Library Building	Discussion and update on data collection	1h 30 min	Got idea about how to collect data	Nazmun Nahar	
17	25.10.22	11	Discussion abad update on data collection	1h 30 min	effective discussion	Nazmun Nahar	
18	31.10.22	11	Discussion and update on data collection	45 min	effective discussion	Nazmun Nahar	
19	12.11.22	BHPI Building	Discussion about data collection and get signature on Permission letter.	30min	effective discussion about process of data collection	Nazmun Nahar	
20	27.11.22	11	Participants related discussion.	1 hr	helpful discussion	Nazmun Nahar	
21	2.12.22	Library Building	Guideline for ongoing research Project work	2 hr	got and effective guidline about Project work	Nazmun Nahar	
22	12.12.22	11	Research related Problem discussion and discusion on introduction, Background and literature review.	45min	Got idea about write up.	Nazmun Nahar	
23	17.12.22	11	introduction, Background and literature review feedback.	1h 30 min	helpful feedback about write up	Nazmun Nahar	
24	20.12.22	11	Submission and discussion on introduction, Background, literature reviews and methodology	1hr	helpful feedback about write up.	Nazmun Nahar	

25	27.12.22	Library Building	Data entry discussion and writing related feedback	1 hr	got effective feedback about data entry	Nazmun Nahar	
26	01.01.23	〃	Analysis related Problem discussion	45 min	helpful discussion about analysis	Nazmun Nahar	
27	02.01.23	〃	〃	15 min	helpful discussion about analysis	Nazmun Nahar	
28	03.01.23	〃	〃	45 min	effective feedback	Nazmun Nahar	
29	06.01.23	〃	〃	40 min	effective feedback on analysis	Nazmun Nahar	
30	09.01.23	〃	〃	20 min	helpful discussion about analysis	Nazmun Nahar	
31	15.01.23	SCI inpatient unit	〃	45 min	helpful discussion about analysis	Nazmun Nahar	
32	09.02.23	BHPI Building	1st draft feedback	1 hr	effective feedback on 1st draft	Nazmun Nahar	
33	04.03.23	Library Building	guidline for completing thesis writeup	30 min	helpful guidline about writeup	Nazmun Nahar	
34	08.04.23	〃	Discussion about Preparation for defense	30 min	effective discussion about Presentation	Nazmun Nahar	

35	15.04.23	library	Analysis related Problem discussion	30 min	effective discussion about analysis	Nazmun Nahar	
36	06.05.23	BHPI Building	discussion and sharing about research result.	1hr	helpful discussion about result	Nazmun Nahar	
37	07.05.23	Library building	Thesis Presentation guidlines	45min	got effective guidline about Presentation	Nazmun Nahar	
38	09.05.23	BHPI Building	Feedback 2nd draft	50 min	got effective feedback	Nazmun Nahar	
39	14.05.23	Library Building	Feedback PowerPoint Presentation	40 min	got idea about effective write up Presentation	Nazmun Nahar	
40	15.05.23	11	Feedback Powerpoint Presentation	30 min	effective feedback about Presentation	Nazmun Nahar.	

Note:

1. Appointment number will cover at least a total of 40 hours; applicable only for face-to-face contact with the supervisors.
2. Students will require submitting this completed record during submission your final thesis.