جـــامـعـــة الـــشـرق الأوسـط
MIDDLE EAST UNIVERSITY
Amman - Jordan

Assessment of Sleep Disorders and Their Association with Screen Time Among Iraqi Children Aged 6-8 years Using the Global Pittsburgh Sleep Quality Index (PSQI).

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تقييم اضطرابات النوم وعلاقتها بوقت استخدام الشاشات لدى الأطفال العراقيين في عمر 6–8 سنوات باستخدام المقياس العالمي لمؤشر جودة النوم في بيتسبرغ (PSQI).

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الدكتورة نداء عثمان كرامة

قدّمت هذه الرسالة استكمالًا لمتطلّبات الحصول على درجة الماجستير في العلوم الصيدلانية

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Thesis Committee Decision

This thesis, titled **"Assessment of Sleep Disorders and Their Association with Screen Time Among Iraqi Children Aged 6-8 years Using the Global Pittsburgh Sleep Quality Index (PSQI)."** by researcher **Saif Majeed Mohammed Mohammed** and was successfully defended and approved on 26-1-2026.

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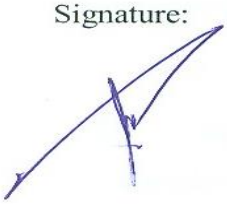

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Saif Majeed Mohammed Mohammed

Dedication

I dedicate this work to…

To my beloved father, my first anchor and the steady hand that taught me perseverance through quiet strength. Your wisdom, patience, and unwavering faith in me have guided every step of this journey, and your presence remains my greatest source of confidence and support.

To my beloved mother, the warmth of our home and the boundless heart that never stops giving. Your prayers, encouragement, and gentle reassurance carried me through moments of doubt and exhaustion. I dedicate this work to you as a humble tribute to a love that gives endlessly, without asking for anything in return.

To my dear brothers, my lifelong companions and steadfast support. Your encouragement, generosity, and constant presence have been a source of comfort and strength throughout this journey. I dedicate this achievement to you with sincere gratitude and love.

Saif Majeed Mohammed Mohammed

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Abbreviation	Full Term
h/day	Hours per day
IQR	Interquartile Range
PSQI	Pittsburgh Sleep Quality Index
SD	Standard Deviation
χ^2	Chi-square statistic

Assessment of Sleep Disorders and Their Association with Screen Time Among Iraqi Children Aged 6-8 years Using the Global Pittsburgh Sleep Quality Index (PSQI).

Prepared by
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Abstract

Background: Children are frequently exposed to digital screens every day, and that raises the concern of them not sleeping well. Recent studies suggest that when screens are used, the context in which they are used and whether it is near bedtime may matter more than how long. However, data among early school aged children are limited in Middle Eastern settings. **Aim:** To examine the association between screen exposure patterns and multidimensional sleep quality among Iraqi children aged 6–8 years. **Methods:** A study was conducted on 402 Iraqi children of age 6-8 years. The parents completed a structured questionnaire about their total daily screen time, use of screens at bedtime and sleep effect. The quality of sleep was assessed based on a parent-reported Pittsburgh Sleep Quality Index. We categorized the sleep quality as per standard cut-off (PSQI >5). The researchers used chi-square tests to analyze categorical associations. Furthermore, the team performed non-parametric comparison of global PSQI scores using the Kruskal-Wallis test ($p < 0.05$). **Results:** Median PSQI 0.0 indicates overall sleep quality was good. According to the cutoff, only 8.7% were classified as poor sleepers. There was no significant association ($p > 0.05$) between total daily screen time and global sleep quality. On the other hand, the use of screens during bedtime was significantly associated with poorer sleep quality ($\chi^2(1) = 10.10$, $p = 0.001$). In addition, increased parental scrutiny of screens affecting sleep were found to be more likely to have a poor sleep quality ($\chi^2(3) = 12.09$, $p = 0.007$). **Conclusion:** While total daily screen duration was not associated with sleep quality, bedtime screen exposure emerged as a significant correlate of poorer sleep. The findings of this study indicate that the timing of screen exposure as well as contextual factors in paediatric sleep health, therefore supporting specific sleep hygiene advice to minimise screen exposure before bedtime.

Keywords: Screen time; Sleep quality; Pittsburgh Sleep Quality Index (PSQI); Bedtime screen use; Children

تقييم اضطرابات النوم وعلاقتها بوقت استخدام الشاشات لدى الأطفال العراقيين في عمر 6–8 سنوات باستخدام المقياس العالمي لمؤشر جودة النوم في بيتسبرغ (PSQI).

إعداد
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الملخص

الخلفية: أصبح استخدام الشاشات الرقمية جزءًا ثابتًا من الحياة اليومية للأطفال، مما أثار اهتمامًا متزايدًا حول تأثيرها المحتمل في صحة النوم. وتشير الأدلة الحديثة إلى أن توقيت استخدام الشاشة وسياقه، خصوصًا خلال الفترة المسائية أو قبل النوم مباشرة، قد يكون أكثر تأثيرًا من إجمالي عدد الساعات اليومية. ومع ذلك، ما تزال الدراسات التي تناولت هذه العلاقة لدى الأطفال في سن المدرسة المبكرة في البيئات العربية محدودة. **الهدف:** هدفت هذه الدراسة إلى فحص العلاقة بين أنماط استخدام الشاشات وجودة النوم متعددة الأبعاد لدى الأطفال العراقيين بعمر 6–8 سنوات. **المنهجية:** أُجريت دراسة مقطعية شملت 402 طفلًا عراقيًا بعمر 6–8 سنوات. استكمل أولياء الأمور استبانة منظّمة تقيس إجمالي وقت الشاشة اليومي، واستخدام الشاشات في وقت النوم، وتصورهم لتأثيرها على نوم أطفالهم. تم تقييم جودة النوم باستخدام النسخة المبلّغ عنها من قبل الوالدين لمؤشر جودة النوم في بيتسبرغ(PSQI) ، وتصنيفها إلى نوم جيد أو سيئ وفقًا للحد الفاصل المعتمد (درجة 5<). استُخدمت اختبارات مربع كاي لتحليل الفروق بين المتغيرات التصنيفية، كما استُخدم اختبار كروسكال–والِس لمقارنة درجات المؤشر الكلية غير الموزعة طبيعيًا.($p < 0.05$) **النتائج:** أظهرت النتائج أن جودة النوم كانت جيدة بشكل عام (الوسيط = 0.0)، حيث صُنِّف 8.7% فقط من الأطفال ضمن فئة النوم السيئ. لم يُلاحظ ارتباط ذو دلالة إحصائية بين إجمالي وقت الشاشة اليومي وجودة النوم. في المقابل، ارتبط استخدام الشاشات خلال وقت النوم بزيادة احتمال انخفاض جودة النوم بشكل معنوي ($p = 0.001$). كما تبين أن ارتفاع تصور الوالدين لتأثير الشاشات في نوم أطفالهم ارتبط بزيادة احتمال تصنيف الطفل ضمن فئة النوم السيئ.($p = 0.007$) **الاستنتاج:** تشير النتائج إلى أن عدد ساعات استخدام الشاشة بحد ذاته ليس العامل الحاسم في اضطراب النوم، بل إن توقيت الاستخدام، خصوصًا خلال الفترة السابقة للنوم، يمثل عاملًا أكثر أهمية. وتدعم هذه النتائج أهمية التركيز على ضبط استخدام الشاشات في الفترة المسائية ضمن إرشادات تعزيز صحة النوم لدى الأطفال.

الكلمات المفتاحية: وقت الشاشة؛ جودة النوم؛ مؤشر جودة النوم في بيتسبرغ؛ استخدام الشاشات قبل النوم؛ الأطفال.

Chapter One

Background and Problem Statement

1.1 Introduction

Sleep is biological to growth, neurodevelopment and regulation of emotion in childhood. Studies (Astill et al., 2012; Chaput et al., 2016) show that adequate quality and quantity of sleep favour brain maturation as well as the learning and memory processes that are requisite for school performance in the early years. The optimal development of the brain takes place during sleep as opposed to being awake. Sleep deprivation or disturbances in children on the one hand is linked to lower attention span, poorer school performance, behavioral disturbance, mood disturbance, and higher risk of obesity and cardiometabolic disorders in later life (Astill et al. 2012; Chaput et al. 2016). According to a study by the American Academy of Sleep Medicine, the recommended sleep for school-aged children which includes children aged 6 years to 12 years is around 9 to 12 hours of sleep in a 24 hour period for good health (Paruthi et al., 2016)

Sleep difficulties are common in school-age children globally, despite recommendations for adequate sleep. According to epidemiological studies, sleep problems such as prolonged sleep onset latency, frequent night wakings, short sleep duration, irregular bedtimes and daytime sleepiness are associated with a range of adverse cognitive, behavioural and health outcomes (Owens, 2014; Chaput et al., 2016). The years between six and eight had been regarded as a sensitive period for being formal school-going children. Their capacity to cope with formal school demands is still developing and so are their cognitive and affective pathways. At this stage, poor or insufficient sleep may lead to a disproportionate impact on school functioning, behaviour, emotional regulation and family functioning.

In the past decade, children's world has rapidly expanded through digital media simultaneously with having other developmental challenges. Modern families, even those with less or medium income in countries, have incorporated smartphones, tablets, TV, computer and gaming into their lives. Children's restricted use of digital media may provide some benefits. But an increasing amount of evidence suggests use at the wrong time or excessive use may interfere with sleep. Studies show that use of screen time is

associated with negative sleep outcomes (Cain & Gradisar, 2010; Hale & Guan, 2015; LeBourgeois, et al., 2017).

Screen time can have an effect on sleep due to a few unrelated processes. One of the mechanisms is time displacement i.e. evening screen time reduces the time available for sleep as it pushes back bed time and shortens total sleep time (Cain & Gradisar, 2010; Hale & Guan, 2015). Melatonin secretion and circadian phase delay resulting from blue-enriched light emitted by electronic screens makes it harder for children to sleep at a developmentally appropriate bedtime (LeBourgeois et al., 2017). Cognitive and emotional stimulation resulting from engaging digital content such as video games, videos, or social media—may further increase physiological arousal close to bedtime, thereby interfering with sleep onset. Moreover, the presence of electronic devices in the bedroom and the use of screens in bed may weaken the learned association between the bed and sleep, leading to more irregular sleep–wake patterns and fragmented sleep (Cain & Gradisar, 2010). Collectively, these mechanisms indicate that screen exposure should be conceptualized not only in terms of total duration but also with respect to the timing and context of use, particularly screen use during bedtime and in bed (Hale & Guan, 2015).

Systematic reviews and meta-analyses show that greater exposure to screens is associated with shorter quantity of sleep, delay onset of sleep, and poorer subjective sleep quality in children (Hale & Guan, 2015; Chaput et al., 2016). Most of this literature is aimed at adolescents or older school-aged children and predominantly uses crude indices such as total sleep duration or bedtimes. There is a lack of researchers studying the multidimensional sleep quality of younger children. Furthermore, there is not yet much research that distinguishes overall daily screen times and specific pre-sleep behaviours. An example of the latter is using screens in bed or during the hour before sleep.

To define sleep more comprehensively, it is necessary that additional dimensions of sleep quality be investigated, in addition to hours or hours slept. The Pittsburgh Sleep Quality Index (PSQI), a widely employed self-report instrument to measure subjective sleep quality in both clinical and investigative contexts, has proven to be a useful marker (Buysse, 1988). It assesses seven aspects subjective quality of sleep, sleep latency, sleep duration, habitual efficiency of sleep, sleep disturbances, use of sleep medication and daytime dysfunction—and returns a global score that differentiates between good and bad

sleepers (Buysse, 1988). Psychometric research has shown excellent internal consistency, test–retest reliability and construct validity for the PSQI in various populations (Carpenter & Andrykowski, 1998). Parent-reported adaptations of the PSQI have been used in paediatric settings; caregivers were able to offer a comprehensive account of their child's sleep quality in the previous month and have been used recently in Arabic-speaking samples such as healthcare workers in the Middle East (Xiao et al., 2020; Alboghdadly et al., 2022).

Children growing up in Iraq are increasingly experiencing the internet, as devices wrapped to the internet become more common while family routines change. The reference to "educational pressures" indicates that high proportions of families' experience academic pressure. In some countries, families also experience other stressors related to economic and social collapse. These contextual factors can have an influence on both the children's screen time and their sleep schedule. So far, however, there is little systematically collected evidence on sleep quality in Iraqi children with a specific focus on daily screen exposure and behaviours (e.g. using screens in bed or before sleep) and associations with multidimensional measures of sleep disturbance. It is essential to address the existing gap to guide parents, schools and health professionals culturally.

The present study aims to evaluate sleep quality among Iraqi children aged 6–8 years using a parent-reported PSQI-based tool and to examine its association with total daily screen time and screen use in bed or before sleep. By applying a multidimensional measure of sleep quality alongside detailed data on children's media use and parental perceptions, this study seeks to clarify how different patterns of screen exposure relate to sleep among early school-aged Arabic-speaking children. The findings are expected to inform evidence-based recommendations for promoting healthy sleep and responsible screen use in this population.

1.2 Study Problem

While sleep is recognised as an essential element of healthy development in childhood, many school-aged children do not achieve the recommended duration or quality of sleep and are at risk for adverse cognitive, behavioural and physical health outcomes (Astill et al., 2012; Chaput et al., 2016; Paruthi et al., 2016). Meanwhile, children's daily routines have become increasingly saturated with screen-based activities,

and international evidence suggests that higher levels of screen exposure are associated with shorter sleep, delayed sleep onset and poorer subjective sleep quality (Cain & Gradisar, 2010; Hale & Guan, 2015; LeBourgeois et al., 2017).

However, many significant gaps still persist in the literature. The earliest school-aged children (ages 6–8) WHO are still adapting to formal schooling but rather adolescents or older school-aged children were given less attention by most studies. Many studies have used crude sleep indicators alone for example sleep duration rather than using multidimensional instruments that capture latency efficiency disturbance and daytime dysfunction. The Pittsburgh Sleep Quality Index or PSQI is a validated and reliable measure of assessing global sleep quality (Buysse, 1988; Carpenter & Andrykowski, 1998), but has seldom been applied in parent-reported form to community samples of young children and in Arabic culture.

The majority of evidence on screen time and sleep comes from wealthy countries in the West and is not applicable in other contexts. In Iraq, more and more children are being exposed to digital media, however, local evidence on how screen-related behaviours interact with sleep quality is scarce, especially considering the changing sociocultural and economic context. As a result, whether total daily screen time, pre-sleep screen time and short sleep duration are associated with poor multidimensional sleep quality, as assessed by PSQI, among Iraqi children aged 6-8 years is still unclear. The absence of robust evidence in this area presents a significant challenge for parents, teachers and health professionals to give evidence-based advice on healthy sleep patterns and appropriate screen use for different purposes for this age group.

1.3 Study Questions

In view of the above problems, this study attempts to answer the main question and sub-questions below.

1. What percentage of Iraqi children aged 6-8 experience poor sleep quality, according to a parent-report PSQI-based tool?

2. What patterns of daily screen time and pre-sleep screen behaviours (e.g. use in bed or during the period immediately before sleep) of children in the study sample?

3. Is there a relationship between daily screen hours and quality of sleep?

- Are there differences in mean global PSQI scores between the different screen-time categories of less than 1 hour, 1 to 2 hours, 3 to 4 hours, and more than 4 hours per day?
- Is the prevalence of poor sleep quality different between children with low (≤2 h/day) and high (>2 h/day) daily screen time?

4. Are screens used in bed or immediately before sleep associated with poorer sleep quality (higher global PSQI scores and a higher proportion of poor sleepers)?

5. Could getting less than 7 hours of sleep per night increase your risk for poor sleep quality and screen exposure?

6. What is the relationship between parents' perceptions of the effect of screens on their child's sleep and objectively measured PSQI-based sleep quality?

1.4 Study Hypotheses

Based on background work in children's screen use and sleep (Cain & Gradisar, 2010; Hale & Guan, 2015; LeBourgeois et al., 2017), this study will test the following hypotheses:

H1: A sizeable portion of Iraqi children aged 6–8 years will show poor sleep quality (global PSQI score > 5).

H2: Among children with high daily screen time (>2 h/day), children will have higher mean global PSQI scores and greater prevalence of poor sleep quality than children with low screen time (≤2 h/day).

H3: Children who use screens in bed or near sleep hours will have higher global PSQI scores and greater odds of being categorized as poor sleepers than children who do not use screens in this context.

H4: Children with short sleep duration (<7 hours per night) will be more likely to be classified as poor sleepers based on the global PSQI score compared with children who obtain ≥7 hours of sleep per night.

H5: Poor sleep quality will be more prevalent among children whose parents report a stronger perceived negative impact of screen use on their child's sleep than among those whose parents report little or no perceived impact.

1.5 Study Objectives

Based upon these research questions and hypotheses, the aims of the study are as follows:

1. To determine the prevalence of poor sleep quality among Iraqi children (aged 6–8 years) using a parent-reported, PSQI-based instrument.
2. To describe the patterns of screen use in this age group, including total daily screen time, use of screens in bed or prior to sleep, and parents' perceptions of the impact of screens on sleep.
3. The study's objective was to investigate the association of daily screen time with sleep quality using a continuous (global PSQI score) and a categorical (good vs poor sleep quality) measure.To investigate the relationship between pre-sleep screen behaviours (use of screens in bed or immediately before sleep) and sleep quality indicators.
4. The relationship of shorter sleep duration (less than seven hours) and screen-related behaviours among Iraqi children aged between 6-8 years.
5. The goal of this study is to provide evidence-based recommendations for parents, school and health professionals for promoting healthy sleep and responsible use of screens among early school-aged children in Iraq.

1.6 Study Importance

Theoretical and existential relevance of the research. According to the theories, research which consists of digital devices which may consist of sleep problems among school-aged children represents an initial investigation as well as it may help us know how it is evaluated in future research within the range of particular disorders. Further, it may answer to us. The PSQI assesses sleep quality in a multidimensional way, instead of just using sleep duration, thereby providing a more reliable assessment of young children's sleep disturbances.

In the context of the study, evidence is offered to help families, educators and health practitioners manage those particular screen behaviours that may interfere with sleep, from a practical perspective. The results highlight the importance of both timing and context of screen use, especially pre-sleep and in-bed screen timing, to the development of age-appropriate sleep hygiene and media-use guidelines for young

children and their families that may align with current international guidelines (Paruthi et al., 2016; Chaput et al., 2016).

1.7 Study Limitations

The careful design and execution of the study notwithstanding, there are some methodological points worth mentioning.

1. Cross-sectional study design

The cross-section design is apt for describing sleep and screen use patterns and for assessing associations between sleep quality and screen-related behaviours. Nonetheless, this layout does not permit definitive conclusions concerning the directions of these associations over time.

2. Sampling and representativeness.

Students recruited from schools and online by method of convenience sampling. The implementation of this approach, which is often used in similar studies, was pragmatic and the sample size is quite large, this may not generalise to children aged 6–8 years old in Iraq. The use of schools and online means to recruit children may have led to the underrepresentation of children from rural or unserved areas who do not have access to technology. This could limit the generalizability of findings to the wider Iraqi paediatric population.

Besides, the extent to which parents report sleep quality and screen exposure is a limitation. Parental information is generally biased due to either forgetting the actual events or exaggeration of events due to not wanting to look incompetent.

Chapter Two

Theoretical Framework and Previous Studies

2.1 Theoretical Framework

2.1.1 Sleep and sleep quality in childhood

The sleep process is essential for children's brain growth, cognitive development, and emotional regulation capacities. Having adequate sleep is related to many health benefits, such as physical growth, immune function and metabolism regulation (Astill et al., 2012; Chaput et al., 2016). Between the ages of 6 and 8 years, children undergo rapid cognitive, social, and emotional development as they adjust to the heightened academic demands. In this phase, sleep is not just a form of rest; it is the period where the memory is consolidated and synaptic plasticity occurs. Moreover, sleep affects behavior, attentional ability, and also academic performance (Astill et al., 2012; Owens, 2014).

According to several studies, the sleep duration on weekdays and weekends can be different where a longer weekend sleep is related to mood improvement. The Pittsburgh Sleep Quality Index (PSQI) is used to measure sleep quality and identify sleep disturbances in clinical and community settings. The Pittsburgh Sleep Quality Index (PSQI) consists of seven components that are sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication and daytime dysfunction. The overall seven components produce a global score that makes reference to overall sleep quality (Buysse et al., 1989; John et al., 2012). The PSQI has demonstrated acceptable reliability and construct validity across diverse populations. Its ability to distinguish between good and poor sleepers underpins its clinical and research applicability.

It should be noted that just because you spent adequate time in your bed, it does not guarantee that you would get restorative sleep. A child might sleep for an adequate length of time, but that sleep may still be fragmented, delayed or non-restorative (which negatively impacts functioning the next day) (Astill et al., 2012; Chaput et al., 2016). Theoretical models of child sleep in the modern times indicate that both quantitative (sleep duration) and qualitative (sleep quality) are essential for healthy development.

Adequate sleep duration alone is not sufficient for optimal cognitive, emotional and behavioural functioning (Owens, 2014).

2.1.2 Recommended sleep duration and health outcomes in school-aged children

According to the American Academy of Sleep Medicine, professionals recommend that school-aged children (6–12 years) sleep about 9 – 12 hours in a 24-hour period on a regular basis for a healthy life (Paruthi et al.2016). Multiple systematic reviews have demonstrated that insufficient sleep in children aged 6-13 years is linked to behavioural problems, emotional dysregulation, poor school performance, obesity and unfavorable cardiometabolic profiles (Astill et al., 2012; Chaput et al., 2016).

Early school-aged children (6-8 years) are a highly vulnerable group in this framework. During this developmental stage, children are expected to maintain attention in formal classroom settings, acquire foundational academic skills, and regulate their behaviour in increasingly complex social environments. Sleep deprivation at this age may therefore adversely affect learning, peer relationships, emotional regulation, and family functioning, as consistently reported in previous studies (Owens, 2014; Chaput et al., 2016). Consequently, it is important to understand how everyday behaviours particularly screen-based behaviours may influence sleep quality and support healthy sleep patterns in this age group.

2.1.3 Digital media and screen time in childhood

These days, digital media are important in children's lives. Children use television, smartphone, tablet, computer, gaming consoles and other devices for entertainment, communication and education. Many family routines involve screen-based activities before and after school, which may also happen throughout the evening and at bedtime (Cain & Gradisar, 2010; Hale & Guan, 2015).

Typically, "screen time" refers to the total number of hours per day spent using screen-based devices. However, recent conceptual work emphasises that media use is multidimensional and should be examined beyond total exposure alone. These dimensions include the timing of use (e.g., daytime versus evening or pre-sleep), the context of use (shared family spaces versus alone, in the bedroom or in bed), and the

content consumed (educational versus entertainment; calm versus highly stimulating) (Cain & Gradisar, 2010; LeBourgeois et al., 2017).

From a developmental perspective, moderate screen use may support learning and social interaction. Concern arises, however, when screen use becomes excessive, displaces sleep or physical activity, or occurs at times and in contexts that are not conducive to restorative sleep. Specifically, exposure to screens close to bedtime may disrupt sleep onset and sleep quality affecting children's ability to fall asleep and stay asleep (Hale & Guan, 2015; LeBourgeois et al., 2017).

2.1.4 Mechanisms linking screen use to sleep problems

Various theoretical mechanisms may be proposed to explain how screen use may negatively impact children's sleep. The mechanisms which have been proposed include behavioural, physiological and environmental pathways which are not mutually exclusive of each other.

1. Time Displacement

Using screens during the evening or at night may reduce time spent on activities before sleep and sleep itself. According to Cain and Gradisar (2010) as well as Hale and Guan (2015), excessive screen time (videos, gaming, phone) use inhibits the onset of sleep in children at night as well as reduces their total sleep time at night. More and more, people are spending time on their screens in the bedroom. When you consider prime time and winding down time, this stands out.

2. Cognitive and emotional arousal.

An overwhelming number of involvements in digital media stimulate cognition and affect. Exposure to fast-paced video games, action cartoons or emotionally intense content can increase physiological arousal and keep the brain engaged for a longer time which can lower the ability to relax and fall asleep (Cain & Gradisar, 2010). One also may feel increased arousal and worry or excited anticipation from messaging or online posting just before sleep.

3. Light exposure and circadian disruption.

Evening exposure to blue-enriched light from screens has been shown to suppress melatonin production and shift circadian timing, thereby increasing sleep latency and reducing physiological sleepiness at appropriate bedtimes (LeBourgeois et al., 2017).

4. Bedroom environment and learned sleep associations

The bedroom environment and screen use in bed could impact cues associated with sleep. If the bed is used more often for stimulating screen activities than sleeping, the learnt association of the bed with sleep may weaken. Due to playing games at night, kids may not see their bedroom as a sleep space but as a playroom, making them resistant to sleep, delaying sleep onset and having fragmented sleep.

As such, while total screen use should not be neglected, the timing and context of screen use, particularly screen use in the bed or just before sleep, may be the culprit behind sleep disruption. Such evidence is consistent with other studies indicating the association between sleep problems and pre-sleep media use is stronger than the association with daytime media use (Hale & Guan, 2015; LeBourgeois et al., 2017). There's a theoretical justification for probing not just how much screen time children engage in, but when and where this screen time occurs.

2.1.5 Measurement of sleep quality: The Pittsburgh Sleep Quality Index (PSQI)

The current analysis employs the Pittsburgh Sleep Quality Index (PSQI) in order to reflect the multidimensionality of sleep quality. The PSQI is an instrument with excellent validation for measuring subjective sleep quality over the last month in both clinical and research settings (Buysse et al., 1988). The questionnaire has 19 self-rated items distributed into seven components. The components are subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication and daytime dysfunction. A higher global score indicates poor sleep quality. The scores of all the components yield global PSQI score in the range of 0-21, where the score of each component is given value in between 0-3. The PSQI is a reliable and valid tool used across populations and ages, hence it is found appropriate for the present study (Buysse et al., 1988).

The PSQI has acceptable internal consistency, test–retest reliability and construct validity according to psychometric evaluation (Carpenter & Andrykowski, 1998). The tool is a standardized parent-reported tool. It has been adapted for use in different languages and cultural contexts. Also, it has been used in studies of healthcare workers, patients and community samples. For example, studies of Arabic speakers (Xiao et al., 2020; Alboghdadly et al., 2022). The PSQI, parent-report versions, reliably assess children's sleep where caregivers reply with bedtimes, wake times, sleep problems, and daytime consequences of sleep problems.

The PSQI framework offers various benefits concerning investigation. For instance, assessment of sleep quality will be multidimensional in nature. Not to forget, there is a global score provided by PSQI framework which can be used as continuous measure. Finally, there is a standard cut-off score (>5) also available which will differentiate good and poor sleepers (Buysse, 1988; Carpenter & Andrykowski, 1998). This makes it optimal for exploring the relationships between global sleep disturbance in young children and their patterns of screen use, such as total daily screen time and pre-sleep screen behaviours.

2.1.6 Conceptual model of the study

Based on the theoretical framework outlined above, the present study adopts a conceptual model in which screen-related behaviours and sleep duration are considered the primary antecedents of PSQI-based sleep quality among early school-aged children. The model is grounded in established media–sleep theoretical frameworks, including time displacement, cognitive and physiological arousal, and circadian/light exposure mechanisms. The main components of the conceptual model are described below.

Independent variables (explanatory factors)

Total daily screen time:

Total screen exposure was assessed as the average amount of time a child spent using any screen-based device (e.g. television, smartphone, tablet) on a typical day. The scholars made a categorization of screen time into four groups. This categorization was such as less than 1 hour '<1 hour', between 1 and 2 hours '1–2 hours', between 3 and 4 hours '3–4 hours', and more than 4 hours '>4 hours'. Later in the study, it was

dichotomised into low (≤2 hour/day) and high (>2 hour/day) use of screen. The threshold of two hours which is frequently used in paediatric guidelines of media and past studies is a quite usable value of screen exposure. (Hale & Guan, 2015)

Screen use in bed or immediately before sleep:

This variable indicates whether the child usually uses a screen-based device in bed or during the period immediately preceding sleep. It was operationalised as a binary variable (yes/no). This measure directly reflects the time displacement, arousal, and circadian/light exposure mechanisms proposed in media–sleep models, which link pre-sleep screen use to disrupted sleep patterns (Cain & Gradisar, 2010; LeBourgeois et al., 2017).

Sleep duration:

The mean number of hours a child slept per night was derived from PSQI items of sleep duration. The duration of sleep was limited to short sleep duration which was '<7 hours' and adequate sleep duration which was '≥7 hours'. This categorization is consistent with global recommendations regarding sleep and evidence showing a dose–response link between insufficient sleep and a range of negative health outcomes in children (Chaput et al., 2016; Paruthi et al., 2016).

Parental perception of screen-related sleep impact:

A question was asked to the parents on how sleeping of their kid use screen impacts subjectively. The parents had to rate this as screen use use affects their child's sleep no effect, slight effect, moderate effect or strong effect. This variable reflects caregivers' experiential judgement and is thus a contextual correlate of PSQI-based sleep quality.

Demographic characteristics:

The researchers selected child age and sex as contextual variables; these basic demographic variables may impact screen-related behaviours as well as sleeping outcomes.

Dependent variables (outcomes)

- The global Pittsburgh Sleep Quality Index (PSQI) score is a continuous measure of the general sleep quality.
- The sleep quality category will distinguish children by a good sleeper (global PSQI score ≤5) with poor sleeper (global PSQI score >5) based on the cut-offs (Buysse, 1988; Carpenter, Andrykowski, 1998).

The theoretical framework of this study was developed on the basis of childhood sleep development, contemporary models of digital media use, and multidimensional conceptualisation of sleep quality, operationalised through PSQI. This integrative framework guides the research questions and hypotheses of the study, and subsequently the analysis of the relationship of different patterns of screen use, sleep duration and sleep quality of Iraqi children 6-8 years.

2.2 Previous Studies Related to Sleep in Children

2.2.1 Sleep duration and health in school-aged children

Over the past decades, a lot of research has been carried out on the relationship of sleep duration with physical, cognitive and psychosocial outcomes of school-age children. Astill et al. (2012) conducted a meta-analysis that showed sleep in school-age children that is shorter or disrupted is related to poorer performance on measures of attention, executive functioning, academic achievement and behavioural regulation. It goes on for over 100 years. A lack of adequate sleep shows the children becoming more inattentive and hyperactive in addition to impulsive. They show more externalising behaviour along with increased internalising symptoms such as anxiety and low mood (Astill et al., 2012; Owens, 2014).

The systematic reviews have associated short sleep duration with negative indicators from the perspective of physical health, including higher body mass index, enhanced risk of overweight and obesity, an example of poorer cardiometabolic profile and less physical activity (Chaput et al., 2016). Chaput et al. (2016) conducted a review on sleep duration and health indicators in school-aged children and youth, and reported that insufficient sleep relates to unfavourable outcomes in adiposity, emotional regulation, academic performance, quality of life and risk-taking behaviours. These findings led to the recommendation from the American Academy of Sleep Medicine on

regular sleep for children aged 6–12 years. According to them, children must sleep 9–12 hours per 24 hours for optimal health (Paruthi et al., 2016).

The effects of chronic partial sleep deprivation have been evaluated in clinical and community studies. According to Owens (2014), chronic sleep deprivation in children and teens is linked to symptoms including daytime sleepiness, poor performance at school, irritability, mood instability and a greater accident risk. Longitudinal studies suggest sleep difficulties in childhood may later lead to emotional and behavioural problems. This underlines the need for early detection and early intervention (Astill et al. 2012; Owens 2014).

Despite these advancements, much of the literature focuses on older school-aged children and adolescents. In addition, fewer studies have particularly involved early school-aged children such as those between 6 and 8 years old. Children in this age group are developing at a transitional stage, as children are expected to cope with formal schooling but still require sleep more like younger children. As such, further study into the nature of sleep duration and correlates in this age category, notably in non-Western settings, warrants further study.

2.2.2 Studies on sleep quality and multidimensional assessment

Although sleep duration is the most commonly studied indicator of sleep, growing evidence highlights that sleep quality is a multidimensional construct encompassing sleep latency, sleep continuity, habitual sleep efficiency, nocturnal disturbances, and daytime functioning. The adequacy of sleep is not only determined by sleep duration. A child may sleep for a long time in bed at night but may not sleep immediately, wake a lot during the night, have restless sleep or have a lot of daytime impairment. All of these indicate low sleep quality even with enough sleep duration (Astill et al. 2012; Chaput et al. 2016).

Many questionnaires have been developed and adapted to capture these dimensions for paediatric populations. The Pittsburgh Sleep Quality Index (PSQI) is among the most commonly utilized tools that Buysse (1988) developed for adults. The PSQI uses 19 self-report items to produce 7 component scores. These component scores are for subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication and daytime dysfunction. These seven scores are summed to provide a global PSQI score which ranges from 0 to 21. A high PSQI score indicates a worse sleep quality. A cut-off PSQI score of

greater than 5 has been used to distinguish “poor” from “good” sleeper (Buysse, 1988; Carpenter & Andrykowski, 1998).

According to studies, the internal consistency, test-retest reliability, and construct validity of PSQI are quite acceptable in various clinical as well as community samples. Also translated and validated in several languages and cultures, including in Arabic and for use with medical staff, university students and patients with chronic conditions, among others (Xiao et al., 2020; Alboghdadly et al., 2022).

Several studies adapted PSQI or used parent-report versions of PSQI to assess children’s sleep in pediatric studies. Most studies like these ask the parent to report the child’s average bedtime, wake time, sleep onset latency, total sleep time, night-time awakenings, daytime sleep disturbance behaviour markers, fatigue and irritability. Children with higher PSQI scores have, according to evidence from these studies, more behavioural and emotional problems, poorer school performance and lower health-related quality of life compared with children with lower scores (Astill et al., 2012; Owens, 2014). A multidimensional index like the PSQI allows researchers to ask more than just “how many hours” did your child sleep, but rather how well did your child sleep.

Despite this, only a limited number of studies use PSQI-based measures in younger school-aged children (e.g., 6–8 years), and fewer still in Arabic-speaking or Middle Eastern contexts. Much of the available works has been conducted in North America, Europe and East Asia, which may limit the direct applicability of findings to other sociocultural settings, where family routines, school schedules, housing conditions and health service structures differ. Many previous studies have not only focused on children with chronic disease or neurodevelopmental disorder, but also on sleep quality in community samples of mostly normal children have received less attention.

2.3 Pharmacological and Nutritional Context of Screen-Related Sleep Disturbance

According to scientists, the brain contains interconnected networks that regulate sleep. These networks regulate circadian timing and sleep pressure homeostasis. The hypothalamic system (the suprachiasmatic nucleus, for example) and some brainstem systems involved in arousal are important for sleep regulation, however.

Bedtime screen exposure can interfere with these melatonin-regulating brain processes via two pathways: (i) blue-enriched light suppresses the release of endogenous melatonin and shifts the circadian phase and (ii) cognitively stimulating content increases arousal-related neuroendocrine activity (e.g. dopaminergic activation and stress hormones) thus prolonging sleep latency and decreasing sleep efficiency (Cain & Gradisar, 2010, LeBourgeois et al., 2017, Touitou et al., 2020). In terms of the pharmaceutical care, this brain-centred mechanism is clinically relevant because it may lead those affected to misattribute the environmentally driven arousal state they experience as a "medical sleep problem". This misattribution may in turn escalate their use of over-the-counter sedative medications or unsupervised use of melatonin and detract from the effective treatment of the primary behavioural trigger (Owens, 2014; Bruni et al., 2022; Lelak et al., 2022).

In addition to behavioral and circadian mechanisms, screen-related sleep disturbance also has significant pharmacological and nutritional implications particularly in pediatric and pharmaceutical care. Using digital screens in the evenings becomes a bad habit that reduce release of melatonin and shift body circadian rhythm. At the same time, it enhances our mental functions and our body responsiveness (Cain & Gradisar, 2010; LeBourgeois et al., 2017). The above physiological changes can have indirect effects on health-seeking behaviours, such as over-the-counter sleep medicine, the taking of melatonin and sedating antihistamines due to perceived sleep problems.

Drugs can be useful for selected circadian rhythm disorders, but international pediatric sleep recommendations indicate that behavioral sleep hygiene strategies should remain first line therapy, especially when sleep disruption is environmentally-driven (Owens, 2014; Paruthi et al., 2016). To differentiate between circadian misalignment on account of screen exposure (secondary) and primary sleep disorders that may need a medical evaluation would therefore be necessary from a pharmaceutical care perspective.

The effects of screen exposure at bedtime summarized in Table 1 may disrupt sleep through a number of interactive mechanisms, including melatonin suppression, cognitive arousal, and modified sleep environment associations (Cain & Gradisar, 2010; LeBourgeois et al., 2017). Based on the available evidences, behavioural change strategy, such as decreasing pre-sleep screen time and promoting consistent bed time routine, should be given priority over prescription of medications in children (Chaput et al., 2016; Owens, 2014).

Figure 1 shows a conceptual framework by which evening screen exposure may set off a sequence of biological and behavioural events which then impacts sleep. The model shows how circadian effects and melatonin suppression related to blue light, accompanied by cognitive and emotional arousal, lead to delayed sleep onset and reduced sleep efficiency (LeBourgeois et al., 2017; Cain & Gradisar, 2010). Significantly, it also shows how the perception of "a sleep problem" by parents may increase the demand for quick drug solutions, leading to the unsupervised use of OTC sleep aids. This idea suggests that environmental and behavioral factors such as screen time before sleep should be a first order of business in sleep hygiene approaches for young people (Owens, 2014; Chaput et al., 2016; Hale & Guan, 2015).

Table 2-1 Clinical and Therapeutic Implications of Bedtime Screen Exposure in Children.

Mechanism	Biological Effect	Clinical Consequence	Clinical / Therapeutic Consideration	Evidence Source
Blue light exposure	Melatonin suppression	Delayed sleep onset	Caution against unsupervised melatonin use; prioritize sleep hygiene	LeBourgeois et al., 2017
Cognitive arousal	Increased dopamine & cortisol	Prolonged sleep latency	Address behavioral factors before considering pharmacologic options	Cain & Gradisar, 2010
Circadian phase delay	Shifted sleep–wake rhythm	Reduced sleep efficiency	Emphasize consistent bedtime routines and light management	Chang et al., 2015
Bed–wake dissociation	Conditioned insomnia	Fragmented sleep	Behavioral sleep interventions preferred over sedative use	Owens, 2014
Sleep restriction	↑ inflammatory markers	Daytime irritability	Reinforce adequate sleep duration and parental guidance	Chaput et al., 2016

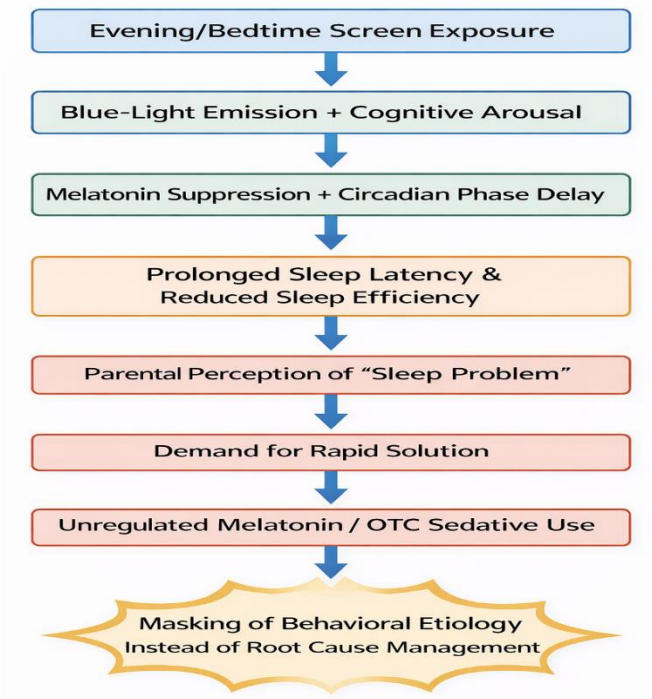

Figure 1-1 Conceptual Pharmacological Model Linking Bedtime Screen Exposure to Behavioral Sleep Disturbance and Potential Medication Misuse in Children.

Table 2 provides an overview of pharmacological and nutritional agents which are useful in sleep management Despite being potentially helpful with circadian rhythm sleep–wake disorders, current evidence doesn't support the routine use of pharmacological treatments for sleep disturbances caused by environmental factors like excessive screen use at bedtime. A systematic review and meta-analysis showed that melatonin can reduce sleep onset latency in certain pediatric populations. However, it should be used with caution and after behavioural sleep interventions (Bruni et al., 2022). Epidemiological surveillance data show a marked rise in pediatric melatonin ingestions over the past decade, raising concerns about unsupervised, over-the-counter use and inappropriate dosing (Lelak et al., 2022).

Experimental and chronobiological research also confirms that evening exposure to light-emitting screens suppresses endogenous melatonin secretion and delays circadian timing, thereby contributing to sleep-onset delay and reduced sleep efficiency (Touitou et al., 2020; LeBourgeois et al., 2017). Accordingly, when sleep disruption is primarily attributable to modifiable environmental factors such as bedtime screen use, behavioral sleep hygiene strategies should remain first-line management, with pharmacological therapy reserved for clinically indicated cases under professional supervision.

Studies conducted at the lab suggests either drugs affect the sleep duration or drug metabolism is dependent on sleep duration. Drugs that shorten sleep duration or delay sleep onset include central nervous system stimulants, corticosteroids, and selective serotonin reuptake inhibitors (SSRIs). In contrast, first-generation sedating antihistamines and melatonin increase total sleep time for certain clinical indications (Owens, 2014; Bruni et al., 2022). Sleep deprivation in the evening due to screen-emitted light is more frequently attributable to behavioral time displacement and circadian misalignment rather than primary pharmacological effects (LeBourgeois et al., 2017; Touitou et al., 2020). Therefore, it is essential to differentiate between medication-induced sleep alterations and environmentally driven sleep disruption within pediatric pharmaceutical care assessment.

Table 2-2 Pharmacological and Nutritional Agents Commonly Associated with Sleep Management in the Context of Screen-Related Circadian Disruption (LeBourgeois et al., 2017; Touitou et al., 2020; Bruni et al., 2022; Lelak et al., 2022).

Agent / Category	Mechanism of Action	Evidence in Children	Evidence in Adults	Key Clinical Consideration
Melatonin (supplement)	Regulates circadian rhythm; promotes sleep onset	Moderate evidence for circadian delay; not routine insomnia	Moderate–strong evidence for delayed sleep phase	Should be timed appropriately; avoid unsupervised chronic use
Sedating antihistamines (e.g., diphenhydramine)	H1 receptor antagonism causing sedation	Limited evidence; not recommended for routine use	Short-term symptomatic relief	Risk of tolerance, daytime sedation, paradoxical excitation in children
Benzodiazepines / Z-drugs	GABA-A receptor modulation	Not recommended in pediatric insomnia	Effective short-term in adults	Risk of dependence; not indicated for screen-induced sleep issues
Magnesium (supplement)	Neuromuscular relaxation; indirect CNS effects	Insufficient pediatric evidence	Limited supportive evidence	Use only if deficiency suspected
Vitamin D (supplement)	Indirect association with sleep regulation	Observational associations only	Mixed evidence	Supplement based on deficiency, not as primary sleep therapy

2.4 International Evidence on Screen Time and Sleep Quality in School-Aged Children

A comparison of international research on screen exposure and sleep quality in school-age children is shown in Table 3. Estimates of poor sleep quality vary across cultures and regions, from 12–30% in national samples and from 25–50% in adolescents. Significantly, most of the international studies report a good association between bedtime screen use and poorer sleep outcomes but the same cannot be said about total daily screen time for which association appears weaker or more variable.

Table 3 illustrates a useful comparative pattern that provides further support for contemporary theoretical models which indicate that when and under what context screens are viewed may be more relevant to sleep quality than just total duration, especially just before sleep. Scholars have suggested that exposure to blue light, cognitive engagement, and stimulation prior to sleep are the mechanisms involved. The international synthesis presents an important conceptual framework with which to interpret the findings of the present study.

Table 2-3 International Comparison of Screen Time and Sleep Quality in School-Aged Children

Country	Age Group	Prevalence of Poor Sleep (%)	Association with Total Screen Time	Association with Bedtime Screen Use	Key Reference
Iraq (Current Study)	6–8 years	8.7%	Not significant (p=0.61)	Significant (p<0.001)	Present study
USA	6–12 years	15–25%	Moderate association	Strong association	Carter et al., 2016
China	7–12 years	18–30%	Significant dose–response	Strong association	Li et al., 2010
Saudi Arabia	6–12 years	12–22%	Significant	Significant	Alqarni et al., 2022
Meta-analysis (Global)	5–17 years	Variable	Small–moderate effect size	Stronger effect	Hale & Guan, 2015

2.5 Research Gap

Findings from previous research have indicated a positive correlation between sleep quality and physical activity, diet, and other lifestyle behaviours. However, considerably less research has examined how total daily screen time, evening media

exposure, and the presence of screens in the bedroom relate to PSQI-based sleep quality among early school-aged children. When these associations have been explored, evening or pre-sleep screen use has generally shown a stronger relationship with sleep difficulties compared to total daily screen time. However, it is important to note that most of the evidence is from studies in adolescents or older children and from samples from high-income countries.

Chapter Three

Methodology (Methods and Procedures)

3 Materials and Methods

3.1 Study design and setting

A cross-sectional study using a questionnaire type studied the association between sleep quality and screen time among Iraqi children 6–8 years of age. We developed the online survey on the google form in streamlined form such that family members preferably parents/primary caregivers of eligible child from the family were contacted only once on a random basis to ensure that data collected would be from reliable source. In sleep research, the same PSQI based survey design has been adopted to assess COVID-19 for sleep quality during this period. Studies conducted on different populations (Alboghdadly et al., 2022; Xiao et al. 2020).

3.2 Participants and sampling

Organizations utilized parent user groups and social media as recruitment tools with parents at schools and community forums." Parents of children studying in Iraq and aged between 6 - 8 years were eligible participants. Furthermore, they were required to be living with at least one parent / guardian who could complete the Arabic questionnaire. In order to minimize the likelihood of any medical conditions confounding the sleep outcomes of our children, we excluded children from the study, if parents reported that any diagnosed medical or developmental condition was present that was known to substantially interfere with typical sleep-wake patterns.

Data quality checks were conducted to assess eligibility and internal consistency. Questionnaires were excluded if they were completed for children outside the target age range (6–8 years), contained missing key PSQI or screen-time variables, or included implausible sleep values (e.g., impossible sleep latency). After removing these cases, the final analysis sample included 402 children.

3.3 Socio-demographic and screen-related variables

In the first section, the fundamental socio-demographic characteristics (an age and gender of the child) and screen-using behaviour (duration and type of media use). Parents requested to respond.

- The average total screen time of the child on devices (smartphone, tablet, television, computer, gaming console), divided into <1 hour, 1-2 hours of screen time, 3-4 hours or >4 hours in a day.
- Was the child using screens in-bed or just before sleep? (yes/no).
- Parents were asked to rate the perceived impact of screen use on their child's sleep (no effect, slight effect, moderate effect, strong effect). For several analyses, daily screen time was categorized into low screen time (≤ 2 h/day) and high screen time (> 2 h/day), consistent with prior research examining media use and sleep outcomes in children (Xiao et al., 2020).

3.4 Pittsburgh Sleep Quality Index (PSQI)

Overall sleep quality over the past month was assessed using an Arabic, parent-reported adaptation of the Pittsburgh Sleep Quality Index (PSQI) for children. The Pittsburgh Sleep Quality Index (PSQI) developed by Buysse et al. in 1988 is a reliable psychologist instrument used to measure sleep quality, and it has been used extensively over the years. The seven items in this scale include subjective sleep quality latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication and daytime dysfunction. Each component is scored from 0 (no difficulty) to 3 (severe difficulty), and component scores are summed to yield a global PSQI score ranging from 0 to 21, with higher scores indicating poorer sleep quality (Buysse, 1988).

The PSQI is a widely used and psychometrically supported measure of sleep quality in clinical and non-clinical populations (Carpenter & Andrykowski, 1998). It has also been used in Arabic and regional contexts (e.g., Alboghdadly et al., 2022). In the present study, the PSQI items were adapted for parent-proxy reporting by rewording items so that parents responded on behalf of their child while maintaining the original structure and scoring rules. Because this parent-proxy adaptation has not been formally

validated for this age group, internal consistency was examined within the current sample, and this adaptation is considered a study limitation.

In line with the cut-off used by Buysse (1988) and in consequent studies (Carpenter & Andrykowski, 1998; Xiao et al., 2020), a global PSQI score >5 was adopted for poor sleep quality while scores ≤5 denoted good sleep quality. Nightly sleep duration (hours of actual sleep) was also obtained from PSQI items, and short sleep was defined as <7 hours per night as noted in paediatric sleep guidelines.

The study sample (n = 402) was used to evaluate the internal consistency of the parent-reported adaptation of the Pittsburgh Sleep Quality Index (PSQI) for reliability. As presented in Table 4, the seven PSQI components were sufficiently internally consistent (total Cronbach's α = 0.83). The components of the domains of PSQI used in this study were observed to have a statistically significant relationship which implies that they have a good internal consistency. The acceptable values of Cronbach's α calculated if the item deleted indicate that no item affects the reliability coefficient severely. The findings support the internal consistency and structural validity of the parent-reported PSQI adaptation for the multidimensional evaluation of sleep quality in Iraqi children aged 6-8 years old, indicating satisfactory reliability within this age group. This value is comparable to, and slightly higher than, those reported in pediatric validation studies (e.g., α = 0.719–0.74), supporting the applicability of the instrument in younger populations (Scialpi et al., 2022; Larche et al., 2021).

The Pittsburgh Sleep Quality Index (PSQI), which was originally designed for adult populations (Buysse et al., 1989), has undergone psychometric evaluation in pediatric samples, which include healthy children and clinical populations of adolescents. According to these psychometric studies PSQI has an acceptable internal consistency, test–retest reliability, and construct validity (Scialpi et al., 2022; Larche et al., 2021). In the current study, the adaptation included minimal wording changes to permit parent-reports but maintained the original structure, domains, and scoring system. None of the structural changes were made. Since this study was not designed to be a full psychometric validation study, the procedures performed combined with prior pediatric evidence are methodologically sound enough to warrant consideration of this instrument in this sample.

Table 3-1 The internal consistency and inter-component correlation of the seven PSQI components based on the study sample of 402 have been determined.

PSQI components	Mean (SD)	Cronbach's α if item deleted	1	2	3	4	5	6
1. Subjective sleep quality	0.73 (0.90)	0.81	—					
2. Sleep latency	0.84 (0.93)	0.82	.63***	—				
3. Sleep duration	0.55 (0.84)	0.79	.49***	.54***	—			
4. Habitual sleep efficiency	0.50 (0.82)	0.84	.45***	.47***	.66***	—		
5. Sleep disturbances	1.39 (0.61)	0.8	.58***	.55***	.45***	.46***	—	
6. Use of sleeping medication	0.12 (0.48)	0.85	.25***	.23***	.16**	.17**	.27***	—
7. Daytime dysfunction	0.97 (0.89)	0.82	.63***	.58***	.48***	.45***	.65***	.29***

Pittsburgh Sleep Quality Index; correlation significance: $^{*}p < 0{:}05$, ** p < 0.01, $^{***}p < 0{:}001$ (2-tailed).
The value of Cronbach's α is 0.83 for all seven components.

3.5 Data collection procedures

The Google Forms was used for a web survey. The information sheet provided details on the study aim, confirmed the voluntary nature of participation, and estimated questionnaire completion time. Confidentiality of data was ensured. None of the information collected could identify any person including their names and addresses. Recorded IP Addresses Were Not. Each device was allowed one response to reduce duplication. The data were exported to Microsoft Excel for a preliminary screening, and later they were analysed through IBM SPSS Statistics (IBM Corp., Armonk, NY, USA).

3.6 Ethical considerations

As the study does not pose any potential harm, physical or otherwise, the application was submitted to the Research Ethics Committee at Middle East University (MEU) located in Amman, Jordan (decision no: 2026-2025/04/04).

Institutional ethical standards were followed in all procedures. Consent was taken from parents/guardians for participating in this study. No identifiers were collected to ensure anonymity.

All procedures were conducted in accordance with institutional ethical standards. Informed consent was obtained from parents or legal guardians prior to participation, and all data were collected anonymously to ensure confidentiality.

3.7 Statistical analysis

The distributional properties of continuous variables were examined prior to analysis. Variables that were approximately normally distributed were summarised using mean ± standard deviation (SD), whereas skewed variables, including global PSQI scores, were summarised using median and interquartile range (IQR). Categorical variables were described using frequencies and percentages. Group differences in categorical variables were assessed using the Chi-square test. Given the substantial skewness of PSQI scores, with a clustering of lower values, between-group comparisons were conducted using non-parametric tests, including the Kruskal–Wallis test for comparisons involving two or more groups and the Mann–Whitney U test for two-group comparisons. A two-tailed p-value of <0.05 was considered statistically significant. All statistical analyses were performed using IBM SPSS Statistics version 11.

Chapter Four

Results of the Study

4.1 Pittsburgh Sleep Quality Index (PSQI)

Data were collected using a parent-reported questionnaire designed to assess children's sleep quality over the previous month using the PSQI. The PSQI consists of 19 parent-reported items grouped into seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. Each score by component was between 0 and 3, inclusive. The global PSQI score ranges from 0 to 21, with higher scores indicating poorer sleep quality. The seven PSQI components showed good internal consistency (Cronbach's alpha = 0.83) for children aged 6−8 years. Hence, the tool is reliable to measure sleep quality in the population.

4.2 Sample characteristics, sleep quality, and screen time

Table 5 summarizes the sociodemographic characteristics sleep parameters and screen time of the study sample (n = 402). The mean age of the children was 7.15 ± 0.78 years (range: 6–8), with boys comprising 64.2% of the sample. The mean global PSQI score of the sample was 1.10 ± 2.77 in the range of 0–21. According to the PSQI cut-off level that was established (>5), 91.3% of the children were good sleepers whereas 8.7% were poor sleepers. Subjects had a mean sleep duration of 7.00 ± 2.29 hours/night (1–10 hours).

With respect to daily screen exposure, 48.3% of children reported 1–2 hours/day, 24.9% reported 3–4 hours/day, 19.9% reported less than 1 hour/day, and 7.0% exceeded 4 hours/day. When dichotomized, 68.2% of the sample fell within the low screen-time group (≤2 hours/day), while 31.8% exceeded 2 hours/day.

Table 4-1 Sociodemographic characteristics, sleep quality, and screen time among Iraqi children aged 6–8 years (n = 402).

Variable	Category	n (%) or Mean ± SD
Age (years)	–	7.15 ± 0.78 (6–8)
Gender	Boys	258 (64.2%)
	Girls	144 (35.8%)
Global PSQI score	–	1.10 ± 2.77 (0–21)
Sleep quality category	Good sleep (PSQI ≤5)	367 (91.3%)
	Poor sleep (PSQI >5)	35 (8.7%)
Sleep duration (hours/night)	–	7.00 ± 2.29 (1–10)
Screen time (dichotomized)	Low (≤2 h/day)	274 (68.2%)
	High (>2 h/day)	128 (31.8%)

4.3 Sleep quality by detailed daily screen time categories

As seen in Table 6, who defined the sleep quality (good vs poor) with PSQI. Most children in the different groups were categorized as good sleepers. The occurrence of poor sleep was between 6.2% for less than 1 hour in a day and 10.7% for more than 4 hours in a day. Yet the quality of one's sleep was not significantly different between the screen categories ($\chi^2(3) = 0.96$, $p = 0.81$) indicating that the total daily screen length is not associated with poor sleep for this sample. Consequent examinations were therefore focused on contextual factors of screen exposure (e.g. screen use in bed/close to lights out).

Table 4-2 Distribution of sleep quality by daily screen time category (n = 402).

Daily screen time	Good sleep n (%)	Poor sleep n (%)	Total n
< 1 hour (n = 80)	75 (93.8%)	5 (6.2%)	80
1–2 hours (n = 194)	177 (91.2%)	17 (8.8%)	194
3–4 hours (n = 100)	90 (90.0%)	10 (10.0%)	100
> 4 hours (n = 28)	25 (89.3%)	3 (10.7%)	28
Total (n = 402)	**367**	**35**	**402**

n = number of children within each screen time category.

Percentages are calculated within each daily screen time category.

Chi-square test: $\chi^2(3) = 0.96$, $p = 0.81$.

4.4 Sleep quality according to low vs. high daily screen time

According to the PSQI classification, the association between sleep quality and dichotomized daily screen time (≤2 hours/day vs. >2 hours/day) is presented in Table 7. The proportion of children classified as having good sleep was slightly higher in the low screen time group (92.0%) compared with the high screen time group (89.8%).

Correspondingly, poor sleep was observed in 8.0% of children with low screen time and 10.2% of those with high screen time. However, the difference between the two groups was not statistically significant ($\chi^2(1) = 0.27$, $p = 0.61$), indicating that screen time exceeding two hours per day was not significantly associated with sleep quality in this study population.

Table 4-3 Association between sleep quality and dichotomized daily screen time (n = 402).

Screen time group	Good sleep n (%)[1]	Poor sleep n (%)[1]	Total n
Low screen time (≤ 2 h/day)	252 (92.0%)	22 (8.0%)	274
High screen time (> 2 h/day)	115 (89.8%)	13 (10.2%)	128
Total (n = 402)	367	35	402

[1] Percentages are calculated within each screen time group. Chi-square test: $\chi^2(1) = 0.27$, $p = 0.61$.

4.5 Global PSQI scores across daily screen time categories

Global PSQI scores were analyzed as continuous variables across four daily screen time categories (<1 hour, 1–2 hours, 3–4 hours, and >4 hours per day), as presented in Table 8. There was a progressive rise in mean PSQI values associated with the increase in screentime exposure. The PSQI value was 0.75 in children with screentime exposures less than one hour per day. It was 1.50 in children with screentime exposures of more than four hours per day.

Although many respondents showed a rise in the PSQI score as screen time increased, the median score was 0.0 for all screen time categories. This indicates a strong floor effect and hence low sleep disturbance scores among this sample. The narrow, mostly overlapping IQRs indicate that distributions were similar among groups.

Given the skewed distribution of PSQI scores, non-parametric analysis was performed using the Kruskal–Wallis test. The results did not demonstrate a statistically significant difference in global PSQI scores across screen time categories (H = 4.64, p = 0.20). These findings indicate that higher daily screen time duration was not significantly associated with poorer global sleep quality in this study population.

Table 4-4 Association between daily screen time categories and global PSQI scores among Iraqi children aged 6–8 years (n = 402).

Daily screen time	n	Mean ± SD PSQI	Median (IQR) PSQI
< 1 hour	80	0.75 ± 2.11	0.0 (0.0–0.0)
1–2 hours	194	1.11 ± 3.03	0.0 (0.0–0.0)
3–4 hours	100	1.23 ± 2.70	0.0 (0.0–0.0)
> 4 hours	28	1.50 ± 2.77	0.0 (0.0–3.0)
Total	402	1.10 ± 2.77	0.0 (0.0–0.0)

Kruskal–Wallis test: H = 4.64, p = 0.20.

4.6 Global PSQI scores by low vs. high screen time

As seen in table 9, the mean PSQI score among children who spend more than two hours a day in front of a screen, that is 1.29, was more than that among children spending only two hours or less a day in front of the screen, that is 1.01. However, the interquartile ranges of both groups overlapped substantially, indicating similar score distributions. The comparison between groups did not reach statistical significance (Mann–Whitney U test, p = 0.067). These findings suggest a trend toward higher PSQI scores with increased screen exposure; however, this association was not statistically significant in the present sample.

Table 4-5 Global PSQI scores according to low vs. high daily screen time (n = 402)

Screen time group	n	Mean ± SD PSQI	Median (IQR) PSQI	P-value
Low screen time (≤ 2 h/day)	274	1.01 ± 2.80	0.0 (0.0–0.0)	0.067
High screen time (> 2 h/day)	128	1.29 ± 2.71	0.0 (0.0–3.0)	
Total	402	1.10 ± 2.77	0.0 (0.0–0.0)	

Mann–Whitney U test was used to compare PSQI scores between low and high screen time groups (p = 0.067).

4.7 Sleep quality and PSQI scores by gender

The gender differences for sleep quality and global PSQI scores are indicated in Table 10. The frequency at which poor sleep was reported in girls (10.4%) was higher than boys (7.8%). The mean PSQI scores of girls (1.35 ± 2.83) were also more than those of boys (0.95 ± 2.72). Sleep quality classification according to $\chi^2(1) = 0.52$, $p = 0.47$, chi-square analysis proved that these differences were non-significant. The sleep quality and PSQI scores of boys and girls were found to differ by gender, however, these differences were small and statistically insignificant. The median PSQI score was 0.0, indicating generally good sleep quality across the sample.

Table 4-6 Association between gender (boys vs. girls) and sleep quality and global PSQI scores (n = 402).

Gender	**n**	**Good sleep n (%)**	**Poor sleep n (%)**	**Mean ± SD PSQI**	**Median (IQR) PSQI**	**P-value**
Boys	258	238 (92.2%)	20 (7.8%)	0.95 ± 2.72	0.0 (0.0–0.0)	
Girls	144	129 (89.6%)	15 (10.4%)	1.35 ± 2.83	0.0 (0.0–3.0)	0.47
Total	402	367 (91.3%)	35 (8.7%)	1.10 ± 2.77	0.0 (0.0–0.0)	

Chi-square test (sleep quality by sex): $\chi^2(1) = 0.52$, $p = 0.47$.

4.8 Sleep quality by using screens in bed / before sleep

As shown in Table 11, screen use in bed or before sleep was significantly associated with PSQI-defined sleep quality. The prevalence of good sleep among children who did not use screens in bed was 98.4%, whereas only 1.6% were classified as poor sleepers. In contrast, children who reported screen use in bed or close to bedtime exhibited a higher prevalence of poor sleep (11.9%).

This association was statistically significant ($\chi^2(1) = 10.10$, $p < 0.001$). These findings suggest that screen use before bedtime may be more strongly related to sleep disturbances than overall daily screen duration.

Table 4-7 Association between screen use in bed/before sleep and sleep quality (n = 402).

Uses screens in bed / before sleep	Good sleep n (%)[1]	Poor sleep n (%)[1]	Total n	**P-value**
No (n = 124)	122 (98.4%)	2 (1.6%)	124	0.001
Yes (n = 278)	245 (88.1%)	33 (11.9%)	278	
Total	367	35	402	

[1] Column percentages within each perception category of using screen in bed/before sleep.

Chi-square test: $\chi^2(1) = 10.10$, $p < 0.001$.

4.9 Sleep quality by parents' perception of the effect of screen time

As shown in Table 12, parents' perception of the impact of screen time on their child's sleep was significantly associated with PSQI-defined sleep quality. Although the majority of children were classified as good sleepers across all perception categories, the prevalence of poor sleep increased as parental perception of screen time impact increased. Poor sleep was reported in 2.9% of children whose parents indicated that screen time had no effect on sleep, compared with 14.1% among those whose parents reported that screen time affects sleep "a lot". The chi-square test confirmed a statistically significant association between parental perception and sleep quality ($\chi^2(3) = 12.09$, $p = 0.007$). However, given the cross-sectional nature of the study, this association should be interpreted cautiously, as the direction of the relationship cannot be determined.

Table 4-8 Sleep quality according to parents' perception of the effect of screen time on sleep (n = 402)

Parent's perception of screen time effect	**Good sleep n (%)[1]**	**Poor sleep n (%)[1]**	**Total n**
No effect at all (n = 35)	34 (97.1%)	1 (2.9%)	35
Affects to some extent (n = 120)	110 (91.7%)	10 (8.3%)	120
Affects a little (n = 91)	89 (97.8%)	2 (2.2%)	91
Affects a lot (n = 156)	134 (85.9%)	22 (14.1%)	156
Total	**367**	**35**	**402**

[1] Column percentages within each perception category.

Chi-square test: $\chi^2(3) = 12.09$, $p = 0.007$.

4.10 Sleep timing and duration

Table 13 presents the sleep timing and duration characteristics of the children studied. The mean sleep duration was 7.00 ± 2.29 hours per night. Most children (69.7%) slept for ≥ 7 hours. On the other hand, 30.3% of the children slept for < 7 hours per night. Most children in this study showed a short sleep onset latency with 77.9% who fell asleep within 30 minutes while 22.1% fell asleep after more than 30 minutes. In terms of sleep timing, 74.1% of the children reported a usual sleep time before 9:00 pm, and 83.1% of the children reported waking after 7:00 am. In general, the sleep-wake schedule and baseline sleep duration of participants are fairly consistent during nighttime sleep.

Table 4-9 Sleep timing and duration characteristics among Iraqi children aged 6–8 years (n = 402).

Variable	Category	n (%) / Mean ± SD
Sleep duration (hours/night)	Mean ± SD	7.00 ± 2.29
	< 7 hours	122 (30.3%)
	≥ 7 hours	280 (69.7%)
Sleep latency	≤ 30 minutes	313 (77.9%)
	> 30 minutes	89 (22.1%)
Usual bedtime	Before 9:00 pm	298 (74.1%)
	After 9:00 pm	104 (25.9%)
Usual wake-up time	Before 7:00 am	68 (16.9%)
	After 7:00 am	334 (83.1%)

4.11 Sleep disturbance and daytime consequences

According to table 14 the frequency and daytime outcomes of sleeping disturbance of the children. A study shows that nearly half the children had either clinically relevant sleep disturbances or clinically significant disturbances. In children, sleep disturbances are prevalent. Moreover, there is sleep disturbance association with depression, anxiety and attention deficiency.

In contrast, the children did not show any clinically significant daytime dysfunction. This sample rarely reported any difficulties in staying awake during the day or diminished enthusiasm during the day.

Further investigation revealed that clinically important sleep disturbances were significantly preferentially associated with sleep quality category ($\chi^2 = 25.11$,

$p < 0.001$), suggesting that children with sleep disturbances were more likely to have poor sleep quality. There was a significant association between clinically relevant sleep disturbances and poorer sleep quality ($\chi^2(1) = 25.11$, $p < 0.001$).

Table 4-10 Sleep disturbances and daytime consequences among Iraqi children aged 6–8 years (n = 402).

Variable	Category	n (%)
Clinically relevant sleep disturbance	Yes	188 (46.8%)
	No	214 (53.2%)
Daytime dysfunction	Clinically significant	0 (0.0%)
	None / mild	402 (100%)

4.12 Sleep medication and screen-related behaviors

Only 1.5% of the children reported using sleep medication, indicating that pharmacological sleep aid use is uncommon in this age group (Table 15). In contrast, screen use in bed or before sleep was reported by 69.2% of the participants. Regarding the timing of screen exposure, usage was most frequently reported in the evening (53.2%) and within one hour before bedtime (69.2%), while 38.8% and 22.9% reported screen use in the afternoon and morning, respectively. No statistically significant association was observed between sleep medication use and sleep quality category.

Overall, most parents rated their child's sleep quality as good or very good, with only a small proportion reporting fair to poor sleep. Habitual sleep efficiency, as part of the PSQI structure, was calculated based on bedtime, wake-up time, and sleep duration, and was not analyzed separately in this study.

Table 4-11 Sleep medication use and screen-related behaviors among Iraqi children aged 6–8 years (n = 402).

Variable	Category	n (%)
Use of sleep medication	Yes	6 (1.5%)
	No	396 (98.5%)
Use of screens in bed / before sleep	Yes	278 (69.2%)
	No	124 (30.8%)
Timing of screen use*	Morning	92 (22.9%)
	Afternoon	156 (38.8%)
	Evening	214 (53.2%)
	Within 1 hour before bedtime	278 (69.2%)

Chapter Five

Discussion of Results and Recommendation

5.1 Introduction and Summary of Main Findings

Sleep in early childhood is a multidimensional construct that encompasses sleep duration, continuity, timing and subjective quality, all of which are closely linked to cognitive performance, behavioural regulation, metabolic health and emotional well-being (Dewald et al., 2010; Chaput et al., 2016; Yang et al., 2022). Inadequate or poor-quality sleep in school-aged children has been associated with learning difficulties, inattention, mood problems and increased cardiometabolic risk, highlighting the importance of valid tools to quantify sleep quality in both clinical and community settings (Quach et al., 2009; Cappuccio et al., 2008; Reynaud et al., 2019).

The Pittsburgh Sleep Quality Index (PSQI) is a widely used measure for assessing sleep quality over the previous month. It consists of 19 self- or proxy-reported items that are summarised into seven component scores: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. Each component is scored from 0 to 3, yielding a global score ranging from 0 to 21, with higher scores indicating poorer sleep quality (Buysse, 1988; Carpenter & Andrykowski, 1998). The PSQI has demonstrated acceptable internal consistency and construct validity across diverse populations. A global score greater than 5 is commonly used to distinguish poor sleepers from good sleepers (Buysse, 1988; Mollayeva et al., 2016). In the present study, the PSQI showed good internal consistency in Iraqi children aged 6–8 years (Cronbach's alpha = 0.83), supporting the reliability of the Arabic parent-reported version in this age group.

The present study examined the association between children's screen-related behaviors, sleep duration, and PSQI-defined sleep quality in a community sample of Iraqi children aged 6–8 years. The findings suggest that while overall daily screen time showed limited association with global PSQI scores, the timing and context of screen use—particularly use in bed or before sleep—were more strongly linked to poorer sleep quality. In addition, shorter nocturnal sleep duration and stronger parental beliefs regarding the impact of screens were associated with higher rates of poor sleep.

The findings suggest a nuanced pattern. When children were categorized by total daily screen time, mean global PSQI scores showed a modest upward trend with increasing screen exposure; however, group differences were not statistically significant. The majority of the single components of the PSQI had median global scores that were close to minimal (median = 0.0), suggesting a strong floor effect and low symptom burden in this sample. This might suggest that total screen time (not accounting for context) is a relatively crude predictor of sleep (Hale & Guan, 2015; Gomes & Goldman, 2024; Hartstein et al., 2024). In other words, monitoring only the screen hours during the day would not distinguish a good sleeper from a poor sleeper in this age group.

The pattern and timing of screen use were more marked in comparison. Comparatively, the sleep of children in bed or just before lights out has a high prevalence of poor sleep and higher global PSQI scores. According to the findings, usage of light-emitting devices before sleep onset delays sleep onset, suppresses melatonin secretion and circadian regulation (Chang et al., 2015; Higuchi et al., 2014; LeBourgeois et al., 2017) According to these mechanisms, past international studies have shown significant associations between bedtime screen use and sleep duration and quality (Carter et al., 2016, fuller et al., 2017; Gomes & Goldman, 2024).

Children who sleep for fewer than seven hours nightly are likely to have sleep of poor quality and greater sleep disturbance. The report is aligned with international guidelines and major observational studies, which find that short sleep duration in school-aged children is associated with negative health and developmental consequences (Chaput et al. 2016; Paruthi et al., 2016; Dewald et al. 2010).

In addition, parents whose thought that screens “strongly affect” their child’s sleep, were likely to have poor sleepers.

Parents who perceive their child as having a good sleep are not disturbed throughout the night. Earlier studies show such closeness between reports by caregivers, and on screen related items, with standardised or objective measures of sleep problems (Quach et al., 2009; Hiltunen et al., 2021; Lan et al., 2020).

Collectively, these findings suggest moving beyond a narrow focus on the number of hours children spend on screens toward a more contextual perspective that considers the timing and context of screen use and how these factors interact with overall sleep duration. Although total daily screen time showed only a weak and non-significant association with higher sleep disturbance scores, pre-sleep screen use and shorter nocturnal sleep duration were clearly associated with poorer PSQI-defined sleep quality.

These findings are consistent with recent literature emphasizing bedtime screen restriction and the protection of adequate sleep duration as key targets for paediatric sleep-health interventions (Hale & Guan, 2015; Gomes & Goldman, 2024; Carter et al., 2016). In this way, the present study extends existing evidence to an Arabic-speaking cohort of Iraqi children aged 6–8 years by applying a validated PSQI-based measure and providing locally relevant data to inform family, school, and public health strategies aimed at improving sleep in young children.

5.2 Sleep Quality in the Present Sample and Comparison with Previous Studies

In this group of early school-aged children, clinically significant sleep disturbance (PSQI >5) was observed in only 8.7% of participants.

The broad general consensus findings from this perspective are in keeping with evidence that many children in early primary school still obtain sufficient sleep and show fewer chronic sleep complaints than older youth, although a significant minority of children in many populations fail to meet age-specific sleep recommendations (Chaput et al., 2016; Paruthi et al., 2016). Current consensus recommendations are 9-12 hours sleep per 24 h for children aged 6–12 years that are recommended by the American Academy of Sleep Medicine for optimal health and functioning (Paruthi et al., 2016). In our cohort, most children, especially those reported as good sleepers, seemed to be exhibiting an optimal sleep duration and continuity, but certain subgroups were experiencing a reduced duration and/or higher than average global PSQI score which suggest a risk to adverse outcomes.

Against international studies assessing the PSQI in paediatric and youth populations, the prevalence of poor sleep quality in the current sample (8.7%) seems comparatively low. In fact, one large cross-sectional study of students from elementary school to university in China found an overall mean PSQI score of 3.64 ± 2.81, with 22.2% of the participants classified as having poor sleep quality, with a clear trend toward worse scores as students' educational levels increase (Liu et al., 2020). In such study, the mean PSQI scores for elementary school students were lowest (2.24 ± 2.08), but adolescents who went to higher secondary and tertiary institutions reported significantly greater sleep disturbances (Liu et al., 2020). In fact, research that has been conducted in adolescent and older school-aged children from different countries found far higher prevalences of poor sleep quality, usually between 30 to 50% or greater, mainly in

environments of academic pressure and heavy technology use (Miniksar et al., 2021; Thinh et al., 2024; Shaheen & Albqoor, 2020).

So, this cross-study comparison makes two key observations. Firstly, poor sleep, as per PSQI cut-offs, is less common among our group of 6- to 8-year-old children than in many samples of adolescents and young adult populations, which is supported by long-term trends revealing that sleep problems and inadequate sleep are largely related to the advancing age of children and young adults (Chaput et al., 2016; Ranum et al., 2020). Second, despite comparisons with some elementary school cohorts, the sample at present demonstrates particularly low global PSQI scores and a strong floor effect (median = 0) that may emerge from real protective factors (e.g., better control by parents over bedtimes, earlier bedtimes, less academic burden) and methodological shortcomings (e.g., the dependence on parent report, and children being relatively young).

At the same time, global research shows that a non-trivial proportion of school-aged children do not attain recommended sleep time or report significant complaints about sleep, even in affluent contexts. For example, the evidence of objectively measured insufficient sleep (often <7–8 hours) among 6–12 years old children can be seen from accelerometer studies (Ranum et al., 2020; Zou et al., 2021) and survey-based data from national samples suggest that many 6–12-year-olds sleep less than the 9–12 hours recommended by expert consensus (Chaput et al., 2016; CDC, 2015). In view of this wider perspective, the small incidence of poor sleepers in our current study does indicate a possible more positive sleep pattern among Iraqi children, but it should also caution against missing the significant minority group that present with poor PSQI scores and short sleep duration, seeing that studies have reliably associated sleep problems with different health issues (behavioral, emotional, and academic).

The PSQI-based findings of the present study indicate that most Iraqi children aged 6–8 years demonstrated generally good parent-reported sleep quality, reflected by a low mean global PSQI score and a small proportion of poor sleepers based on standard cut-off values. These findings are broadly consistent with international evidence suggesting that bedtime screen exposure tends to show a stronger association with sleep disturbance than total daily screen duration. In the present Iraqi sample, total screen time was not significantly associated with PSQI-defined sleep quality, whereas the timing and context of screen use—particularly use in bed or immediately before sleep—emerged as significant correlates. This pattern supports theoretical models emphasizing the role of circadian disruption and pre-sleep arousal in sleep regulation.

5.3 Daily Screen Time and Sleep Quality

A central question of the current study was whether total daily screen time is associated with PSQI-defined sleep quality in early school-aged children. Consistent with the discourse in the public and professional literature, it is commonly assumed that "more screen time" leads to "worse sleep" in some dose–response way (Hale & Guan, 2015; LeBourgeois et al., 2017). But the results from this population of Iraqi children aged 6–8 years imply a more complex picture.

In the study, the children were placed in four categories according to daily screen time: < 1 hour, 1 - 2 hours, 3 - 4 hours and > 4 hours per day. The quality of sleep was examined as a binary outcome (good and poor sleeper using PSQI > 5 cut-off) and as continuous global PSQI score. People across the classes experienced no statistically significant association between daily screen time and the proportion of poor sleepers. The percentage of children with bad sleep was equally low and comparable for all four groups. Chi-square analyses did not yield significant differences in PSQI-defined sleep quality across groups defined by screen time.

Likewise, in the context of the continuous variable for global PSQI score, the mean PSQI score modestly increased from lowest to highest screen-time categories (e.g., from approximately 0.75 in the <1-hour group to 1.50 in the >4 hours group), but the median score maintained 0.0 across almost all groups, and Kruskal–Wallis testing did not demonstrate significant differences among the four screen-time groups. When dichotomizing screen time from low (≤2 hours/day) to high (>2 hours/day), the results were similar – while the children with more screen input had marginally higher mean PSQI scores, the medians did not differ (0.0), and group differences did not reach statistical significance. These results suggest that in this cohort, total daily screen time alone was neither a robust nor statistically reliable predictor of PSQI-based sleep quality.

According to Hale and Guan (2015), as well as Carter et al. (2016), greater exposure of screens was associated with shorter duration of sleep, a later bedtime, and worse sleep outcomes in children and adolescents. However, this finding appears to contradict them. Recent research has begun to indicate that overall screen use and sleep may show weak, non-linear or strong moderation by contextual variables (content, timing, co-use with parents, individual vulnerability) (Przybylski, 2019; Magee et al., 2020; Gomes & Goldman, 2024).

A research conducted among students with school age found a minor connection between screen time and sleep results with small effect sizes that attenuated often when adjusted for family customs and physical activity (Magee et al., 2020). Similarly, the contemporary commentators suggest that “screen time minutes” [11] is a fairly blunt measure of exposure because “how, when and why devices are used” may be more relevant than total hours (Przybylski, 2019; Domingues-Montanari, 2017; Gomes & Goldman, 2024).

There are a range of possible explanations for the failure of the current study to identify a significant association between daily screen time and sleep quality.

1. Floor impact within PSQI scoreframe.

As discussed in Section 4.2, the median global PSQI score was 0.0 for most screen-time categories, with only a small subgroup of children reporting substantial sleep disturbance. Because of this strong floor effect, non-parametric tests are limited in their ability to detect subtle variations in sleep quality between the screen-time groups. When nearly all children have extremely low PSQI scores, even genuine differences may fall short of conventional levels of significance.

2. Age level and development level.

The participants were fairly young (6–8 years). At this age of development, many children may benefit from more structured routines and parents exerting greater control over bedtimes and device access (Chaput et al., 2016; LeBourgeois et al., 2017). A structure like that could help buffer against the effects of higher daytime screen time on sleep. This would be especially the case when screen time happened earlier in the day rather than later so that light doesn’t disturb sleep onset.

3. The measurement of screen time according to broad categories and parent report.

Parents were asked to categorically estimate their children’s daily screens, rather than log time use or tracking on a device. According to Saunders et al. (2020), the wide categorical descriptions (<1, 1–2, 3–4, >4 hours) used by parents may lead to the under- or over-estimation of daily exposure. This, in turn, may lead to misclassification, weakening possible associations. Moreover, the influential categories we have discussed so far do not take educational versus entertainment content, passive versus interactive use, or co-viewing with parents into consideration, each of which may differently associate with arousal and sleep (Hale & Guan, 2015; Domingues-Montanari, 2017).

4. Contextual and cultural factors new

Contextual and cultural factors may shape children's screen-related behaviours and sleep patterns in ways that differ from Western populations, where most of the existing literature has been generated (Hale & Guan, 2015; LeBourgeois et al., 2017). In Iraqi households, shared sleeping arrangements, later family routines, and media-related rules may influence both bedtime structure and device exposure. When parents regularly restrict device use at night, the overall amount of screen time has the potential to alleviate screen time interference, even though it does not entirely disappear. Recent findings reveal that the period or venue of a media's utilization by a person may matter more than the duration of its use when it comes to media influence, and hence, their degree of connection with the media.

Rather than contradicting the significance of the link between screens and sleep, our findings give support to the view – also stressed in recent guidelines – that total daily screen time should not be treated as the only or main marker of risk for sleep problems (Przybylski, 2019; Gomes & Goldman, 2024). The current study finds that the daily screen time does not have as strong an effect as does pre-sleep screen use and short sleep duration. This finding suggests that the "when" and the "how" a screen is being used could be more important than "how many hours" are being accumulated throughout the whole day. The mechanistic models suggest that sleep disruption is mainly due to treatment factors that occur around the time of bedtime which creates a physiological arousal and exposure to blue-enriched light later in the evening.

In the current study show that daily screen time in isolation is a weak, non-significant correlate of PSQI-defined sleep quality among Iraqi 6–8 years children despite small non-significant trending toward higher PSQI scores with increased screen exposure. There is mounting evidence suggesting that instead of monitoring simple exposure through crude thresholds for screen time, researchers should pay close attention to screen timing, the timing of bed and total sleep duration. This will be discussed with further details in the subsequent sections.

5.4 Screen Use in Bed/Before Sleep and Sleep Duration

The strongest correlations identified in this research were not related to total daily screen time. Rather, the associations found were screens in bed or just before bedtime and short sleep duration. Researchers have created a new theoretical framework within which

scientific evidence regarding the impact of screens on sleep among young children can come together.

5.4.1 Screen Use in Bed/Before Sleep

In the current sample, those children who used screens in bed or during the period just before falling asleep had significantly worse sleep quality than those who did not. Among children whose parents reported “no screen use in bed/before sleep”, only 1.6% were classified as poor sleepers, compared to 11.9% who were classified as poor sleepers and did use screens in bed/before sleep. There was a significant statistical difference in pre-sleep screen exposure between those with poor sleep as defined by PSQI and those without at $\chi^2(1) = 10.10$, $p=0.001$.

Empirically, the current results are in line with decades of research demonstrating that bedtime or bedroom device use is more strongly related to sleep problems than total daily screen time. Carter et al.'s meta-analytic evidence (2016) reported that access to, or use of, portable screen-based media devices at bedtime was associated with shorter sleep duration, delayed bedtimes and poorer sleep quality in children and adolescents. Indeed, similar conclusions have been drawn in more recent work, in which pre-sleep device use predicted insufficient sleep and daytime tiredness even after controlling for overall screen exposure (Gomes & Goldman, 2024; Hartstein et al., 2024). In this context, the current study provides additional evidence from an Arabic-speaking Iraqi cohort of 6–8-year-old children, showing that screen use specifically in bed or before sleep is a clear risk marker for poor PSQI-based sleep quality, even when total daily screen time is not strongly associated with sleep outcomes.

5.4.2 Short Sleep Duration (<7 Hours)

The present study finds that short sleep duration was among the most consistent correlates of poor sleep quality. Most children slept for seven hours or more every night, but almost one-third slept less than seven hours. And this group was significantly more likely to be poor sleepers than those who slept long hours.

separated out children into 3 groups; that is, children with no sleep disruptions at all; with transient or mild impairments at the component level and those with globally impaired sleep quality. Notably, whereas a fair proportion of the children had isolated

disturbances at the component level, decreased total sleep duration seemed to separate the group with globally impaired sleep quality from the one with transient or mild impairment. It appears that not enough sleep may be an additive factor that enhances the effect of other sleep complaints and pushes children further into the poor-sleeper category.

These findings align with international recommendations indicating that school-aged children require substantially longer sleep durations to support optimal health and functioning (Paruthi et al., 2016; Chaput et al., 2016). Longitudinal and objective sleep studies further demonstrate that chronic restriction of sleep is associated with behavioural, emotional, and daytime functional difficulties (Ranum et al., 2020; Zou et al., 2021).

Within this context, the observed association between sleep duration below seven hours and poorer PSQI-defined sleep quality reinforces the central role of adequate sleep duration as a key determinant of overall sleep health in this age group.

5.4.3 Integrating Screen Timing and Sleep Duration

All findings collectively signify a clear conclusion.

The timing and patterns of screen-time - along with actual sleep duration - are more critical for sleep quality than the total screen-time count (hours) of the entire day.

As established in Section 4.3, overall daily screen time correlated weakly and non-significantly with PSQI scores. However, the present analyses demonstrate that screen use in bed or before sleep and sleeping for less than seven hours per night are both strongly positively associated with poorer sleep quality. This composite picture is completely consistent with the contemporary media and sleep models, which suggest that the most harmful effects occur when screens encroach on the pre-sleep period and infringe on time needed for sufficient, quality sleep (Cain & Gradisar, 2010; LeBourgeois et al., 2017; Gomes & Goldman, 2024).

These results suggest that from a public-health and clinical perspective, recommendations to families should go beyond generic limits on daily “minutes of screen-time,” and emphasise the following:

- Not using screens in the bedroom or just before sleeping.

- Confirming that children's sleep amount is consistent with age-appropriate recommendations.

In this way, the findings of the study inform existing recommendations by illustrating, in Iraqi cultural context, that pre-sleep screen behaviours and short sleep duration are the most relevant targets for intervention to protect sleep quality in young school-aged children.

5.5 Parental perception of screen impact on sleep.

A significant supplementary finding of this analysis relates to parents' perceptions of the impact of screen use on their child's sleep. Parents were asked to report their perception of how much screen use affects their child's sleep (no effect, slight effect, moderate effect, strong effect), and these responses were subsequently compared with PSQI-based sleep quality categories. The results revealed a clear gradient.

Among parents that noted that screens have little or no effect on their child, the proportion that are poor sleepers is quite low.

The proportion of families that perceive screens to have a moderate impact has been rising.

The majority of parents believe that screens have a substantial impact on their child's sleep, with many going as high as two hours before bed.

The statistical evaluation of these differences shows that they were significant, meaning that the parental perception of the impact of the screen was significantly associated with the PSQI sleep quality.

The viewpoint on measurement holds evidence that concurs with the original-results from the analysis. The PSQI, developed by Buysse (1988) and validated by Carpenter and Andrykowski (1998), is a standardized instrument that assesses various domains of sleep quality over the previous month. The item which captures the parent perception refers to the caregiver's more overarching, experiential judgement on whether screens are harming the child's sleep. The prevalence of poor sleepers was greater with higher perceived impact of screens. This indicates that parents can probably recognise,

broadly at least, when screen related behaviours coincide with sleep problems. In other studies of too much screen time or bedtime device use among children which have used objective or questionnaire defined sleep disturbances, a similar convergence of parental reports and standardised measures has been observed (Quach et al., 2009; Hiltunen et al., 2021; Lan et al., 2020).

It is also essential to realize that a parent's perception is a subjective variable. How strongly parents believe screens affect their child's sleep will depend on many factors.

- More health-aware or anxious parents may be more conscious of potential negative effects and therefore more likely to attribute sleep problems to screens.
- Due to strong warnings about screens by the media and public discourse, parents may overestimate their impact.
- The temperament and behavior of children during daytime hours influence what parents see as a cause of the issues their kids have that produce the screen time and sleep use.

Due to both the PSQI scores and the perceptions of screen impact being reported by the same informant (the parent), there is also the possibility of a common-method bias: Parents who are more concerned about their child's sleep will likely give both sleep quality and screen impact more negative ratings. Although it does not negate the association, it indicates that the association between parental perception and PSQI outcomes is reflective of a combination of true sleep disturbance and parent-driven appraisal.

Despite this, the gradients involved is informative in hindsight. To begin with, it enhances the confidence that the sleep behaviours recorded are genuine sleep problems that are medically relevant, as more distressed and bed-time parents and parents seeing a higher number of daytime consequences are also parents who think screens have a strong effect.

However, in spite of these caveats, the gradient observed is informative. First, it bolsters the interpretation that the study is capturing genuine, clinically relevant sleep problems, because parents who struggle more at bedtime or are seeing a greater number of daytime consequences are also parents who believe screens have a strong effect.

The findings suggest the possibility of utilizing parental beliefs as specific targets for intervention. Parents who have already acknowledged that screens are doing harm to sleep may be more open to changing (for example, removing their device from their

bedroom, not using devices close to sleeping time) and education and counselling can build on this.". "Even if they do not see any effect on their child, parents with poor sleeper children may still appreciate bespoke information on how evening screen time can affect sleep architecture or circadian timing in subtler ways."

Overall, the association between parental perception of screen impact and PSQI-defined sleep quality serves as an additional support angle for the study's findings. It suggests that, within families, the awareness of screen-related sleep disruption is generally consistent with measurable sleep problems, but it also suggests that this perception is subjective and influenced by parental worries, knowledge and experience. This dual nature — informative and potentially biased — should be carefully considered in developing family-based interventions and in interpreting parent-reported data in follow-up studies.

5.6 Strengths of the methodology employed in the study.

The present study has several methodological advantages that improve the validity and interpretability of the findings. The first study has a fairly large sample of 402 children, aged 6-8 years. A sample of this size is sufficient in cross-sectional paediatric sleep research (Chaput et al., 2016; Liu et al., 2020) to yield stable prevalence estimates and meaningful group comparisons.

This study also used Pittsburgh Sleep Quality Index. The PSQI is a very popular and well-validated tool (Buysse, 1988, Carpenter & Andrykowski, 1998) for assessing subjective sleep quality over the previous month. The results are reported in Table 2. According to previous studies that found Cronbach's alpha values to be in the range of 0.70–0.85 (Mollayeva et al., 2016), the PSQI exhibited excellent internal consistency in the present sample (Cronbach's alpha = 0.83), suggesting it is a reliable multi-dimensional measure of sleep quality in the Arabic parent-reported version in this age group.

A further methodological strength was the focus on early school-aged children (6–8 year) whose screens and sleep have been studied much less than adolescents. This is a critical developmental period where sleep habits and school routines get consolidated (Hale & Guan, 2015; LeBourgeois et al., 2017). In the fourth place, it was carried out in an Iraqi/Arabic-speaking context to fill a clear gap in predominantly Western evidence.

The locally relevant evidence can inform local family, school and public health interventions while still being comparable to international findings.

In conclusion, the design deployed several theoretically-grounded predictors: total daily screen time, screen use in bed/before sleep, sleep duration and parent perception of screen impact, rather than a single exposure. By employing a multidimensional approach, the authors demonstrated that screen timing and actual sleep duration are more strongly related to PSQI-defined sleep quality than overall volume of daily screen time. This adds nuance to existing media–sleep models.

5.7 Limitations of the study

There are a number of setbacks associated with this research study. To begin with, their cross-sectional design prohibits any causal inference. The observed associations between screen use, sleep duration, and PSQI-defined sleep quality cannot help establish directionality or rule out residual confounding (Hale & Guan, 2015; Chaput et al., 2016). The second limitation of the study was that all sleep and media use data were collected via parent-reported questionnaires. These are vulnerable to recall bias, as parents may not always remember accurately, and subjective interpretation of both bedtimes and screen exposure (Short et al., 2013; Hiltunen et al., 2021).

The time spent on various devices was estimated through broad entries rather than through logs or detailed records of timing, content and device type. The sleep outcomes related to specific patterns of use might be masked due to such coarse categorisation (Domingues-Montanari, 2017; Saunders et al., 2020). Another limitation of the study was the absence of objective sleep measures, like actigraphy, which can provide more accurate estimates of sleep duration and continuity. This is important as the objective measures often disagree with the subjective reports (Sadeh, 2011; Ranum et al., 2020).

Eventually, the sample was obtained via a convenience approach from specific schools/platforms which may affect its generalisability to all Iraqi children aged 6-8 years and to other sociocultural or socioeconomic contexts (Liu et al., 2020) The limitations of this study notwithstanding, it does offer useful evidence by deploying a valid and reliable global sleep measure (PSQI) in a sizable cohort, finding strong associations between pre-sleep use of screens and short sleep duration as well as poor sleep quality, and adding

data from an under-represented Iraqi/Arabic context to the international literature on children's sleep and the digital media.

5.8 Practical implications and recommendations

This research has many practical implications for families, schools and health-care professionals. From a pharmaceutical and clinical perspective, the present findings carry important implications for pediatric sleep management. Table 14 summarizes the potential biological mechanisms and pharmacological considerations related to bedtime screen exposure. It is imperative to spend on behavior sleep hygiene mechanism before melatonin supplementation in healthy children for best results as observed in findings.

One of the most effective messages that parents and caregivers could convey is to discourage any use of screens when in bed and in the hour before sleep. In our sample, this pattern and not total daily screen time alone was clearly associated with poorer sleep quality as defined by the PSQI. LeBourgeois et al. (2017) and Hale and Guan (2015) corroborate that literature is replete with this problem (American Academy of Pediatrics, 2016).

Parents should maintain consistent bedtimes and wake times throughout the week, including weekends, and ensure that children obtain the recommended amount of sleep for their age (9–12 hours per 24 hours). Reducing evening screen exposure should be considered as part of a broader approach to promoting healthy sleep patterns (Paruthi et al., 2016; Chaput et al., 2016).

The results of this study can be used by schools and education authorities in helping support sleep and screen-hygiene education being integrated into school health and wellbeing programmes. Educational materials directed at pupils and parents should emphasise that the timing and context of screen use (e.g. devices in the bedroom, use right before sleep) may be more harmful to sleep than moderate daytime use, and emphasise practical strategies such as "digital curfews" before bedtime and keeping devices out of children's bedrooms (Domingues-Montanari, 2017; Gomes & Goldman, 2024).

According to the study, health-care providers should routinely screen for bedtime screen use and short sleep duration when assessing children for sleep problems. In standard pediatric consultations, simple questions can be asked regarding the devices in the bedroom and pre-sleep screen habits. Once difficulties have been established, clinicians can provide clear, behaviourally specific recommendations – remove screens

from the bedroom, stop screens at least 30-60 minutes before bedtime and incorporate calming pre-sleep routines, such as reading or quiet play. In light of the current findings, it would be more beneficial for counselling to emphasize the importance of changing evening screen habits and extending sleep duration than to focus solely on daily time limits.

In general, these implications suggest a shift away from "how many hours of screen time," to a more nuanced "when and how are screens used" and are children getting enough sleep, which appears to be more important for protecting sleep quality among early school-age children.

5.9 Further Research

In the realm of sleep among young children, subsequent investigations into screen usage have the potential to address numerous significant research puzzles in methods through use of randomized trials. In order to minimize recall bias, parent-reported questionnaires can be supplemented by objective measures of screen exposure (device-based logs or tracking apps) as well as objective assessments of sleep e.g. actigraphy which provide better timing and pattern of use (Sadeh, 2011).

In order to elucidate the causal relationship(s) between risk factors and disease outcome(s), longitudinal and interventional designs are required. "Investigations that utilize an intervention aimed at reducing screen use prior to sleep, together with follow up measures of sleep quality over time, would gather particularly useful data (Hale & Guan, 2015; Carter et al., 2016).

The use of a convenience sample may limit generalizability; future research should recruit participants from other Arab countries and from other regions of Iraq, for example, rural and underserved areas and from varied socio-economic status (Liu et al. 2020).

The focus of forthcoming investigations should be on examining the nature of screen usage and the context of usage A greater understanding of the ways that sleep affects other areas of life, daytime functioning, mood or school performance for instance might prove useful in deepening knowledge of the developmental implications of screen exposure (Domingues-Montanari, 2017; Dewald et al., 2010).

5.10 Conclusion

Sleep quality and screen-related behaviours were reported through a PSQI-based questionnaire among 402 Iraqi children aged 6–8 years as reported by their parents. The majority of children were considered good sleepers. Global PSQI scores were generally low. This suggests that substantial sleep disturbances are uncommon in children of this age. There was a noted weak, non significant association between total daily screen time and sleep quality defined by the PSQI which means that it is may be possible that total hours on screen a day may not mark poor sleep.

In contrast, sleeping with less than 7 hours of sleep a night and screen use in bed or just before sleep was positively associated with poorer sleep quality. Children whose parents thought that screens have a strong influence on sleep were also likely to be classified as poor sleepers. As per the findings, when screens were first introduced during sleep, and sufficient sleep occurred, sleep quality was not disrupted. Thus, time and context of exposure is more important than overall screen time.

The cross-sectional design, parent-reported data, and convenience sampling may limit the causal inference and generalizability of the study findings, but it provides PSQI-based evidence from an under-researched Iraqi/Arab context and early school-age population. The results presented in this study which deal with evening and in-bed screen use could assist in providing realistic recommendations with a view to maximizing amounts of sufficient nightly sleep. These recommendations may be applied in the family, school and clinical settings. Longitudinal studies with objective designs are needed to better clarify these recommendations and underlying causal pathways.

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Appendix I
مؤشر جودة النوم في بيتسبرغ – (PSQI) النسخة الخاصة بالأطفال

مؤشر جودة النوم في بيتسبرغ (PSQI) هو أداة تقييم معيارية لقياس جودة النوم والاضطرابات المتعلقة به خلال الشهر الماضي.

النسخة التالية مخصصة ليُجيب عليها أحد الوالدين أو ولي أمر الطفل، وتُغطي 7 مكونات من خلال 19 سؤالًا.

نموذج استبيان مؤشر جودة النوم للأطفال(PSQI)

اسم الطفل: _____

العمر: _____

الجنس: _____

التاريخ: _____

تمت الإجابة بواسطة (ولي الأمر): _____

التعليمات: تتعلق الأسئلة التالية بعادات نوم طفلك خلال الشهر الماضي فقط.

يرجى أن تعكس إجاباتك ما هو أدق وصف لمعظم الأيام والليالي خلال هذا الشهر.

---

1. خلال الشهر الماضي، متى كان طفلك يذهب إلى النوم عادةً؟

وقت النوم: _____

2. خلال الشهر الماضي، كم من الوقت (بالدقائق) كان طفلك يحتاج عادةً ليغفو كل ليلة؟

عدد الدقائق حتى النوم: _____

3. خلال الشهر الماضي، متى كان طفلك يستيقظ عادةً في الصباح؟

وقت الاستيقاظ: _____

4. خلال الشهر الماضي، كم عدد ساعات النوم الفعلية التي حصل عليها طفلك ليلاً؟

(قد يختلف هذا الرقم عن عدد الساعات التي قضاها في السرير)

عدد ساعات النوم: _____

---

5. خلال الشهر الماضي، كم مرة واجه طفلك صعوبة في النوم بسبب...

(استخدم خيارات الإجابة التالية:

0 = لم يحدث خلال الشهر الماضي

1 = أقل من مرة في الأسبوع

2 = مرة أو مرتين في الأسبوع

3 = ثلاث مرات أو أكثر في الأسبوع)

سبب صعوبة النوم	0	1	2	3
أ. لا يستطيع النوم خلال 30 دقيقة				
ب. يستيقظ في منتصف الليل أو في الصباح الباكر				
ج. يحتاج إلى استخدام الحمام أثناء الليل				
د. يعاني من صعوبة في التنفس أو يصدر صوتاً				
هـ. يشخر أو يسعل بصوت عالٍ أثناء النوم				
و. يشعر بالبرد الشديد أثناء النوم				
ز. يشعر بالحرارة الشديدة أثناء النوم				
ح. يعاني من كوابيس أو فزع ليلي				
ط. يشتكي من ألم أثناء الليل				
ي. أسباب أخرى - يرجى التوضيح: _____				

---

6. خلال الشهر الماضي، كيف تقيّم جودة نوم طفلك بشكل عام؟

(0 = جيدة جدًا، 1 = جيدة إلى حد ما، 2 = سيئة إلى حد ما، 3 = سيئة جدًا)

الدرجة: _____

7. خلال الشهر الماضي، كم مرة احتاج طفلك إلى دواء (بوصفة أو بدون وصفة) لمساعدته على النوم؟

(استخدم مقياس 0–3 أعلاه)

الدرجة: _____

8. خلال الشهر الماضي، كم مرة واجه طفلك صعوبة في البقاء مستيقظًا أثناء النهار؟

(استخدم مقياس 0–3 أعلاه)

الدرجة: _____

9. خلال الشهر الماضي، ما مدى صعوبة محافظة طفلك على الحماس والتركيز في الأنشطة اليومية؟

(استخدم مقياس 0–3 أعلاه)

الدرجة: _____

التقييم العام لمؤشر PSQI

يتكوّن مقياس PSQI للأطفال من سبعة مكونات رئيسية:

جودة النوم الذاتية

فترة بدء النوم

مدة النوم

كفاءة النوم الاعتيادية

اضطرابات النوم

استخدام الأدوية المنومة

اضطرابات النهار

كل مكون يُقيّم من 0 (لا توجد صعوبة) إلى 3 (صعوبة شديدة).

المجموع الكلي = مجموع الدرجات للمكونات السبعة، ويتراوح من 0 إلى 21.

تشير الدرجة الإجمالية التي تزيد عن 5 إلى جودة نوم ضعيفة.

عادات استخدام الشاشات

كم عدد الساعات التي كان طفلك يقضيها يوميًا في استخدام الشاشات في المتوسط؟

□ أقل من ساعة واحدة

□ من 1 إلى 2 ساعة

□ من 3 إلى 4 ساعات

□ أكثر من 4 ساعات

في أي وقت من اليوم كان طفلك يستخدم الشاشات غالبًا؟ (اختر كل ما ينطبق)

□ الصباح

□ بعد الظهر

□ المساء

□ خلال ساعة قبل النوم

هل يستخدم طفلك الشاشات أثناء وجوده في السرير أو قبل النوم مباشرة؟

□ نعم

□ لا

هل تعتقد أن وقت الشاشة يؤثر على نوم طفلك؟

□ لا يؤثر إطلاقًا

□ يؤثر قليلًا

□ يؤثر إلى حد ما

□ يؤثر كثيرًا