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Abstracts

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Note: Abstracts are listed in alphabetical order by the presenting author's first name.

Presenting Author
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Presentation Day and Board Number
Saturday, April 27, 2024 | P01

Title
Oxygen Desaturation Index validity in predicting the severity of obstructive sleep apnea among children.

Introduction
Obstructive sleep apnea (OSA) is the most prevalent form of sleep-disordered breathing in pediatric populations, with an estimated prevalence ranging from 1% to 5%. The American Thoracic Society and the American Academy of Pediatrics recommend the overnight polysomnography (PSG) as the gold standard for diagnosing OSA and determining its severity. OSA is defined based on the apnea-hypopnea index (AHI), which defined as the count of apnea and hypopnea events per hour during total sleep time (TST). PSG is relatively inaccessible in some centers which can delay or impede the diagnosis and treatment of patients with OSA. In the American Academy of Pediatrics practice guideline, alternative diagnostic tests, including nocturnal oximetry may be ordered if PSG is not available. The parameter used to quantify the average number of desaturation episodes per hour is referred to as the oxygen desaturation index (ODI), which can be quantified using polysomnography (PSG). Desaturation episodes is an oxygen saturation decrease of ≥3% (over the last 120 seconds), sustained for at least 10 seconds . Oxygen desaturation index (ODI) is a potentially valuable indicator of both the presence and severity of pediatric OSA. Our study aims to explore the correlation between AHI and ODI in assessing the diagnosis and severity of pediatric OSA, evaluating the feasibility of ODI as an alternative parameter for OSA screening.

Materials and Methods
This study is a retrospective review of demographic, clinical, and PSG data for all patients who underwent diagnostic PSG studies in our hospital from Jan, 2018 till Jan,2024. the Relevant PSG parameters, including total recording time, total sleep time (TST), AHI, OAHI, CAHI,

average O2, O2 nadir and ODI, was analyzed. OSA diagnosis was confirmed when AHI exceeded 1.5 events per hour, with severity categorized as mild (AHI 1.5-4.99 events/hour), moderate (AHI 5-9.99 events/hour), or severe (AHI ≥10 events/hour). ODI, representing the mean hourly desaturation value, defined by a reduction of at least 3% in mean oxygen saturation during sleep. the correlation between AHI and ODI in assessing the severity of OSA.

We investigated the correlation between ODI and AHI and the correlation between the ODI and nocturnal average and lowest O2 saturation during PSG study. We examined the effect of the patient's clinical and demographic factors that would affect the correlation between the ODI and OSA.

Results

Clinical and PSG data for a total of 833 patients were reviewed. The mean age ± std was 8.18 ± 5.21 years. BMI mean ± std was 25.27 ± 12.75. 58.5% of the patients was male. 527 (63%) patients had OSA. 45% had mild OSA, 25% had moderate OSA and 29% had severe OSA. The Linear Regression Analysis provides a better understanding of the variables influencing ODI. Among the variables, REM AHI, Average O2, and Nadir O2 are statistically significant ($p < 0.05$). This indicates that these variables have a significant impact on ODI as :REM AHI: For each unit increase in REM AHI, the ODI increases by 0.19 units (95% CI: 0.07 - 0.30), Average O2: For each unit increase in Average O2, the ODI decreases by 1.25 units (95% CI: -1.95 - -0.55), Nadir O2: For each unit increase in Nadir O2, the ODI decreases by 0.21 units (95% CI: -0.40 - -0.02). The scatter plot shows how ODI and AHI are related to each other. A positive association between ODI and AHI revealed by the interpretation, suggesting that higher ODI values are correlated with higher AHI values. This link is quantified by the regression equation, $y = 3.54 + 1.02x$, which indicates that an increase in AHI of one unit is often correlated with an increase in ODI of 1.02-units. The strong R^2 value of 0.751 support the predictive capability of AHI in estimating ODI values in this sample, since it shows that AHI be effective in explaining 75.1% of the variability in ODI.

Conclusions

ODI is a promising alternative tool for OSA screening in pediatric population. ODI correlates with REM AHI and moderate to severe OSA.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P02

Title
Performance of automated oximetry scoring algorithms in comparison to clinician McGill scoring for the detection of polysomnography-diagnosed paediatric OSA

Introduction
McGill scoring is a method of oximetry analysis for detection of obstructive sleep disordered breathing in children, originally described more than twenty years ago. McGill scoring is performed manually by healthcare staff, but in recent years, automated methods for oximetry analysis to detect paediatric OSA have been developed. To date there has been no direct comparison of the accuracy of human-performed McGill scoring with computerised oximetry analysis algorithms. We therefore aimed to develop multiple oximetry analysis algorithms and evaluate their performance for detection of paediatric OSA using oximetry traces extracted from PSG, with comparison to performance of sleep physicians performing McGill scoring on the same oximetry traces.

Materials and Methods
We extracted oximetry data (oxygen saturation and heart rate, down-sampled to 1Hz) from 300 PSGs performed in 2018 in a single Australian paediatric centre to evaluate for suspected OSA. Deidentified demographic and clinical information was extracted from the electronic medical record. Two paediatric sleep physicians (DK, AK) who routinely perform McGill scoring for clinical purposes separately scored all oximetries, blinded to PSG outcome and clinical information. Oximetry data from these traces were then evaluated by six different computer algorithms that attempted to predict the McGill score in an automated fashion from oxygen saturation data. Five of these algorithms were heuristic/rules-based and one was neural network based in nature. We compared the sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of sleep physician McGill scoring (using a binary outcome of McGill 1 being negative or ≥2 being positive) to that of the computer algorithms for detection of paediatric OSA, defined as oAHI ≥1/hr.

Results

Of 300 patients with a median age 7.4 (IQR 4.1 – 11.5) years, 77 (26%) had a significant neuromuscular, neurologic or genetic disorder diagnosed (including 23 with Trisomy 21 and six with Prader Willi Syndrome), 45 (15%) had undergone previous adenoidectomy+/-tonsillectomy and 43 (14%) were obese at the time of PSG. 129 (43%) were found to have oAHI ≥1. For the two clinicians (DK, AK), a McGill score ≥2 had a specificity of 0.94 & 0.93 respectively, sensitivity of 0.28 & 0.39, PPV of 0.82 & 0.78 and NPV of 0.63 & 0.66 for the paediatric OSA diagnosis defined as oAHI ≥1. The performance of automated scoring approaches varied depending on the particular algorithm used, with the best performing algorithm utilised a rules-based approach. This had a higher sensitivity (0.54) and NPV (0.69) but lower specificity (0.78) and PPV (0.65) for paediatric OSA detection compared to clinicians.

Conclusions

In a real-world cohort of a diverse group of children undergoing PSG for concerns regarding possible obstructive sleep disordered breathing, McGill scoring by expert clinicians had a high specificity but poor sensitivity for detection of paediatric OSA. Our best performing rules-based algorithm missed less cases of OSA in comparison to clinicians utilising McGill scoring, with greater false-positive misclassification being the trade-off.

Presenting Author
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Presentation Day and Board Number
Saturday, April 27, 2024 | P03

Title
Development of a Pediatric Sleep Routine Questionnaire for Black Families: A human-centered design approach

Introduction
Bedtime routines are the hallmark for sleep guidance in young children. Yet, Black children have an 80% increased likelihood of not having a bedtime routine, compared to white children. To promote healthy bedtime routines, a comprehensive assessment tool that capture children's bedtime routine behaviors and relevant bedtime environment and context is needed to guide the targeting areas for intervention. However, existing sleep routine questionnaires do not capture sleep contexts that are relevant to Black families. Thus, the objective of our study was to develop a comprehensive sleep routine questionnaire that captures child's bedtime routine behaviors, and household adult-child interaction and bedtime environment that support health bedtime behaviors. As the first step of the measurement development, we focused on study cultural relevance, salience and appropriateness of the three bedtime measures: 1. the Parent-Child Sleep Interaction Scale, 2. Bedtime Routines Questionnaire, and 3. Child Routines Inventory scales, prior to formal administration.

Materials and Methods
A human-centered design process, Ecological Theory (considering individual, home, black community contexts), and qualitative formative research methods were applied to guide sleep routine questionnaire adaptation. A convenience sample of five Black caregivers with preschool-aged children were interviewed and provided feedback for the bedtime routine surveys. Interview questions were guided by human-centered design, centering the lived experience of the caregivers, as well as multiple-domains of sleep contexts and behaviors to understand child sleep routine practices, household structure, child sleep environment, social-family connection, social support and child sleep decision-making.

Results
Thematic areas of caregiver feedback fell into the following three areas: 1. deficit-based and focused on punitive discipline, 2. Do not capture child weekend sleepovers at Grandparent's house, 3. Two-home households were not reflected, 4. Racial options for mixed children were not reflected and 5. age-appropriate activities were not reflected in the measures.

Conclusions

Current pediatric bedtime routine sleep measures are not culturally tailored for Black families of preschool aged children. Future steps include holding caregiver focus groups to glean relevant survey items/domains for the development of a new comprehensive culturally tailored measure for Black preschool-aged children that can be used to guide the intervention and intervention theory of testing.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P01

Title
Parent Engagement with Digital Sleep Health Interventions for Young Children: A Global Scoping Review

Introduction
It is widely recognized that young children may experience sleep problems early in life that affect child development outcomes. Digital technology offers an accessible platform to reach and engage families of young children with sleep health solutions early in life. Our global scoping review aimed to investigate the use of digital technology as a resource to facilitate parental interventions aimed at enhancing sleep health among children in early childhood (3 –8 years old).

Materials and Methods
We performed a scoping review of peer-reviewed articles published from inception to 2023 for the following databases: PubMed, Embase, Web of Science including FSTA and Scielo, MEDLINE, Cochrane Library, Engineering Village, CINAHL, APA PsycInfo, Global Health and citation searching. In conjunction with the authors, two librarians conducted an extensive literature search, and the strategies can be found at [osf.io/74hba]. Our methodological approach encompassed a systematic review of key terms related to sleep, communication, parental involvement, and internet-based intervention. Inclusion criteria included intervention studies with parents of children 3-8 years old via digital communications (e.g. social media, telehealth, websites, mobile apps, wearable devices) to address sleep health in their child. Exclusion criteria included platforms unrelated to sleep, studies that digitally recruited participants but did not use a digital platform, studies with children outside the target age, or protocol studies. Review Registration: https://doi.org/10.17605/OSF.IO/TNFY2

Results
Five articles met the final inclusion criteria. A final sample size of 277 parent-child dyads across Australia and the United States were enrolled. Mean child age was 5 years old and mean parent age was 37. Mobile apps, internet-based websites and Facebook groups were the most common mobile health digital intervention modalities. Sleep health behavior outcomes in children addressed by digital mobile health solutions included bedtime resistance, night wakings, sleep onset, sleep duration, and independent sleep, in child's own bed. Sleep health outcomes also included positive improvements in parent sleep health education.

Conclusions

Parent engagement with child sleep health interventions yielded favorable outcomes, enhancing the overall sleep health of children. More research is needed to understand tailored interventions for sustained sleep health improvements in child sleep.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P04

Title
Sleep for Health in Hospital: addressing excessive light exposure during nursing care

Introduction
Sleep for Health in Hospital (SHH) is a multi-component intervention to improve the sleep of children in hospitals. It includes key aspects identified within the Pediatric Inpatient Sleep Model conceptual model (Fidler et al 2022) proposed for quality improvement projects, specifically: family and staff education, methods to improve sleep environment (with a particular focus on noise) and safe care at night that minimises sleep disruption. Routine nursing care at night (drug administration and nursing observations) are a key disrupter of sleep due to noise, discomfort and light exposure. Here we report the outcomes of an intervention to minimize light exposure during routine nursing care.

Materials and Methods
Design: intervention study with baseline and follow up measures

Setting: Random sample of nursing staff working night shifts in medical, surgical, specialty (cardiac and oncology) wards and PICU in a tertiary children's hospital in the South of England

Intervention: Introduction of neck worn torches with adjustable settings (orange/white light and adjustable lux) allowing flexible, hands-free use. An education component supported the introduction of the watches specifically about the effect of the blue and white light spectrum on melatonin secretion and in turn sleep initiation and maintenance.
Measures: Semi-structured questionnaires at baseline and post-intervention assessed nursing experience of nighttime care and perceived impact children's sleep.

Results
45 staff completed baseline questionnaires. At baseline 98% used white light torches (one used a dual white/pink device), 44% of nurses provided their own equipment. 49 staff completed post intervention questionnaires. 35 (73%) reported using the new torch orange

light setting. There was a significant increase in the number of staff who reported that it was rare for children to wake during non-contact night-time observations (43% v 24% at baseline). 96% of respondents positively appraised the new torches citing reduced likelihood of waking children, ease of use and improved child sleep. Example statements:
'Massive positive impact. Now children rarely wake up'.
'Love them! Hands free and low-level lighting'.
'Better sleep for patients and parents'

Conclusions

The introduction of flexible neck-worn torches with adjustable orange light options resulted in high levels of staff satisfaction and were perceived as less likely to disturb children's sleep during routine night-time care.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P05

Title
The Patient and Public Involvement (PPI) voice: Reporting on parent/carer experiences of using two sleep diaries for children with ADHD.

Introduction
The DISCA study will develop and trial a digital sleep guide for parents/carers of children with ADHD. The primary outcome for the randomised controlled trial is sleep onset latency, which will be measured using a self-report sleep diary. The aim of this PPI work was to gather parent/carer views on two potential sleep diaries for use in the trial: 1) a prospective diary filled in every morning for a week (Consensus Sleep Diary adapted for use with ADHD children); and 2) a diary filled in retrospectively once at the end of the week (The Split Week Self-Assessment of Sleep Survey (SASS-Y)), which reported a child's typical sleep patterns across the last school week and weekend.

Materials and Methods
Four parents/carers, who were members of the DISCA parent/carer advisory group, were sent and completed the two sleep diaries. Interviews were conducted over Microsoft Teams with parents/carers who had tested the two sleep diaries to explore their experiences of using each diary, suggestions for improvements and any preferences they had.

Results
The interview findings highlighted that both diaries were acceptable to parents/carers, and neither was experienced as being overly onerous or time-consuming to complete. Parents/carers preferred the consensus diary over the SASS-Y, reporting that they found this easier to complete and felt it to be the most accurate. With the consensus diary, participants found it helpful to reflect on their child's sleep patterns over seven days. However, there were several items of this diary participants found difficult to complete, including reporting on their child's night-time waking.

Conclusions

Based on the PPI feedback combined with feedback from clinical experts and the literature, we plan to use a shortened version of the adapted Consensus diary omitting some questions reported as difficult by PPI, as our primary outcome measure, and the SASS-Y as a secondary outcome measure in the DISCA study.

Acknowledgements

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Presentation Day and Board Number
Saturday, April 27, 2024 | P06

Title
Sleep-wake rhythms and impulsivity in adolescents

Introduction
High impulsivity influences decision-making, emotional control and risk-taking in adolescents. Previous studies suggest that impulsivity may be linked to sleep deprivation. However, these relationships remain complex. Our study aims to characterize the links between sleep patterns, school days and non-school days, and different facets of impulsivity in adolescents.

Materials and Methods
The sleep habits of 113 adolescents (13.3 years) were assessed by questionnaire. Their trait impulsivity (UPPS) and cognitive impulsivity (computerized cognitive tasks: BART and STROOP) were also assessed. Relationships between sleep and impulsivity were explored via correlations.

Results
On school days, late bedtimes and late bedtimes were correlated with higher impulsivity scores. Late bedtimes were also correlated with high cognitive impulsivity (STROOP). On days without school, late sleep times and late bedtimes correlated with high trait and cognitive impulsivity scores (BART). Late wake-up and late bedtimes also correlated with high cognitive impulsivity (STROOP).

Conclusions
These results highlight the strong links between poor sleep habits and high impulsivity in adolescents. These results underline the need to find effective tools to improve sleep quality in adolescents in order to prevent the deleterious effects of impulsivity.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P07

Title
The "bedtime checking" sleep intervention in infants with insomnia: Preliminary results

Introduction
Early-childhood insomnia is very prevalent and is associated with negative child and family outcomes (Sadeh et al., 2010). Behavioral sleep interventions, based on limiting parent-child nocturnal interactions, are effective in significantly improving infant sleep (Kahn et al., 2022). Yet, these interventions frequently involve significant parent and infant distress that deter many parents (Thomas et al., 2014). Research on sleep interventions that involve a lower "dose" of parent-infant separation, and thus may be more acceptable to many parents, has so far been sparse. Thus, the main aim of our ongoing research is to study the sleep outcomes of an intervention that encourages parents to gradually reduce their involvement in settling the infant to sleep only at bedtime ("bedtime checking"), compared to an intervention that also asks parent to limit their involvement when the infant wakes up during the night ("standard checking").

Materials and Methods
The study was approved by the Helsinki Ethics Committee of Soroka Medical Center. Inclusion criteria include: (a) Early-childhood insomnia according to DSM-5 (e.g., significant settling and night-waking problems lasting at least 3 months); (b) Age range 9-18 months; (c) The parents wish to sleep independently from the child. Parents sign informed consent before baseline assessment. After baseline assessment, infants are randomly assigned to a bedtime checking intervention or to a standard checking intervention. Parents complete daily diaries and the Brief Infant Sleep Questionnaire (BISQ; Sadeh, 2004) at baseline and at two weeks post-intervention. The questionnaires assess infant's habitual sleep patterns and parental sleep-related behaviors.

Results
We compared the results of 26 families (infants' mean age = 11.8 months, SD = 2.17; 13 boys) who, so far, completed the intervention and follow-up assessments in the two groups (15 families in the bedtime group). A mixed between-within subjects' analysis of variance was conducted to assess the impact of the two sleep interventions on infants' sleep, across two

time points (baseline and 2-weeks post intervention). No differences were found between the groups at baseline (all p <.16). The results show that both interventions lead to a significant improvement in reported infant sleep for the following measures: (1) Sleep onset latency: Diaries (F (1, 24(= 7.73, p <.010), BISQ (F (1, 25(= 3.90, p <.006); (2) Parental difficulty of putting the infant to sleep: Diaries (F (1, 24(= 11.81, p =.002), BISQ:(F (1, 24(= 8.85, p <.007); (3) Parental perception of infant sleep problems: Diaries (F (1, 23(= 27.23, p <.001); (4) Duration of nighttime wakefulness: Diaries (F (1, 23(= 36.61, p <.001), BISQ (F (1, 25(= 16.02, p <.001); and (5) Number of night-time wakings: Diaries (F (1, 23(= 37.43, p <.001), BISQ (F (1, 25(= 26.75, p <.001). There were no significant interactions between intervention type and time for any outcome.

Conclusions

This is the first study that conducts a randomized controlled treatment study of the bedtime checking method. The preliminary results indicate that the bedtime intervention may be a promising intervention for families who prefer to implement a more gradual sleep intervention.

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We wish to thank all participating families.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P08

Title
Multi-method analysis of parental sleep on a Paediatric inpatient ward.

Introduction
Sleep restriction has a well-documented range of emotional and physiological consequences. Parents and carers of children resident on hospital wards are expected to both look after their child and contribute towards key decisions about their care whilst in unsettling and stressful environments. Poor quality sleep while in hospital can impact mood, stress levels, decision-making and critical thinking, among many other factors. Therefore, alongside the sleep of patients, we also have a responsibility to prioritise parental sleep and minimise their sleep restriction where possible.

Materials and Methods
Data was collected from parents and carers in cubicles on a paediatric hospital ward. Each night's sleep was measured using three different methods: actigraphy, SoundEars devices, and sleep diaries. Parents and carers wore actigraphy watches to track their sleep onset, duration of sleep and wakening times; the results were analysed on MotionWare. SoundEars recorded the level of noise within the patient cubicle for each night. Sleep diaries were used to document parents and carers' perceived hours of sleep and any positive or negative comments about each night. Their responses were reviewed and key themes extracted.

Results
Eleven parents and carers took part in our study with a total of 28 nights reviewed. Actigraphy data was obtained from 20 nights, with a mean sleep duration of 5.22 hours per night. By comparison, the parent and carers' perceived duration of sleep was on average 4.74 hours. For six of the nights the parent or carer had less than four hours sleep. The mean sleep duration within cubicles deemed close to the nurses' desk was 4.7 hours, with a mean of 5.9 hours seen in cubicles further away. The average noise levels in the cubicles were 61.4 dB. Qualitative data was provided from comments in patient diaries for 25 nights. Key factors for

sleep disruption included room temperature, light, patient alarms and being woken for observations.

Conclusions

This study is part of a wider project at Great North Children's Hospital aimed at measuring and improving sleep: 'Sleep for Health in Hospital.' The effects of persistent sleep restriction are well-documented and are known to have significant effects on cognition and mood. Here we have shown that parents have poor quality sleep while in hospital, demonstrated through both their perceived and actual duration of sleep. The WHO recommendation for noise within hospitals is below 40 dB at night, and focusing on achieving this may prevent unnecessary sleep interruption. The sleep diaries have identified further modifiable barriers to parental sleep which should be explored. Hospital staff need to be aware of the consequences of persistently poor sleep and aim to actively promote sleep for children and caregivers wherever possible.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P09

Title
The effect of supraglottoplasty on OSA severity in children with sleep-dependent laryngomalacia

Introduction
Sleep-dependent laryngomalacia (LM) is defined as a clinical entity causing obstructive sleep apnea (OSA) in children, beyond the neonatal period or the first year of life (Richter et al. 2008). This condition is increasingly reported as a cause of persistent OSA after adenotonsillectomy. The diagnosis is typically established by drug-induced sleep endoscopy. Supraglottoplasty is the first line treatment for sleep-dependent LM.
The aim of this study is to investigate the outcome of supraglottoplasty on OSA severity documented by full night polysomnography (PSG) in children with sleep-dependent laryngomalacia

Materials and Methods
Retrospective analysis of patient data from all patients between 1-18 years of age undergoing supraglottoplasty for sleep-dependent LM. A diagnosis of OSA was confirmed by PSG and the sleep study was repeated three months after surgery. Laryngomalacia was diagnosed by drug-induced sleep endoscopy and surgery performed by cold steel instruments.

Results
Pre-and postoperative data are available for 14 patients. 64.3% are male with a mean age of 6.0 (± 4.6) years. These patients had severe OSA with an obstructive apnea/hypopnea index (oAHI) of 19.03 ± 16.13/h. None of them was obese, 64.3% had trisomy 21 as comorbid condition. Three children had primary laryngomalacia and in 11 cases, laryngomalacia was the cause of persistent OSA after (adeno) tonsillectomy. The mean time between surgery and post-op PSG was 3.0 ± 1.4 months. Supraglottoplasty resulted in a significant improvement of OSA severity with a reduction in oAHI from 19.03 ± 16.13/h to 8.70 ± 9.13/h (p= 0.029). There was no significant change in mean or minimum oxygen saturation, oxygen desaturation index or sleep parameters.

Despite the significant improvement in oAHI, persistent moderate to severe OSA was documented in 64% of the patients. Two patients were successfully treated (oAHI between 2-5/h) and three were cured (oHAI<2/h).

Conclusions

Supraglottoplasty resulted in a significant improvement of OSA severity in children with sleep-dependent LM, but persistent OSA is documented in more than half of the cases. More patients are needed to investigate outcome of supraglottoplasty for sleep-dependen laryngomalacia as a function of age, body mass index or comorbidity such as trisomy 21.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P10

Title
Sleep help seeking behavior of parents with children suffering from insomnia – what counts?

Introduction
Insomnia in children is common and causes many mental health problems. Nevertheless, only little is known about influencing factors on sleep help-seeking behavior of parents with children with insomnia.
The aim of this study was to evaluate duration and severity of insomnia in children and the influence of additional mental disorders on insomnia duration and severity. The influence of child insomnia duration and severity on parental sleep help-seeking behavior was examined.

Materials and Methods
Patients at three German sleep outpatient clinics were evaluated. A self-developed parental sleep interview according to ICSD-3 criteria was conducted for every child. Additionally, information about insomnia severity and duration, the number of sleep help-seeking efforts and mental disorders were retrieved from the family registration form.

Results
175 children (4-11 years) with a mean insomnia duration of 54 month were included. Insomnia severity was high, with no differences between children with and without comorbid mental disorders. Most parents (88.6%) made efforts to seek sleep related help for their child´s insomnia, before contacting our sleep ambulances. Insomnia severity ratings were significantly correlated with the amount of seeking professional help, but not with the amount of self-help efforts. Insomnia duration was not correlated with any of the help-seeking measures.

Conclusions
Insomnia severity, but not insomnia duration is associated with help-seeking behavior in parents. In our sample there were no differences between children with and without comorbid mental disorders, neither in insomnia duration nor in insomnia severity. It seems necessary to promote awareness for the consequences of insomnia in children and therefore support a faster parental help-seeking behavior.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P02

Title
Pilotstudy for modification of children's sleep-related fears by reading picture books

Introduction
Sleep problems in childhood are frequent. Approximately two thirds of all children and adolescents experience distressing sleep-related anxieties as they grow up. This taken by itself, is indeed not a diagnosis, but it has far-reaching consequences, as the prevalence of secondary disorders such as anxiety or insomnia disorders increases.
Single case studies have shown that even short bibliotherapeutic intervention programmes of just a few weeks can change about changes in anxiety and problematic bedtime behaviour. Picture books are an early, low-risk and cost-effective interventions of coping with sleep-related anxiety, especially for younger children, in whom sleep-related anxiety is particularly common. The aim of the study was therefore to examine the effectiveness of a therapeutically guided and supervised bibliotherapy with regard to sleep-related anxiety.

Materials and Methods
19 children aged 4.5-7 years and their parents were asked about their fears and bedtime behaviour in a pre-post design with baseline and follow-up before and after reading selected picture books. Each family received an identical set of four picture books and standardized reading instructions on reading behavior. Sleep logs, parental and child assessment instruments and interviews were used for the data collection. A two-week baseline was followed by a two-week test phase and a follow-up survey four weeks later.

Results
The results show a significant improvement of sleep-related anxieties and in some problematic bedtime behaviour in a pre-post comparison. The number of fears expressed, resistance to going to bed and the frequency of waking up at night were reduced significantly. The changes remained stable four weeks after the test phase.

Conclusions

The pilotstudy at hand showed positive effects of picture books on sleep-related anxieties and problematic bedtime behavior. The effects were reported from the parents and also from the children. However, larger studies with control group design are necessary.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P11

Title
Presentation of the International Delphi Consensus on Sleep Problems in Pediatric Palliative Care. Let the Curtain Rise!

Introduction
In pediatric palliative care (PPC), sleep problems are among the most troublesome symptoms that lack extensive evidence. In addition to being highly common and heterogeneous, they contribute to disease morbidity and cause additional distress to children and adolescents with life-threatening and life-limiting conditions and their families.

Despite their significant impact, problematic sleeping is poorly pursued in this population, and no clinical guidelines or good practices are available for its management. The application of general recommendations from pediatric sleep medicine appears insufficient to address the unique challenges of the PPC dimension in terms of disease variability, duration, comorbidities, complexity of needs, and particular features of sleep problems related to hospice care.

Given the urgency of this matter, we started an international project to obtain a multidisciplinary consensus.

Materials and Methods
A two-round Delphi approach was used to develop recommendations for managing sleep problems in PPC. A group of international experts in PPC and/or sleep medicine from different disciplines was selected to identify the main discussion areas and elaborate a questionnaire focusing on the current literature and their clinical expertise.

A multidisciplinary panel of experts was then requested to comment on the statements in the questionnaire, expressing their level of agreement through a Likert scale (1–5; 1=total

disagreement; 5=total agreement) and making suggestions to improve the formulation of the statements. Consensus was established when ≥75% of participants expressed a vote ≥ 4. Within this project, the Delphi method was developed using SurveyMonkey software and conducted through online voting.

Results
Statements addressed the areas of Definition, Assessment/Monitoring, and Treatment of sleep problems in PPC.

First round: Consensus on the agreement was reached for 35 of 52 items (67%): 9 of 13 (69%) in Definition, 10 of 15 (67%) in Assessment/Monitoring, and 16 of 24 (67%) in Treatment.

Second round: This comprised 26 items, including statements not approved in the first round and reformulated according to the panelists' suggestions. Consensus on the agreement was reached for 19 of them (73%): 2 of 6 (33%) in Definition, 6 of 9 (67%) in Assessment/Monitoring, and all 11 (100%) in Treatment.

At the end of the two Delphi rounds, we obtained 54 statements based on expert opinion to guide the diagnosis, assessment, monitoring, and treatment of sleep problems specifically in the PPC population.

Conclusions
Sleep problems are underdiagnosed and undertreated in children and adolescents with palliative care needs, where they may lead to various negative consequences, including impaired functioning and exacerbation of other critical symptoms resulting in decreased global quality of life.

This study answered the need to personalize the approach of sleep medicine to the PPC setting and its peculiarities, providing the first international consensus on the management of sleep problems in PPC.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P12

Title
The gamification of sleep education

Introduction
Working in paediatric healthcare can be a stressful environment where team working is essential. The sleep physiology team at Great Ormond Street Hospital for Children (GOSH) consists of 18 physiologists and is one of the biggest paediatric sleep services in the UK conducting over 2000 sleep studies per year. To improve team working and boost morale the clinical simulation team use gamification in an adaptable 30-minute escape room scenario in the Clinical Simulation Centre. Gamification works on the principle that learners will learn most effectively when they find the learning activity fun to complete has previously been validated as a teaching method in medical education literature.

Materials and Methods
Working in collaboration with the Practice Educator for Healthcare Science who also is an experienced Sleep Physiologist the Clinical Simulation Team created a Sleep Physiologist specific escape room. Scenarios were based on duties carried out by Physiologists such as identifying events in sleep epochs, troubleshooting a sleep study on a high-fidelity manikin as well as non-clinical tasks such as jigsaws. Teams were given an orientation and then entered the locked Simulation room. They had 30 minutes to solve all the puzzles which would reveal a pass phrase to open the door. Nine Sleep Physiologists with a variety of experience levels took part and were split into two teams. After the time was up groups were debriefed led by the simulation fellow and practice educator to reflect and affirm learning.

Results
Out of the two groups one completed in a record time of 22 minutes whilst the other failed the escape. All nine physiologists felt that this was an innovative method of team working. 55.5% of the group had previously participated in escape rooms but never in work before. All rated the session highly with 88.9% giving 5/5* reviews and 100% reported that they found it to be an innovative education initiative. Strong themes were the similarities of the escape room to a clinical environment, and improved teamwork. Respondents highlighted that the

experience demonstrated the different perspectives of different team members and encouraged better communication.

Conclusions

The use of escape rooms was demonstrated to be an engaging and innovative way to boost team morale whilst also providing an education component. Some of the feedback identified different learning needs which were fed back to the department lead. Simulation is an adaptive educational tool and can offer an immersive experience for other educational needs.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P13

Title
Validation of a wireless, self-applied device for sleep recording in the pediatric population

Introduction
Polysomnography represents the gold standard for sleep architecture evaluation, which normally consists of a simultaneous recording of electroencephalographic (EEG), electrooculographic (EOG), electromyographic (EMG) and respiratory activities. Being a costly and time-consuming procedure, not well tolerated especially in specific paediatric populations, there is a considerable interest in valid sleep EEG devices that require fewer resources than ambulatory PSG. The Sleep Profiler is a self-application EEG device developed to be used at the home sleep environment, without the technician assistance: it consists of 3 frontal channels (1 EEG and 2 EOG), 1 chin-EMG channel, a pulse rate sensor, and an accelerometer. The goal of this study is to validate the use of this device on a paediatric cohort of patients, aged between 11 and 15 years.

Materials and Methods
15 subject were recruited from the psychiatric unit of the IRCCS G. Gaslini Institute of Genoa, and previously screened in order to assess the psychological compliance to the study and the absence of severe sleep disruption. EEG recordings were gathered from both the Sleep Profiler and the full Polysomnography (PSG) on the same night, then synchronized epoch by epoch, and scored by an experienced Sleep Technologist, blinded to record identification. The agreement between the manually scored PSG and the manually scored Sleep Profiler record was evaluated for each sleep stage and for aggregated sleep continuity parameters (e.g., sleep onset latency (SOL); wake after sleep onset (WASO); total sleep time (TST); sleep efficiency (SE)), with the PSG serving as the reference.

Results
This study showed a total percentage concordance of 82.96% (k=0.798). Specific concordance for each sleep stage varied significantly, with values of 83.15% (k=0.815) for wakefulness, 54.21% (k=0.501) for N1, 82.02% (k=0.698) for N2, 84.00% (k=0.810) for N3, 89.76% (k=0.823) for REM sleep. The Sleep Profiler demonstrated sensitivity and specificity values when comparing with the gold standard PSG as follows: wakefullness 83.15% and

98.50%, N1 54.31% and 97.92%, N2 82.02% and 87.78%, N3 84.00% and 95.61%, REM sleep 89.76% and 95.95%.

Conclusions

The Sleep Profiler could substantively assist in the determination of diagnosis and treatment plan for a variety of sleep disorders, especially for less compliant children, reducing the discomfort caused by a standard full PSG recording. In future studies we expect to extend this device validation to a younger population, particularly on newborns and infants.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P14

Title
Applying AI techniques for the culturally and family-tailored intervention app "Nenne Navi" for improving sleep habits of young Japanese children: A Preliminary Usability Evaluation

Introduction
Recent cohort studies have highlighted the importance of sleep in the early years of life. Although Japanese children are known to have shorter sleep times, their sleep habits are strongly influenced by family lifestyles. Considering these issues, the authors' group developed "Nenne Navi," an interactive app to support the sleep habits of young Japanese children, aiming for a tailor-made intervention that fits the Japanese culture and each family's lifestyle, and confirmed its effectiveness (Yoshizaki et al., 2020; 2023).

Materials and Methods
To expand the user base, we applied AI technology to the interactive intervention system of the app and developed "Nenne Navi AI." In both "Nenne Navi" and "Nenne Navi AI," sleep health education is primarily delivered through animation; caregivers are asked to input the sleep habits of their children for 8 days of each month. Nenne Navi uses an intervention strategy in which pediatric sleep experts analyzed information and sent five individual suggestions to each caregiver (from which the caregiver chooses one). The aim of developing Nenne Navi AI was to automate this individualized intervention system. We collected weekly sleep habit data from 4,912 toddlers (18–30 months) online and organized them as training data for machine learning from 937 cases after cleaning the data. We employed a combination of machine learning and rule-based methods to analyze a large number of factors and to select the appropriate advice from limited training data. The algorithms were refined based on expert feedback for five rounds. An algorithm for individualized text messaging via the app was developed and refined by experts. A pilot trial of Nenne Navi AI is ongoing in Hirosaki City, Japan, from September 2022. App usability and effectiveness were preliminarily analyzed using questionnaires and interviews after 6 months of app use.

Results

We recruited caregivers of young children (1.5–3 years) with the following sleep problems: 1) falling asleep after 10 pm, 2) getting <9 h of nighttime sleep, 3) frequent nighttime awakenings, 4) irregular sleep–wake rhythms, or 5) none of the above. The caregivers wished to receive guidance for their children's sleep. By December 2023, 25 caregivers had participated, with no dropouts. The post-survey showed that 82% of caregivers reported improved sleep habits in their children, slightly lower than the 91% in the previous human-guided Nenne Navi. Participants in the Nenne Navi AI reported that the natural human-like encouraging messages and individualized advice from the app motivated them to continue using the app to change the behavior of their children.

Conclusions

In our preliminary evaluation, based on adherence to the intervention over 6 months of use and the caregivers' subjective evaluation, the usability of the AI-guided interactive intervention system appears to be sufficient. Additional cases are required to investigate the effects of the intervention, such as improvements in sleep parameters.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P15

Title
Utility of Polysomnograhy in Children with Ambulatory Non-invasive Ventilation

Introduction
Non-invasive ventilation (NIV) is currently a cornerstone of management in children with various chronic illnesses. A notable challenge in implementing NIV, particularly in children, persists in tailoring the treatment to match an individual's growth and disease progression. Polysomnography (PSG) is a recommended tool to evaluate treatment adequacy; however, its availability is limited for the pediatric population. Thus, the aim of our study was to gain insight on the utility of polysomnography in managing NIV in children.

Materials and Methods
We retrospectively reviewed noninvasive ventilation titration polysomnography in pediatric patients at Cincinnati Children's Hospital Medical Center (CCHMC) from January 2023 – January 2024. Patients on non-invasive support with bilevel positive pressure support or pressure control ventilation were included in the study. All patients underwent full PSG with simultaneous recordings of sleep and respiratory parameters. PSGs with a total sleep time of less than 240 minutes were excluded.

Results
76 patients were included in the study. There were 48 male patients (63.1%), and the median age was 15 year-old (IQR 10,19). 53 (69.7%) were on bilevel positive pressure ventilation with spontaneous-time mode (BPAP-ST), 23 (30.2%) were on pressure control ventilation (PC). Primary diagnoses were pulmonary disorders (6, 7.9%), neurological conditions (15, 19.7%), neuromuscular diseases (34, 44.7%), and genetic abnormalities (21, 27.6%). Obstructive sleep apnea (OSA) and central sleep apnea (CSA) were found in 57 (75%) and 10 (13.2%) patients, respectively. The median number of previous PSGs was 3 (IQR1-5), and the median duration from the last PSG was 33 months (IQR 17 – 54 months). The reasons to perform titration PSG were interval follow-ups (43, 56.6%), worsening of primary diseases (23, 30.3%) and optimizations after initiation of empirical settings (10, 13.2%).

Problems identified during the titration PSGs included 26 (34.2%) with residual respiratory events, 26 (34.2%) with inadequate oxygenation, 30 (39.5%) with inadequate ventilation, 18 (23.7%) with significant leak, 5 (6.6%) with ineffective triggering, and 19 (25%) with periodic limb movement of the sleep (PLMS).

Device settings were adjusted in 61 (80.2%) patients during the titration PSG. The adjustments were made for pressure in 57 (75%)patients, rate in 31 (40.8%) patients and inspiratory time in 7 patients (9.2%) patients. Ventilation modes were changed from BPAP-ST to PC in 4 patients (5.3%).

Conclusions

Several issues related to NIV were identified during titration PSG for ambulatory NIV patients, leading to ventilator setting changes. Inadequate ventilation and oxygenation were the most commonly identified problems. Interestingly, PLMS were found in a significant proportion of our cohort. Further studies are needed to evaluate whether changes in NIV settings based on PSG would result in improved long-term outcomes of pediatric patients on NIV.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P16

Title
9:45 a.m. and beyond. Exploring teens' first-hand experiences of later school start times in Aotearoa New Zealand

Introduction
Conventional school start times for teens in Aotearoa New Zealand are between 8:30 and 9:00 a.m.; a similar time that some high schools in the United States have shifted to, to accommodate the natural change in teen's sleep-wake biology to prefer later bed times, and hence the need to sleep-in later. Yet teens in Aotearoa New Zealand are still sleep-deprived, suggesting this may still be too early to maximise their health, wellbeing and learning. The majority of later school start time literature is from the United States, with different cultural and environmental landscapes making some findings not directly translatable to other countries/cultures. In addition, regarding qualitative research in this area, the majority have focused on exploring the perspectives of teachers, parents, and administrators rather than focusing on the students themselves. The aim of this study was to explore the perspectives of students from one of the few schools with later starts (9:45 a.m.) in Aotearoa New Zealand, as a forerunner to understanding the challenges for implementation at other schools.

Materials and Methods
Fourteen students in their last two years of high school were purposively sampled for equivalent numbers starting later every day, or on just one day. A late start every day was 9:45 a.m. on 4 days and 10:20 a.m. on one day (mid-week). A late start on one day was the same 10:20 a.m. start, but 8:45 a.m. start on the other 4 days. Their timetables were adjusted so they did not finish school later than normal. A semi–structured guide was used for interviews with a list of open–ended questions about their sleep, schooling and morning and after school/evening experiences, activities and routines. Interview transcripts were analysed using reflexive thematic analysis. Students completed the PROMIS sleep-related impairment and disturbance scales.

Results

Nine (64%) reported moderate or severe sleep disturbance, whereas 11 (78%) reported moderate or severe sleep–related impairment and 7 (50%) regularly took more than 30 minutes to fall asleep. Four main themes were identified related to the impact of later starts on their sleep and timing, daytime functioning, autonomy, and routines and scheduling. Most (regardless of starting later one day a week, or on all days) reported later starts as positively influencing their sleep quality, concentration, productivity, and personal wellbeing. The importance of student autonomy over their own learning and schedules was strongly emphasised. The main disadvantages perceived were lack of free periods during the day, and the potential for later finishing, if this was to change.

Conclusions

The experiences of these students in Aotearoa New Zealand highlight the largely positive effects on several life domains as a result of later school start times of 9:45 a.m. and later for senior students. It is unknown if this translates to better health, wellbeing and achievement for these students, but the findings are encouraging nonetheless, and support efforts to advocate for even later start times than the traditional 8:30 a.m.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P17

Title
Polysomnographic, clinical and respiratory findings in a pediatric population with neuromuscular disorders

Introduction
Neuromuscular diseases (NMD) encompass various genetic disorders leading to progressive muscle weakness, including the diaphragm. Sleep-related respiratory issues are prevalent among individuals with NMD, particularly hypoventilation, exacerbated during REM and NREM sleep stages, leading to fatigue and daytime sleepiness. Polysomnography (PSG) with capnography is the gold standard for diagnosing these disorders, though spirometry serves as a limited adjunct. Our study aims to describe polysomnographic and clinical findings in NMD patients at a Pediatric Sleep Center in Brazil.

Materials and Methods
This is a retrospective cohort of NMD patients from PSG and clinical data from 2016 to 2023. All patients were in regular follow up in NMD specialized outpatient clinic in University of São Paulo. Clinical data analyzed were weight; height; BMI and weight z-score for older and younger than 10 years old, respectively; ethnicity; sex; degree of strength in all limbs and neck; forced vital capacity (FVC) on spirometry and use of corticosteroids.

Results
We analyzed 33 type 1 PSG from children and adolescents aged 4 to 19 years old (10 ± 4), of which 60% were diagnosed with Duchenne Muscular Dystrophy (DMD); 21% with Congenital Muscular Dystrophy (CMD); 15% with Spinal Muscular Atrophy (SMA) and 3% with Steinert Myotonic Dystrophy. The medium weight was 34 kg ± 14,6; the medium AHI was 5,4 ± 6; the medium minimal oxygen saturation was 83% ± 7 and the medium time under 90% of oxygen saturation (T90) was 5,4% ± 10.

As weight can be a confounder, we divided them into 2 groups regarding BMI and weight z-score: above and under the curve. No significant differences were found in relation to

respiratory polysomnographic parameters, sleep architecture or FVC between these two groups.

Another subgroup analysis was carried out regarding FVC lower and above 60%: those with restricted pattern (FVC lower than 60%) presented lower median oxygen saturation (93,5± 1,8 vs 95,3± 1,3; p-value 0,026), lower PLM (0± 0 vs 1,9± 3,6; p-value 0,027) and lower cervical strength (3,6± 0,4 vs 4,3± 0,4; p-value 0,03) while the ones with no restricted pattern (FVC over 60%), showed higher REM sleep latency (140± 60 vs 92± 35 p-value 0,027).

Conclusions

Neuromuscular disorders are a heterogeneous group of diseases and DMD is the most prevalent of them, which also makes up the majority of our sample. Overall, NMD patients included in this study presented reduced minimal oxygen saturation and increased AHI in polysomnography, which can be expected due to adenoidal and tonsillar tissue hypertrophy, but also progressive muscle weakness and obesity, although no differences were found related to the latter. Otherwise, a restricted respiratory pattern measured by FVC was related to lower oxygen saturation and lower cervical strength.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P18

Title
A new holistic medical approach on a Obstructive Sleep Apnea pediatric clinical case

Introduction
Myofunctional therapy can play a role in Obstructive Sleep Apnea OSA treatment. This study aims to present a clinical case of a pediatric patient with OSA with improvement of respiratory events through myofunctional therapy treatments.

Materials and Methods
For the diagnosis of this clinical case, history, intra- and extra-oral evaluation, radiographic examination and type II polysomnography were performed. After performing 12 months of myofunctional therapy combined with manual physiotherapy, a second polysomnography was performed in order to control and register the possible outcomes. Data obtained were evaluated taking into account the normative values od polysomnographic parameters in childhood and adolescence: arousal events in Sleep Medicine 2013.

Results
After therapy, a second polysomnography revealed an improvement on structure of sleep and no criteria for OSA diagnosis. All the events that were needed in REM phase were corrected, with control of the apneas of central origin that the patient had. Improvements have been recorded in Apnea/Hypopnea Index, oxygen saturation index and oxygen saturation time

Conclusions
The new holistic approaches with myofunctional therapies in correlation with postural therapies would appear to be effective in improving the condition of pediatric children with OSA. It would appear that the use of these therapeutic approaches is most effective in cases of mild OSA that do not require surgical treatment. Improvements also occurred in the clinical case just described, which presented exactly mild OSA.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P03

Title
Obstructive sleep apnea peadiatric dentistry screening: scoping review

Introduction
Obstructive sleep apnea (OSA) is a medical condition that partially or completely obstructs the upper airways during sleep, causing oxygen desaturation and hypercapnia. This study aims to create a form to be used in pediatric dentistry, facilitating the screening and early diagnosis of OSA.

Materials and Methods
To carry out this systematic review, we used the rules of the PRISMA guideline and the PICO model for the research question as a basis. A search was carried out in three bibliographic sources, Pubmed/MEDLINE, Scopus and Web of Science, obtaining 12 articles (out of 465 articles), after excluding duplicates, and reading by title and abstract.

Results
A combined approach of methods, including polysomnography as a standard exam, subjective questionnaires, physical exams and anthropometric measurements, proved to be necessary for the diagnosis of OSA in children and adolescents.

Conclusions
OSA is a serious medical condition that requires a comprehensive approach to diagnosis. Pediatric Dentistry screening is essential to identify risk factors and intervene early, preventing complications

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Presentation Day and Board Number
Saturday, April 27, 2024 | P19

Title
Psychiatric comorbidity in pediatric narcolepsy type 1 – a cross sectional study from Norway

Introduction
Narcolepsy is a severe chronic sleep disorder with sleep wake and REM sleep instability both day and night. Psychiatric symptoms are also frequently reported and adds significantly to impairment in everyday function and quality of life in patients with narcolepsy. We report the prevalence of psychiatric disorders according to a semistructured interview performed by an experienced child and adolescent psychiatrist. The primary aim of the study was to evaluate the prevalence of comorbid psychiatric disorders, and to explore the association between psychiatric comorbidity, narcolepsy disease duration, and subjective and objective sleep measures. We also wanted to compare prevalence of having a psychiatric disorder according to the semistructured interview with cut off scores on a validated questionnaire (the Achenbach System of Empirical Bases Assessment – ASEBA – Child Behavior Checklist-CBCL).

Materials and Methods
Parents of 59 consecutively included pediatric NT1 patients (age: 6-20 years; 34:25 girls: boys; 54/59 H1N1 (Pandemrix®)-vaccinated) were interviewed with semi-structured diagnostic interview Kaufmann Schedule for Affective Disorders and Schizophrenia Present and Lifetime version (KSADS). Subjective sleepiness was assessed by the Epworth Sleepiness Scale. Candidate objective sleep-wake instability measures was for the daytime the mean sleep latency on the Multiple Sleep Latency Test (mean MSLT SL) and for the nighttime Awakening Index (number of awakening per hour sleep on the polysomnography). For a subsample (n=50) of the interviewed participants, information on the CBCL was available and included.

Results
52.5% of the patients had one or more present psychiatric comorbid disorder, 30.5% internalizing (anxiety and/or depression), 25.4% neurodevelopmental disorder (ADHD 13.6% tics/Tourettes Disorder 10.2 %, Autism Spectrum Disorder 6.8 %). Anxiety disorders were not

associated with sleepiness or Awakening Index, while disease duration was borderline significantly longer in youths with an anxiety disorder compared to those without (5.9 yrs versus 5.1 yrs, t= 1.06, p= 0.059), depressive disorders were not associated with sleepiness or Awakening Index, ADHD was not associated with sleepiness, but with a higher Awakening Index (t= - 2.185, p= 0. 033). In the subsample with both KSADS and CBCL, 27 had at least one psychiatric disorder according to the KSADS, but only 14 of these scored above cut off on the CBCL Total Score. However all 19 youths with an KSADS internalizing disorder scored above cut-off on the CBCL internalizing broad band scale.

Conclusions

Occurrence of psychiatric comorbidity is high in pediatric narcolepsy type 1. Different psychiatric comorbidities may associate differently with narcolepsy symptoms and objective findings. Questionnaires screening for psychiatric comorbidity may yield different results from semistructured interviews, and may not have sufficient sensitivity.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P20

Title
Quantifying sleep-related rhythmic movement disorder - the role of videosomnography.

Introduction
Sleep-related rhythmic movement disorder (SR-RMD) is defined as "stereotyped, repetitive rhythmic motor behaviours" occurring in the frequency range 0.5 to 2Hz, associated with sleep.

Polysomnography is an objective means to quantify SR-RMD and assess sleep in these children but has limitations, principally, in our experience 35% of children do not exhibit SR-RMD in the laboratory setting as they do at home, making it challenging to determine whether suspected rhythmic movements (RMs) are behavioural or pathological. Home videosomnography is a supplementary diagnostic approach which mitigates the effect of sensors and allows an ecologically valid assessment of movements.

Aims:
• To examine the diagnostic yield of polysomnography and videosomnography to determine which modality has the best ability to quantify SR-RMD with the fewest limitations.
• To compare night-to-night variability of videosomnography.

Materials and Methods
Ethics committee approval was granted for this retrospective chart review. Children were studied with one night of in-lab attended polysomnography and one or 2 nights of home videosomnography.

Polysomnography and videosomnography (both Somnomedics, Germany) identified RMs were scored using standard criteria. Episodes of rhythmic movements were considered discrete if separated by a minimum of 10 seconds. Data were analysed in SPSS v29.0.1.0 using repeated measures tests to assess differences between diagnostic methods according to data distribution

Results

To date 52 children (41 male: 11 female, age 3-16 years) have completed both videosomnography and polysomnography. Time in bed was highly significantly longer for children studied at home with videosomnography versus in the sleep lab (11 v 8 hours, $p < 0.0001$). Similarly, children exhibited more absolute rhythmic movement episodes during their time in bed at home versus in the sleep laboratory (30 v 24 , $p < 0.001$). Within this sample, twenty-five children were studied for 2 consecutive nights at home with videosomnography allowing an assessment of night-to-night variability in movements. Of this sub-group 18 (72%) exhibited a higher total percentage of time in bed (mean increase of 9.1%, SD 6.3) engaged in rhythmic movements on the second night of study, suggesting a possible first night effect.

Conclusions

Home videosomnography studies provide more accurate information about the severity of sleep-related rhythmic movements. Polysomnography remains an important investigation to exclude co-morbidities such as sleep-disordered breathing and, when rhythmic movements are exhibited, to ascertain whether they arise from sleep or wake epochs. However, we propose that home video offers a more accurate measure of disorder severity and where possible more than one night should be studied.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P21

Title
Sleep and neurocognitive functioning in nocturnal enuresis

Introduction
Sleep problems (i.e., sleep apnea, fragmented and ineffective sleep) have been hypothesized to cause neurocognitive impairment in children with nocturnal enuresis (NE) also known as bedwetting. However, only one study has examined the association between sleep and neurocognitive function and did not include continent reference children.
Therefore we aimed to investigate sleep and neurocognitive function in children with NE compared to continent reference children, and whether sleep quality and neurocognitive functioning are associated in children with NE

Materials and Methods
Data from three groups of children aged 5-12 years were included in the current study: one with NE (n =60) and two continent reference groups. One reference group (n=30) was included to serve as a reference on outcomes related to neurocognitive functioning, and one (n=23) group served as a reference for sleep outcomes. Children with NE participated in neurocognitive assessment as well as sleep assessment (polysomnography) before treatment initiation, while parents completed questionnaires.

Outcomes from sleep was assessed with polysomnography for one night in the childs home environment. Outcomes from neurocognitive assesment included both performance based and rating based measures within the domains of executive function (i.e. working memory and inhibition). The outcome on motivational behaviour and attentional lapses were assessed with performance based measures. Test score differences (△) were estimated between children with NE and the reference groups for each outcome. Two different models were investigated with multiple linear regression, an adjusted model (△adj), which included adjustment for sex and age, and a crude model (△).

Results

Children with NE had lower working memory on both performance based and rating based measures compared to continent reference children, digit span backwards and △ adj.: -0.6 and 95% CI (-0.9;-0.2) and CHEXI subscale △ adj.: 6.0 and 95% CI (2.1;9.8), indicating more WM impairment in children with NE. Children with NE also had lower inhibition on rating based measures, and more impulsive choices on performance based measures.
In exploratory analyses, periodic limb movement index was significantly and strongly associated with accuracy on the 2-Back task only in children with NE, coefficient -0.02; 95% CI (-0.03;-0.01).

Conclusions

In this first study to examine both sleep and neurocognitive functioning in children with NE compared to a reference group, children with NE were found to have more cortical arousals compared to reference children, but the CAi was below the clinical cut-off for the majority of children, and group differences were not found with respect to PLMi and sleep apnea. Children with NE remembered fewer digits on a WM task and made more impulsive choices compared to children in the reference group. PLMi was associated with one WM performance measure in children with NE. To date studies of the association of sleep and neurocognition have included clinical samples of children with NE. Therefore, children with NE, in general, may not have sleep abnormalities and/or specific impairments of neurocognitive functioning. Population-based studies are needed, and future clinical studies should aim to identify risk factors for sleep abnormalities and/or specific impairments of neurocognitive functioning in children with NE.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P22

Title
The association of nocturnal enuresis and school performance - a nationwide registerbased cohortstudy

Introduction
Evidence of the potential impact of nocturnal enuresis (NE) on school performance is scarce, and the area is afflicted by misperceptions and taboos.

Nocturnal enuresis also known as bedwetting affects the well-being of children, and is associated with a higher prevalence of psychiatric disease. Sleep fragmentation might also be prevalent in nocturnal enuresis which can lead to impaired neuropsychological function.

Therefore, we investigated if nocturnal enuresis affects school performance in primary school. Therefore, we investigated whether NE in children is associated with performance on standardised school tests, and how age at treatment onset and co-occurring psychiatric disorders affect the association.

Materials and Methods
We conducted a nationwide matched cohort study among children born in Denmark between 1997 and 2008. We studied the association between NE (prescription fulfilment and ICD-10 codes from health registers) and results from standardised National School Tests (1–100 point scale). Multiple linear regression estimated the difference (△) in test scores with 95% confidence intervals (CIs) between children with NE and matched references after adjusting in for relevant confounders. In sub-analyses, we investigated the influence of co-occurring psychiatric disorders and age at treatment onset.

Results
Children with nocturnal enuresis performed statistically significantly lower than the reference group, but only 0.4-1.3 points lower ($p<0.01$).

Children with NE and most types of psychiatric diseases, most notably attention deficit/hyperactivity disorder, scored substantially lower than the reference population in 4th grade language tests △f.adj −7·6 points, [95% CI 9·5 to −5·7].

Children aged 11 years and above at NE treatment onset had lower overall school performance than children aged 5–7 years at treatment onset △f.adj –2·9 points [95% CI –4·0 to –1·7]. We found no improvement in school test after treatment onset for the independent age groups.

Conclusions
School performance in children with UI was generally comparable to that in children without incontinence. However, psychiatric disorders occurred more commonly in children with UI, and in this subset of children, we observed significantly lower school performance. Children with late NE treatment onset had lower school performance than children with early onset. The reason for lower test score with later treatment initiation could be longer duration of disturbed sleep in nocturnal enuresis. No clear difference was found concerning before vs after treatment. Another reason for lower test scores with later treatment initiation, could be differences in treatment seeking behaviour that is not covered by our adjustment for socioeconomic factors/psychiatric disorders, thus causing residual confounding.

Further clinical studies are needed to investigate the role of sleep fragmentation in certain subpopulations of nocturnal enuresis and the impact on neuropsychological function.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P23

Title
The Use of the PneumoWave DC Respiratory Monitor to Identify Paediatric Sleep Apnoea: In-vitro Validation

Introduction
Identifying sleep apnoea in infants can be complex, requiring multiple sensors for a cardiorespiratory sleep study. Furthermore, immature ultradian and circadian rhythms, feeding requirements and infant behaviours negatively impact on the use of standard clinical monitors and increase the likelihood of false negative results. PneumoWave DC Mobile is a monitoring device intended to capture and store chest motion data continuously over a period of time for retrospective analysis and is registered with UKCA as a Class 1 device. The aim of the study was to validate the ability of the PneumoWave device in combination with experimental algorithms to accurately detect a range of physiological-relevant respiratory rates and simulated periods of apnoea in an in vitro manikin model.

Materials and Methods
A PneumoWave Biosensor was placed on the upper right side of the manikin chest, approximately 4 fingers widths down from the centre of the right collarbone. A range of physiological-relevant respiratory rates (6 – 80 breaths per minute [BPM]) using a tidal volume of 50ml were generated in an in vitro manikin model comprising a PractiBaby Infant CPR manikin (PractiMan, UK) operated using an LTV 1150 ventilator (Vyaire Medical, UK). Periods of apnoea (5 – 20 seconds) were simulated by closing airflow through the endotracheal tube using an in-line 3-way valve. Data was captured for 9 mins at each setting and exported as a CSV file to MATLAB (version R2023a, MathWork Inc., USA) for visualisation and analysis.

Results
The subsequent respiratory waveforms generated in MATLAB from the data captured by the PneumoWave DC device showed high linear correlation with ventilator settings across the 6-80 BPM range (r2=0.99). Performance was excellent with relative standard deviation at 6 or 80 BPM ventilator settings of ±2% or ± 1.2% respectively for this output. A visual count of the

respiratory waveforms generated in MATLAB during periods of simulated apnoea (5 - 20secs) indicated that the events could be successfully observed across the range of 10 - 80 BPM.

Conclusions

The in vitro study demonstrated that the PneumoWave device was able to measure simulated chest movement across a range of physiologically relevant breathing rates. Periods of simulated sleep apnoea could be observed in the experimental algorithms generated from the device outputs. The PneumoWave DC device therefore offers a low-cost option to provide clinical monitoring of infants, and subsequent processing with a suite of experimental algorithms can provide potentially clinically meaningful data. Prior to evaluating the PneumoWave device in a clinical trial, additional in vitro assessment will be undertaken in a newborn manikin to see if its utility can be extended into neonates. In parallel, simulated dynamic patterns of breathing will be generated in the in vitro neonatal model to observe how this affects the ability of the Pneumowave DC device output and algorithms to observe apnoeic events.

Acknowledgements

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Presentation Day and Board Number
Saturday, April 27, 2024 | P24

Title
Do Weighted Blankets Improve Sleep among Children with a History of Maltreatment? A Randomized Controlled Crossover Trial

Introduction
Sleep problems (e.g., trouble falling asleep, nighttime awakenings) are highly prevalent and persistent among children with a history of maltreatment and elevate their risk for a range of deleterious outcomes. Weighted blankets have gained popularity in recent years as a potential non-pharmacological intervention for improving sleep in clinical populations of children, but their efficacy has not been examined among children with a history of maltreatment and/or trauma. Therefore, this study explores whether the use of a weighted blanket for sleep improves objective and subjective sleep outcomes among a group of children adopted from foster care (i.e., with a history of maltreatment).

Materials and Methods
The current study used a randomized, within-subjects, crossover design where participants used a weighted blanket for two weeks and their usual blanket for two weeks in a counterbalanced order. Participants were N=30 children (63% female), ages 6 to 15 years (M = 9.7, SD = 2.9), adopted from foster care in Texas. Sleep outcomes were measured using actigraphy and subjective sleep diaries.

Results
Results indicated no meaningful differences in the type of blanket used in either actigraphy-based estimates of total sleep time ($t(27) = 0.10$, $p = .91$, $d = 0.02$), sleep onset latency ($t(27) = 0.14512$, $p = .88$, $d = 0.03$), or wake minutes after sleep onset ($t(27) = -0.44$, $p = .65$, $d = -0.08$), or subjective total sleep time ($t(27) = 0.75$, $p = .45$, $d = 0.14$), sleep onset latency ($t(25) = 0.28$, $p = .78$, $d = 0.06$), or sleep quality ratings ($t(26) = 1.97$, $p = 0.06$, $d = 0.38$). Period effects were also examined for each variable; however, results were all also non-significant with small effect sizes. Child age, biological sex, and timing of participation (school year versus summer months) did not impact outcomes.

Conclusions

While this study did not find significant differences in sleep outcomes based on type of blanket used, controlled studies using larger samples of children with a history of maltreatment are needed.

Acknowledgements

We thank Luna Blankets (www.lunablanket.com) for donating the weighted blankets used in this study.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P04

Title
Characteristics of Children in Foster Care Given Melatonin for Sleep

Introduction
Children placed in foster care experience trauma/maltreatment, heightening their risk of sleep problems. In recent years, melatonin has become a commonly recommended intervention for pediatric sleep problems, including children in foster care. However, limited information about the use of melatonin in this population exists. This study therefore investigated factors associated with melatonin use among children in foster care.

Materials and Methods
The sample included foster caregivers from across the U.S. (N=456) who reported on a child in their care 4- to 11-years-old (M=6.39, SD=2.20; McGlinchey et al., 2023). Caregivers were recruited for this anonymous online survey via private Facebook groups for foster families. Questions included child and caregiver demographics, child sleep problems, details of foster care history, and whether or not the foster parent had ever administered melatonin to the child. Children in the sample were 49% female and relatively diverse, with 17% identifying as Black/African American, 11% Hispanic, 6% mixed/biracial, 2% Native American, and 64% White. Variables were analyzed using t-tests and chi-squares. Benjamini–Hochberg procedure was applied to reduce type I error at 5% across the multiple comparisons.

Results
Forty-eight percent of the sample (n=221) had administered melatonin to their child either currently or in the past. There were no differences in child age, sex, or race among children who and who had not been given melatonin. Similarly, no differences in melatonin use emerged based on caregiver sex, race, marital status, education level, household income, or years since obtaining their foster care license. However, caregivers who have given their child melatonin were significantly younger on average (t=2.189, p=.015). Regarding child foster care characteristics, children given melatonin spent more time in their current foster home (t=-2.215, p=.014), but less overall time in foster care as compared to children not given

melatonin (t=2.759, p=.003). Children's level of foster care also differed between the two groups (χ^2=13.602; p=.003); children given melatonin were significantly more likely to be placed in specialized/treatment foster care. Regarding sleep outcomes, children who had been given melatonin compared to not evidenced significantly worse sleep quality (t=3.669, p=<.001), more sleep problems (e.g., bedwetting, nightmares, nighttime awakenings; t=-3.663, p=<.001), less weekday total sleep (t=2.170, p=.015), and took longer to fall asleep at night (t=-2.092, p=.019).

Conclusions

Almost one-half of foster caregivers in our large sample reported giving a child in their care melatonin currently or in the past; a rate that is much higher than that observed in the general population. The use of melatonin was associated with poorer sleep based on several parameters (e.g., quality, duration, problems) and was more common among children with greater/specialized needs (e.g., neurodevelopmental disorders). Although no child demographic variable was associated with melatonin use, children given melatonin spent more time in their current foster home on average, but less time in foster care overall. This might suggest that melatonin use is associated with more stable placements and/or adoption from foster care. These findings add to sparse information about melatonin use in this highly vulnerable population.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P25

Title
When, how, and what are the outcomes of exogenous melatonin indicated in a pediatric sleep clinic.

Introduction
Melatonin, a hormone primarily secreted by the pineal gland, plays multiple roles, including metabolic regulation and synchronization of circadian rhythms as sleep/wake cycle (1) Melatonin has gained attention for its potential therapeutic benefits in managing sleep disturbances in pediatric populations, with increasing indiscriminate use in several countries. In Brazil, as in the USA, melatonin has been commercialized as a dietary supplement since October 2021. Despite the growing use of melatonin in pediatric patients, there is a lack of data regarding its long-term effects, optimal dosing regimens, and potential interactions with concomitant medications. The aim of this study was to evaluate the melatonin use among patients attending a pediatric sleep outpatient clinic, focusing on prevalence, diagnosis, dosage and subjective response considering patients already using melatonin or receiving prescriptions from our clinic.

Materials and Methods
Retrospective study based on medical records of pediatric patients followed at the pediatric sleep clinic of the Child and Adolescent Institute of the Hospital Complex of the Hospital das Clínicas of the Faculty of Medicine of the University of São Paulo (HCFMUSP) from 2018 to 2023. Cases using melatonin at the first consultation or introduced during clinical follow-up were surveyed. Patients who were lost to follow-up were excluded.

Results
Twenty-eight patients using melatonin were identified out of a total of 198; 50% were female. The mean age was 8.75 years, ranging from 1.9 years to 15 years. Only five patients were already using melatonin upon arrival. Four groups were divided: circadian rhythm disorder, including Smith-Magenis Syndrome (SMS) and delayed sleep phase syndrome; insomnia associated with neurodevelopmental disorder; neurogenetic syndromes; and narcolepsy.

The mean bedtime of the patient group was 10.9 p.m. + 2.25 hours, with sleep onset latency of 71.5 min + 104 minutes and total nighttime sleep duration of 8.7 h + 2 hours. The group of patients with delayed sleep phase had the latest mean bedtime (1:30 a.m.), and the longest sleep onset latencies (172.5 minutes). The mean initial dose of melatonin after the first consultation, excluding patients diagnosed with SMS and REM sleep behavioral disorder (who received higher doses), was 0.6 mg + 0.72 mg. The mean administration time was 10.58 p.m. + 1.31 hours, with the delayed sleep phase group having later times. 71% showed a satisfactory response to melatonin use according to parental report.

Conclusions

The use of melatonin in childhood sleep disorders has been growing exponentially since its approval in Brazil. In our outpatient clinic, over the past 5 years, we have received few patients with prior use of melatonin, as before 2021 this compound was not easily available. We have documented that the use of melatonin in specific indications and at low or physiological doses presents a satisfactory clinical response, highlighting cases of circadian rhythm disorder and insomnia associated with neurodevelopmental disorders.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P26

Title
Hypoventilation in patients with Prader-Willi syndrome across the pediatric age

Introduction
Few data on alveolar hypoventilation in Prader-Willi syndrome (PWS) are available and the respiratory follow-up of these patients is not standardized. The objectives of this study were to evaluate the prevalence of alveolar hypoventilation in children with PWS and identify potential risk factors.

Materials and Methods
This retrospective study included children with PWS recorded by polysomnography (PSG) with transcutaneous carbon dioxide pressure (PtcCO2) or end-tidal CO2 (ETCO2) measurements, between 2007 and 2021, in a tertiary hospital center. The primary outcome was the presence of alveolar hypoventilation defined as partial pressure of carbon dioxide (pCO2) ≥ 50 mmHg during ≥ 2% of total sleep time (TST) or more than five consecutive minutes.

Results
Among the 57 included children (38 boys, median age 4.8 years, range 0.1-15.6, 60% treated with growth hormone [GH], 37% obese), 19 (33%) had moderate-to-severe obstructive sleep apnea syndrome (defined as obstructive apnea-hypopnea index ≥ 5/h) and 20 (35%) had hypoventilation. The median (range) pCO2 max was 49 mmHg (38-69). Among the children with hypoventilation, 25% were asymptomatic. Median age and GH treatment were significantly higher in children with hypoventilation compared to those without. There was no significant difference in terms of sex, BMI, obstructive or central apnea-hypopnea index between both groups.

Conclusions
The frequency of alveolar hypoventilation in children and adolescents with PWS is of concern and may increase with age and GH treatment. A regular screening by oximetry-capnography appears to be indicated whatever the sex, BMI, and rate of obstructive or central apneas.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P27

Title
Eyes Wide Open: A Protocol for Exploring Stakeholder Perspectives of Adolescent Sleep through Photovoice

Introduction
Insufficient, poor-quality sleep among adolescents is a growing public health concern. At present, efforts to improve adolescent sleep have primarily focused on individual-level behaviour change, with limited population level impact. Furthermore, the lack of stakeholder involvement during intervention development has likely contributed to the poor implementation of existing interventions in real-world settings. Therefore, stakeholder input is necessary to better understand the complex interaction of factors shaping adolescent sleep and potential intervention targets to promote healthy sleep. The aim of this study is to engage adolescents, parents, and teachers through Photovoice to understand the barriers and facilitators to adolescents, as well as motivating factors to improve sleep among adolescents. Photovoice is Community-Based Participatory Research method that gives voice to and empowers participants, providing unique insights into health issues, and promotes critical dialogue for change.

Materials and Methods
This study will be conducted between January - June 2024. Three schools across Scotland will be recruited from areas of low and high deprivation. Each school will enrol one Personal and Social Education classes from S1 – S3 to participate in a weeklong photography exercise, a participatory analysis workshop and host an exhibition at school for the friends and family to attend. Qualitative focus groups will then be conducted with parents and teaching staff and photo-elicitation interviews with a subsample of adolescents to identify barriers, facilitators, and motivating factors for adolescent sleep.

Results
Results will be derived from thematic and narrative analysis of photographs, texts, qualitative discussions, and audience feedback from exhibitions.

Conclusions

This arts- and adolescent-led research will give voice to young people and bridge communication between young people and decision makers. We hope that stakeholders can learn directly from young people to better understand adolescent sleep and inform the development of effective strategies to promote healthy sleep.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P28

Title
Polysomnographic phenotypes of children with down syndrome across the age

Introduction
Down syndrome has the highest prevalence among genetically syndromic abnormalities, most of those also have sleep-disordered breathing. We aimed to explore polysomnographic phenotypes in children with Down syndrome across different age groups and identify predictors of severe obstructive sleep apnea (OSA).

Materials and Methods
This cross-sectional study revealed polysomnographic phenotypes of children aged 3-18 years with Down syndrome. We collected demographic data, sleep symptoms and polysomnographic results during 2013-2023. We analyzed the prevalence of sleep conditions categorized by the age group and used logistic regression to identify predictors of severe OSA.

Results
Among 95 children, 56.8% had severe OSA, 60.0% had central sleep apnea, 14.7% had sleep-related hypoxemia, and 24.5% had sleep-related hypoventilation. Of those with OSA, 50.5% had positional OSA and 55.8% had rapid eye movement (REM)-related OSA. Categorized by age groups, children aged ≥ 12 years had the highest rates: 75.0% for severe OSA, 67.9% for central sleep apnea, 21.4% for sleep-related hypoxemia, and 35.7% for sleep-related hypoventilation. Age (adjusted OR = 1.20, 95% CI: 1.02-1.43, p = 0.03) and tonsillar hypertrophy (adjusted OR = 2.90, 95% CI: 1.09-7.64, p = 0.03) were significantly associated with severe OSA.

Conclusions
Children with Down syndrome aged ≥ 12 years had the highest prevalence of severe OSA and central sleep apnea. Age and tonsillar hypertrophy were significantly associated with severe OSA.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P29

Title
Improving pre-schoolers' sleep with the use of bedtime bibliotherapy (bedtime story): a pilot study

Introduction
Healthy and adequate sleep is essential for the neurodevelopment especially during early childhood. However, our previous study has shown that 40% of preschoolers in Hong Kong were considered as sleep deprived. Bibliotherapy (story telling), has been employed as a therapeutic process to influence the mood features and problem solving skill. Therefore, this pilot study aims to investigate whether the use of bedtime bibliotherapy (bedtime story) by the parents will be able to improve total sleep duration, sleep hygiene and knowledge, in both preschoolers and their parents as well as strengthen parent and child relationship.

Materials and Methods
We have designed a novel book with colour illustration, 'Nighty Night', as the printed picture book for the bibliotherapy study in pre-schoolers aged 3 to 5 years old.
A total of 96 registrations have received and 76 preschoolers and their parents were screened. An online/zoom interview was conducted with interested parents to ensure their eligibility. Finally, a total of 24 preschoolers and their parents were randomized into the bedtime bibliotherapy group or the control group at a 1:1 ratio. Their mean age of preschoolers was 3.70 years [0.76], 11 of them are girls (45.8%).
During the intervention period, information pack were provided to parents to guide them through the whole reading process. Parents were asked to read the story book 'Nighty Night' with their children before bedtime for 15 minutes over 4 weeks intervention period. Weekly phone calls and WhatsApp messages were made to parents to monitor the adherence and progress of the intervention. The research personnel also addressed the difficulties and questions from parents. Parents will be contacted after 4 weeks intervention period and confirmed that they have completed the reading. In addition, parents were also required to attend an online Zoom workshop. While for the control group, no active intervention was provided. There will be a 2-month post intervention follow-up assessment.

Results

All 12 preschoolers and their parents in the intervention arm completed the intervention . Although the parents appreciated the bedtime story activity and also the potential benefits of this activity, the preliminary analysis on self-reported time in bed and parent-children relationship showed that the bibliotherapy intervention did not significantly increase the time in bed compared to the control group (mean differences: 23.6 [42.1] vs 35.9 [39.3], group-by-time interaction p = 0.31) (Table 1). There is also no significant improvement in the level of parent-child interaction (mean difference: 0.1[5.9] vs. 1.7[4.3], group-by-time interaction p = 0.49)

Conclusions

In this pilot study, the bedtime bibliotherapy intervention is a feasible intervention tool that is welcome by the participating parents. However, the pilot finding did not find any significantly increase of the time-in-bed in the active intervention group compared to the control group. Further study with larger scale RCT with adequate statistical power is needed to determine whether the use of the bedtime bibliotherapy will be able to extend the total sleep duration and improve Parents and child interaction among sleep deprived preschoolers.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P30

Title
Sleep Behaviors, Perceptions, and Practices Among Home and Family Childcare Providers in Western Massachusetts

Introduction
Teaching and promoting good sleep health practices during childhood is important for healthy development, and sleep patterns tend to track through adolescence and even adulthood. In the United States, most children under 6 years not enrolled in grade school have nonparental childcare arrangements. Center-based childcare centers have been the been the primary targets for sleep health research in young children. Although over 30% of this population attend home-based family childcare, this is a largely understudied setting that could influence daily health behaviors and routines of young children. Therefore, the purpose of this formative study was to 1) determine sleep-related behaviors, knowledge, perceptions, and childcare practices among home childcare providers, 2) explore if caregiver factors were related to their childcare practices, and 3) identify barriers and needs of this population.

Materials and Methods
Adult home childcare providers of western Massachusetts (n = 48, 97.9% female; age = 45.5 10.8 years, 87.2% White, 12.5% Hispanic) completed a semi-structured online questionnaire. In addition to demographic and childcare practice information, participants answered questions related to their personal sleep behaviors, knowledge and perceptions of child sleep, and childcare practices and policies for napping. Caregiver sleep (duration, insomnia frequency, quality) was measured with the Brief Version of the Pittsburgh Sleep Quality Index). Caregivers responded to 10 true or false questions to assess child sleep health knowledge and shared ratings on 9 statements of child sleep perceptions. Practices and policies were measured with 5 questions adapted from the Go NAP SACC Self-Assessment Instrument for Family Child Care (with 3 contributing to an overall score).

Results
About 42% of providers were familiar with child sleep recommendations, whereas 31.1% responded they were somewhat familiar and 27.1% were not. The average sleep knowledge

accuracy score was 73%. Provider sleep and child nap perceptions varied. The average nap practice score was 0.7 0.9 (range: 0 to 3), with a lower score indicating activities in line with more 'recommended' practices. In a linear multiple regression model with provider sleep duration, child sleep knowledge, education, and income as independent variables, results indicated that providers with higher incomes were more likely to have lower nap practice scores (Coeff. range: -2.7 to -3.1; p values: 0.009 to 0.01). Although most providers perceived the need for naps in young children, some reported that encouraging nap opportunities can be difficult and creates challenges in their settings.

Conclusions

Findings from this preliminary analysis of an ongoing study identify some potential intervention targets in home childcare providers such as increasing child sleep health knowledge. Lower income may contribute to fewer resources for home childcare support and next steps in this formative work such as focus groups and actigraphy measurement of both caregivers and children may provide context to needs and barriers.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P31

Title
Ventilator data: An adjunct to cardiorespiratory sleep study (CRSS) in monitoring children on long term non-invasive ventilation (LT-NIV)

Introduction
Annual CRSS is recommended for monitoring children on LT-NIV, but limitations include poor data quality and inability to assess adherence. Ventilator trend data can include minute ventilation (MV), leak and compliance. We compare such data with CRSS in children on LT-NIV.

Materials and Methods
Analysis of CRSS (clinician) and [ResMed] ventilator (physiologist) reports and breath-by-breath data from the same night using Cohen's Kappa (κ). A summary of the trend [ResMed] data from 30 days prior were also reviewed.

Results
40 datasets (38 patients): 23 on bilevel NIV, 15 on continuous positive airway pressure. Overall median age of 11.1 yrs (60% male). 74% had compliance >80%, 15% had <50% compliance. Interrater reliability for overall impression was poor (κ=0.19, 95% CI 0.03-0.34). However, 38% of ventilator reports noted a stable study, but possible mask issues that CRSS did not identify; Adjusting 'review-mask issues' to 'stable' in these cases (as none led to mask changes) κ improved to moderate (κ=0.55, 95% CI 0.23-0.74). The data were unbalanced (~70% cases were in 2 of 5 categories), which limited the maximal value of κ. There was very good agreement (κ= 0.86) for back-up-rate and good agreement (κ= 0.63) for desaturation assessments. Deviations in CRSS from trend parameters (e.g. MV, leak) were seen in 10%.

Conclusions
Ventilator data complements CRSS by providing trend and supplemental data; identifying opportunities for ventilator optimisation even in those with stable CRSS (leading to a lower

than expected κ for the overall impression). It has potential for use as a screening tool e.g. to identify mask/ compliance issues to be addressed prior to CRSS.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P32

Title
Application of Bidirectional Telemedicine in Continuous Positive Airway Pressure for Children with Upper Airway Obstruction

Introduction
This study aimed to investigate the feasibility and effectiveness of using a mobile communication and remote monitoring system as a bidirectional telemedicine model to improve the compliance of Continuous Positive Airway Pressure (CPAP) treatment in children with upper airway obstruction.

Materials and Methods
A total of 46 children with upper airway obstruction who received CPAP treatment were randomly assigned to the conventional group (n=22) and the telemedicine group (n=24) for 2 months of treatment. Parents of children in the telemedicine group were able to proactively contact doctors through a mobile communication application, and followed-up with the remote monitoring system. Based on the number of consultation questions in the first week, the participants in the telemedicine group were further divided into groups with more and fewer questions.

Results
The treatment termination rate in the telemedicine group was significantly lower than that in the conventional group. In the first week, the average treatment time was shorter and the proportion of nights using CPAP for more than 4 hours was lower in the group with more questions. However, the compliance significantly improved from the second week onwards and for the remainder of the study period.

Conclusions
The bidirectional telemedicine model is an effective and feasible approach to improve the compliance of CPAP treatment in children with upper airway obstruction. Considering the issue of cost, it is recommended that the bidirectional telemedicine model should be applied for at least 1 week to better improve long-term compliance.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P33

Title
Associations between objectively and subjectively measured sleep outcomes and screen time among elementary school children in Rhode Island

Introduction
Sleep is a vital component of children's health and development. However, sleep deprivation in children is a growing health concern in the U.S. Consequently, it is important to understand potential determinants of child sleep such as recreational screen time. It is also important to investigate whether parents have an accurate awareness of whether their children are meeting sleep guidelines. In the current study, we analyzed whether there were discrepancies in parent-reported and actigraphy-derived sleep quality and quantity, and whether there was a relationship between recreational screen time and sleep outcomes.

Materials and Methods
The sample was derived from the Project Greenspace, Sleep, and Mental Health (G-SPACE) cohort. Participants in grades 1-3 wore an actigraph on their non-dominant wrist to measure sleep duration, sleep latency, and wake after sleep onset (WASO) for 7 days. Parents reported perceived values of sleep outcomes: continuous measures of sleep duration and WASO, and a binary measure of sleep latency (whether their child falls asleep within 20 minutes of going to bed). Additionally, parents reported the number of hours on an average school day that their child spends using electronic devices, excluding time spent on schoolwork. Generalized linear models were used to estimate associations between recreational screen time and each sleep outcome. All models were controlled for child age.

Results
In the full sample (n=77), 81.93% of parents believed that their children met sleep guidelines (mean sleep duration: 9 hours, 29 minutes), while only 18.52% of children actually met sleep guidelines according to actigraphy (mean sleep duration: 8 hours, 29 minutes). Parents overestimated their child's sleep duration by an average of 67.34 minutes per night ($t=6.7287$, $p<0.001$). The proportion of children that fell asleep within 20 minutes of going to bed was 48.8% according to parents, while the proportion that fell asleep within 20 minutes

of going to bed according to actigraphy was 80.25% (McNemar's chi-squared=14.049, p <0.001). The average parent-reported WASO was 3.006, while the average WASO recorded by actigraphy was 38.160 (mean difference=35.26 minutes per night, t=-20.369, p<0.001). No associations with screen time were found for parent-reported or objective sleep duration or latency. Children whose parents reported 5 or more hours of screen time had 7.242 more minutes of parent-reported WASO than those whose parents reported 1 hour or less of screen time (SE: 2.929, p=.0156), and this is slightly increased when controlling for age (β=+7.2611, SE: 2.9750, p=.0171). However, no association was seen between screen time and objectively-measured WASO.

Conclusions

These findings suggest a large discrepancy between actigraphy-obtained and parent-reported sleep quality and quantity. Parents tend to overestimate sleep duration and sleep latency, and underestimate wake after sleep onset (WASO), and this difference in reporting may also extend to the association between parent-reported screen time and sleep latency. Further research should take this discrepancy into account when measuring sleep outcomes.

Acknowledgements

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Presentation Day and Board Number
Saturday, April 27, 2024 | P34

Title
Sleeping soundly after discharge from a neonatal ward: Evidence-based, expert- and parent endorsed sleep strategies.

Introduction
Sleep is essential for early development, especially for vulnerable infants admitted to the Neonatal Intensive Care Unit (NICU). During and after a NICU stay, infants are exposed to a myriad of factors disturbing their sleep. Parents often become increasingly anxious about their infants' sleep, especially during the transitional period from hospital to home. Currently, no evidence-based sleep strategies exist for this population.
This study aims to delineate the top five evidence-based and expert-endorsed sleep strategies, incorporating parental feedback in the rating process, to improve infant sleep post-NICU discharge.

Materials and Methods
A Delphi design , consisting of three rounds, was employed. During the first two rounds, evidence-based sleep strategies were presented to sleep experts. Subsequently, the list of sleep strategies was presented to parents of infants discharged from a neonatal ward for final revision and alignment with parental needs.

Results
A literature search identified 11 sleep strategies. These strategies were incorporated in Delphi round 1. A total of 13 sleep experts reviewed and revised these strategies, resulting in a list of 8 categories of sleep strategies. In round 2, these categories were ranked by 14 sleep experts, with the most important strategy being labeled as “knowledge gathering.” In round 3, the same list of 8 categories was ranked by 35 parents. They found the most important strategies to be “sleep hygiene” and “swaddling.”

Conclusions
This study provides an overview of evidence-based, expert-generated, and parent-endorsed sleep strategies that can be used for clinical practice. The ranking of these strategies differs

between experts and parents. In turn, healthcare professionals should ensure that the strategies provided are feasible and tailored to meet the family's specific needs.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P35

Title
Parent-reported Sleep Characteristics of Canadian Infants at 3 and 12-months

Introduction
Major developmental changes occur in infant sleep during the first 12 months postpartum. Moreover, parents often have concerns about whether their infant's sleep is typical. However, there has been limited comprehensive data on Canadian infant sleep characteristics, particularly since the emergence of the COVID-19 pandemic. Thus, this study aimed to (1) describe sleep behaviors in Canadian infants born during the COVID-19 pandemic and (2) explore relationships between socio-ecological factors and infant sleep.

Materials and Methods
This study analyzed data collected by the Pregnancy During the COVID-19 Pandemic (PdP) longitudinal Canadian cohort. The PdP cohort was established in April 2020 to monitor pregnancy and child developmental outcomes throughout the pandemic. For this study, we assessed parent-reported infant sleep characteristics using the Brief Infant Sleep Questionnaire-Revised Short Form (BISQ-RSF) at 3 and 12 months postpartum. Individual sleep items were described with descriptive statistics. Total BISQ scores, as well as the sub-scale scores for infant sleep, parent perception, and parent behavior are also described, with higher scores indicating higher quality sleep. Correlations between sleep and socio-ecological factors at the micro- (infant and birth parent characteristics), meso- (parent-environmental and family relational measures), and exo-/macro-systems (socio-cultural and economic variables) were assessed.

Results
In this study, 3689 and 4069 parents provided infant sleep data at 3 and 12 months, respectively. Preliminary analyses indicate total 24-hour sleep duration was 13.74 hours (+/- 2.17) at 3 months and 13.21 hours (+/- 1.49) at 12 months. The total nighttime infant sleep duration at 3 and 12 months postpartum was 9.69 (+/- 1.64) and 10.79 (+/- 1.27) hours, respectively. Total daytime sleep was 4.05 (+/- 1.6) hours at 3 months and 2.42 (+/- 0.68) hours at 12 months. The longest consolidated sleep period was 5.99 (+/- 2.32) hours at 3

months and 8.16 (+/- 2.26) hours at 12 months. Most infants (84.2% at 3 months and 96.8% at 12 months) had ≤ 1 hour of nighttime wakefulness. The average time infants needed to fall asleep was 26.4 (+/- 18.0) minutes at 12 months, which was 7.2 (+/- 7.2) minutes less than infants at 3 months. Approximately 10% of parents rated their infant's sleep as a moderate or severe problem at 3 and 12 months.
BISQ-RSF total scores at 3 and 12 months postpartum were significantly associated with infant crying at 3 months (-.312, -.125), temperament (negative affectivity, -.272, -.223; orienting/regulating capacity, .135, .056), birth parent anxiety (-.218, -.122) and depression (-.112, -.099), perceptions of COVID-19 threat (-.125, -.083), parental intolerance of uncertainty (.083, -.049), and perceived social support (.101, .162). Parental education was associated BISQ-RSF score at 3 months (-.070), but not 12 months, while household income was associate with BISQ-RSF score at 12 months (0.157), but not 3 months.

Conclusions

This study provides up-to-date community-based Canadian data on infant sleep and their correlates. Understanding the relationships between infant sleep and socio-ecological factors will aid healthcare providers and researchers in identifying risk and protective factors for infant sleep problems.

Acknowledgements

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Presentation Day and Board Number
Sunday, April 28, 2024 | P05

Title
Do school start times in British Columbia, Canada follow recommendations for start times? A population-based scan of publicly available school start times.

Introduction
It has been ten years since the American Academy of Pediatrics issued a policy statement recommending later school start times for middle and high schools of 8:30 AM or later. While robust evidence that middle and high school start times impact the amount of sleep adolescents obtain has continued to accrue, there is scant research on elementary school start times. With many Canadian children and adolescents having inadequate sleep, the study objective was to assess the school start times in Canada's third largest province (British Columbia). Specifically, we aimed to: (a) identify the average start times for schools located in British Columbia; and (b) identify which proportion of these schools start at 8:30am or later. With nearly 19% of Canadians living in rural areas, which are often subject to health inequities, we also sought to determine if rurality was associated with school start times.

Materials and Methods
We conducted a scan of school start times using a population list of all 2329 schools in British Columbia. We included only standard-type schools with active enrollment. We excluded alternate school types (e.g., online learning schools, etc.) and kindergarten or pre-Kindergarten schools. Web searches for start times were completed. Data on warning bell times, school start times, and the source webpage was extracted by a primary extractor and verified by a secondary extractor, with disagreements resolved by a third extractor. Rurality was assigned using the Index of Remoteness, a measure developed by Statistics Canada. The Index of Remoteness ranges from 0 to 1, with a higher index for more rural communities. Descriptive statistics were calculated for school start times, which were also coded as yes/no for meeting the start time recommendation. Sub-analyses were conducted based on grade groupings (e.g., elementary only, middle and high school, high school only, etc.). A Pearson correlation was used to determine if rurality was associated with start time.

Results

Of the 1759 schools that met inclusion criteria, we found start times for 1465 (83%). Of these, 88 schools had different start times for certain grade groupings, each of which were treated as a unique case (n=197), for a total of 1660 school start times. The overall average start time was 8:41 AM (SD = 0:16) and ranged from 7:10 AM to 10:00 AM with a median start time of 8:40 AM. A large majority of schools started at 8:30 AM or later (87%). There was a significant effect of grade category on school start time, $F (5, 1654) = 3.239$, $p = .006$, $\eta 2 = .01$, 95% CI [.001, .018], although all grade categories had means later than 8:30 AM. Higher rurality was associated with earlier school start times ($r(1659) = -.124$, $p < .001$, 95% CI [-.171, -.076]).

Conclusions

These findings demonstrate that British Columbia has overwhelmingly operationalized school start times that support childhood and adolescent sleep recommendations. Future research is needed to understand what facilitated current school start times in British Columbia and explore what factors drive school start times in more rural areas.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P36

Title
Healthy patient and parent sleep: our experience.

Introduction
The Great North Children's Hospital is a large tertiary hospital in the Northeast of England, with two PICU and ten paediatric wards across two different sites. Preliminary surveys identified that sources of 'tension' are prevalent within the hospital. With increasing complexities of patients and lengthy stays, trying to identify simple strategies to make improvements were key and we started by looking at the improvement of sleep.
We have developed a multidisciplinary team of sleep champions who work within a variety of backgrounds including consultants from respiratory paediatrics, general paediatrics, community paediatrics, adult neurology, sleep physiologists, nursing staff, healthcare assistants and play specialists. As a larger group we have identified our key areas for improvement and developed these over the last 2 years.

Materials and Methods
After enrolling in the Sleep for Health in Hospital project and attending a training workshop; training is now being cascaded across the wards and across the multidisciplinary teams. Specific, targeted education has been developed for staff with short PowerPoints delivered in-situ on the wards. There are webpages about 'normal' sleep, simple behavioural improvements that can be made, and project webpages available.
SoundEARS were installed on the wards and are a visible reminder to patients, their families, and staff about the importance of reducing noise overnight. We have monitored average noise levels on the wards, and these are a measurable way of ensuring our intervention is successful.

Results
By utilising the SoundEars, providing a programme of education and training alongside visual reminders we have successfully reduced the noise on the wards. Our work and education programme is ongoing and we are continuing our evaluation of noise, delivering targeted intervention where required.

The Sleep webpages on our regional website have been monitored for the number of hits, are we are successfully providing education/reminders to parents and carers about the importance of sleep alongside simple changes that can be made.

Conclusions

Highlighting the importance of undisturbed sleep has been important and ties in with other Trust work being delivered about overnight observations, reducing the number of medications being given overnight and clustering interventions.

The project is ongoing, but we have made simple and effective changes that we hope will make a continued improvement in experience for both patients and their carers.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P37

Title
Understanding Toddler Sleep in Typical Development: A Videosomnography Study

Introduction
Sleep is a common topic raised at toddler well-child visits—even when other developmental concerns are not present. These discussions may stem in part from uncertainty on what is normal for toddler sleep. Despite recent attempts to classify normative sleep using large samples, there are notable gaps in existing studies and how they inform parental sleep expectations. Most studies use community samples that likely include children with undocumented atypical trajectories. Moreover, sleep estimates are generally gathered using parent reports that are biased and cannot capture sleep context. We aimed to characterize variations that parents can expect for sleep within typical development (TD), including sleep context.

Materials and Methods
Nighttime sleep patterns of TD toddlers were explored using videosomnography, an objective measure of sleep behaviors in context. Participants included 71 toddlers (male n = 40; female n = 31; White n = 60) drawn from two larger prospective studies. In this cross-sectional sample, sleep was recorded at 18 (n = 15), 24 (n = 36), or 36 (n = 20) months, and toddlers were classified as TD at 30 or 36 months based on detailed developmental monitoring.

Video cameras were placed above the child's primary sleep location for at least 3 consecutive nights (Sunday through Thursday). Videos were behaviorally coded for bedtime, sleep onset, night wakings, and sleep offset. Sleep context was also coded for the child's use of sleep aids, sleep location, parental presence at sleep onset, and parental involvement during night wakings. Sleep duration and sleep onset latency were calculated.

Results
There was high variability in nighttime sleep behaviors. On average, children woke .65 times per night (ranging from 0-2.75). For children with night wakings, the average duration per

waking was 17.09 minutes, ranging from 2.0-128.50 minutes. Night waking duration statistically differed across cross-sectional age groups, where 18-month-old children woke longer than 24 and 36-month-old children (p

Conclusions

Ultimately, sleep behaviors such as night waking can be a normative part of early development for toddlers without developmental concerns. Findings from our study may be useful for helping families set realistic expectations about their child's sleep during toddlerhood. Specifically, findings may reduce caregiver anxiety around societal expectations that young children should sleep through the night without parental intervention. Although most children fell asleep independently and woke in their own bed, wakings at a threshold requiring parental assistance continue to be common for many toddlers through at least age three.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P38

Title
Understanding Parental Levels of Engagement in an eHealth Intervention for Pediatric Insomnia and Neurodevelopmental Disorders

Introduction
Children with neurodevelopmental disorders (NDD) experience high rates of sleep problems. The Better Nights, Better Days for Children with Neurodevelopmental DisordersTM (BNBD-NDD) program is an online intervention for parents of children with NDD. The program has recently undergone a national implementation study (recruitment completed; data collection and analysis ongoing), where parental adherence and engagement are being monitored. Preliminary results have shown less utilization than expected. As this study has largely been conducted during the COVID-19 pandemic, this may have impacted parental engagement and adherence. Research also shows that one's motivation and readiness for change can often impact engagement and adherence in an intervention. The objective of the current study is to better understand engagement with the BNBD-NDD program concerning parental motivation and readiness for change, while considering the possible impacts of COVID-19.

Materials and Methods
Parents of children with NDD (n = 18) who were enrolled in the BNBD-NDD program for a minimum of four months were asked to completed exit interviews using a researcher-generated, semi-structured interview guide. During the interview, participants were asked about their engagement in the program, perspectives on their own readiness for changing their child's sleep, and the impact of COVID-19 on their engagement. Data were analyzed following an inductive content analysis approach.

Results
Several themes have been generated across the data. More engaged participants identified higher severity of sleep problems in their children with NDD, high levels of motivation, a history of unsuccessful previous strategies for improving sleep, and greater confidence in the BNBD-NDD program's ability to influence change. In comparison, less engaged participants identified limited time and resource availability and a lack of motivation as barriers to their engagement. They also expressed lower confidence or uncertainty about the potential

impact of the program, as well as an uncertainty about how to actually make changes to their child's sleep habits. Lastly, while most did not think the pandemic impacted their engagement, several participants commented that the COVID-19 pandemic improved their engagement with the program due to remote work, reduced activities, and having more time to engage with the program.

Conclusions

Parents identified several factors related to their readiness for change as contributors to their engagement level in the BNBD-NDD program. The COVID-19 pandemic was not identified as a barrier to engagement in this sample. Understanding parents' engagement levels within the BNBD-NDD eHealth program related to their motivation and readiness for change is crucial to optimize uptake and adherence to the program, improve the program's implementation and sustainability, and continue to help affected children and parents sleep better.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P39

Title
Comparison of transcutaneous carbon dioxide measurements and capillary pCO2 measurements on paediatric sleep study patients

Introduction
Recent British Thoracic Society guidelines for diagnosing and monitoring paediatric sleep-disordered breathing1 recommend that carbon dioxide (CO2) monitoring should be considered for children with comorbidities where hypoventilation is suspected. Many United Kingdom paediatric sleep centres no longer routinely perform calibration of transcutaneous pCO2 (tcpCO2) measurements using capillary blood gases. Historically, our institution has performed a capillary blood gas sample to understand tcpCO2 measurement error (degree of under read/over read). To provide evidence to update local practice guidelines, retrospective analysis of paired transcutaneous (tcpCO2) and capillary (pCO2) measurements was undertaken.

Materials and Methods
Bland Altman analysis2 of paired tcpCO2 measurements (Radiometer TCM5) and capillary pCO2 measurements (Radiometer ABL90 FLEX Plus) conducted on paediatric patients undergoing overnight sleep studies between December 2020 to October 2023 was performed. The BlandR package (version 0.5.1)3 in RStudio (version 4.2.2)4 was used to calculate means for paired set of measurements, the difference in means, and the 95% upper and lower confidence intervals for these .

Results
Paired measurements of TCM5 and capillary pCO2 measurements from 275 sleep patients (age range 1 week to 16 years) were analysed (Figure 1). Overall, the results show a good correlation between tcpCO2 and capillary pCO2 blood gas measurements, with no indication of erroneous measurements at higher or lower pCO2 values. The upper limit of agreement was 1.11 kPa above the mean for all values, and the lower limit of agreement was 1.07 kPa. The bias between measurements was found to be low (0.02; 95% CI -0.05 to 0.09).

Conclusions

There is close agreement between tcpCO2 and pCO2 measurements in our clinical population. This suggests that routine verification of tcpCO2 by contemporaneous capillary pCO2 is unnecessary.

Our new guidelines recommend capillary blood gas sample should only be taken if the tcpCO2 value reads <4.0Kpa or ≥6.5kPa for 5 minutes or more. This is a service improvement that reflects good practice recommendations1 and has had a positive impact on patient experience, as fewer patients undergo invasive sampling.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P40

Title
Late-night snacking, sugar-sweetened beverages, and caffeine consumption are shared determinants of problematic and irregular sleep onset, increased obesity, and poor well-being in 11–14-year-olds.

Introduction
In Europe, 20% of adolescents are classified as overweight or obese, and 69% of adolescents do not meet recommended sleep guidelines; 49% have poor sleep quality. The aim of this study was to identify modifiable shared determinants of poor sleep and increased adiposity.

Materials and Methods
A cross-sectional study of 11–14-year-olds was conducted. Sleep onset problems were measured using validated questionnaires and actigraphy (ActiGraph-GT3X) over seven nights. Body mass index percentile (BMIp) was used as an index of obesity. Validated self-assessed questionnaires assessed well-being and dietary behaviours (late-night (1-hour before bed) sugar-sweetened beverage (SSB), caffeine consumption, and time of last food consumption). Block-wise regression analyses using four blocks were performed to examine the association between the tested variables (sleep and obesity) and diet behaviours, adjusting for (1) maternal education and employment, (2) maternal work shift pattern, (3) well-being and (4) dietary behaviours.

Results
Sixty-two adolescents (29M/33F, 12.2±1.13yrs, BMIp 60.3±32.1) completed the study. Late-night SSB consumption (block 4) was significantly associated with increased insomnia (AdjR^2=.721, F= 18.514, p

Conclusions
Late-night consumption of SSB, caffeine and food explains around two thirds of the variation in BMIp. Thus, targeting these dietary behaviours in health-promoting interventions could help improve sleep and well-being and reduce adolescent obesity.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P41

Title
The role of oxicapnography vs cardiorespiratory polygraphy in the follow up of children on long term NIV

Introduction
Background
Studies show during systematic follow up (PSG/Cardiorespiratory Polygraphy (CR Poly)) after NIV initiation, ongoing respiratory events and/or abnormal gas exchange requiring intervention, even in asymptomatic patients.

There is a lack of validated NIV monitoring strategies. CR Poly offers more data but is more burdensome than O2CO2.

Aim
To evaluate the efficacy of O2CO2 vs CR Poly as primary monitoring tool for children on long term NIV.

Materials and Methods
Singe centre retrospective study; data from Children on home NIV; Jan 2020–Jan 2023. Inclusion: NIV, CR Poly + O2CO2, data >4hrs. Exclusion: NIV initiation studies.

Results
87 children met inclusion criteria. Mean age 11.8 years (SD ±5.4years), 56% male.
If CR Poly normal, the O2CO2 study was normal in 91%. The 9% abnormal cases were false positives (raised ODI: awake/movement artefact).
If CR Poly abnormal:
10% showed hypoventilation only which would be identified on O2CO2 study.
17% showed asynchrony: 55% of O2CO2 normal, 45% abnormal (mostly hypoventilation).
When CR Poly abnormal with raised AHI ±3%ODI (74%), O2CO2 is falsely negative in 37.5% of this group. O2CO2 abnormal in 59% of mild SDB, 73% of moderate/severe SDB.

Conclusions

Ideally, CR Poly should be used to monitor children on long term NIV. O2CO2 studies can miss asynchrony and there may be false positives from movement artefact. However, where resources are limited O2CO2 studies identify most cases of mod/severe SDB.

Future research comparing the combination of O2CO2 with analysis of ventilator download data vs CR Poly would be of interest.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P42

Title
The risk of postoperative respiratory complications following adenotonsillar surgery in children with or without obstructive sleep apnea

Introduction
Obstructive sleep apnea (OSA) appears in 2–5% of children, with first-line treatment being adenotonsillar (AT) surgery. Our aim was to examine the risk of postoperative respiratory complications (PoRCs) in non-OSA and the different OSA severity (mild, moderate, severe) groups.

Materials and Methods
Study design: We conducted a prospective data collection from children who underwent polysomnography followed by AT surgery at Heim Pal National Pediatric Institute, Budapest, Hungary between 1 January 2015 to 31 December 2018. To compare our results with international data, a systematic review and meta-analysis was carried out analyzing PoRCs following AT surgery in children with and without OSA.

Methods: 577 children were included who underwent polysomnography (PSG) followed by AT surgery at Heim Pal National Pediatric Institute, Budapest, Hungary between 1 January 2015 and 31 December 2018. On the other hand, 19 observational studies were enrolled using the same search key in MEDLINE, Embase and CENTRAL. The connection between PoRCs, the presence and severity of OSA, the severity of respiratory complications, and additional comorbidities were examined.

Results
Based on our meta-analysis PoRCs appeared more frequently in moderate ($p=0.048$, OR: 1.79, CI (1.004, 3.194)) and severe OSA ($p=0.002$, OR: 4.06, CI (1.68, 9.81)) compared to non-OSA patients, supporting our findings, where AHI was increased in patients with PoRCs [14.7 (3.4-51.3) events/hour vs. 3.9 (2.0-8.0) events/hour, $p<0.001$]. No significant difference was detected in the appearance rate of major complications ($p=0.200$, OR: 2.14, CI (0.67, 6.86)) in children with OSA compared to children without it. Also, among children who developed PoRCs, no significant difference was observed in the presence of other comorbidities

(p=0.669, OR: 1.29, CI (0.40, 4.14)) or in the distribution of PoRCs (p=0.904, OR: 0.94, CI (0.36, 2.45)) between the two groups, suggesting that OSA alone can increase the risk of PoRCs after AT surgery.

Conclusions

Uniform guidelines and a revision of postoperative monitoring are called for, since children with moderate and severe OSA are more likely to develop PoRCs following AT surgery based on our results, but no significant difference was found in mild OSA. Furthermore, the presence of OSA only is not associated with an increased risk of developing major complications.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P43

Title
What Are the Parent-perceived Barriers and Facilitators to Consistent Use of Sleep-related Routines with Toddlers?

Introduction
Routines, particularly at bedtime, are often recommended as a first line treatment for many common Child Sleep Problems (CSPs). Research has demonstrated the benefits of consistent routines for child sleep in a number of domains, along with benefits for caregiver wellbeing and family functioning. However, despite these benefits, many parents do not follow consistent sleep-related practices. While between 80-90% of caregivers report having a bedtime routine, studies report around a third follow their routine four nights/week or fewer. Parents also report including activities that are not recommended (e.g. television and running around) in toddlers' bedtime routines. Understanding barriers and facilitators of parents' use of sleep-related routines with their children may therefore be important for developing relevant guidance about routines and increasing adherence.

Materials and Methods
This was a qualitative study, based on semi-structured online interviews with 21 mothers of 1-3 year-olds. Parents were asked about advantages and disadvantages of using sleep-related routines with their toddlers, the facilitators and barriers they perceived to using their sleep-related routines consistently and any changes they would like to make to their routine practices. Data were analysed using thematic analysis.

Results
Seven themes were identified, two with associated sub-themes, which represented parent-perceived factors that influenced composition and consistency of toddlers' sleep-related routines: Individual Child Factors, Formation of Habits, Parental Beliefs about Sleep, Parental Attitudes to Routines, Parental Limit-setting, Support and External Schedules. Key barriers and facilitators for caregivers wanting to change their child's sleep routines were also identified. Parents reported that the above child, caregiver, family unit and contextual factors influenced toddlers' sleep-related routines in different ways, with some acting as both as facilitators and

barriers to consistent implementation of their preferred routines. For example, believing that sleep is important for child health and development could promote consistent implementation of a regular bedtime routine, however, it could also prevent mothers from seeking to change aspects of their routines that they felt were detrimental to child sleep and/or their own wellbeing in case sleep worsened.

Conclusions

A range of factors make managing consistent sleep-related routines with toddlers particularly complex and challenging. Therefore, sensitive, non-judgmental acknowledgement of the practical and emotional challenges of maintaining consistent routines with toddlers is needed to help families increase adherence and support them to shape routines which are optimal for the whole family. Caregivers' preferred sleep-related routines for their toddlers may look different in different families, as a range of overlapping child, parent and contextual factors require consideration to ensure routines benefit both individual child sleep and the functioning of the whole family and its members.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P44

Title
Caregiver-reported sleep characteristics of children with epilepsy and their caregivers in independently sleeping, regular co-sleeping and irregularly co-sleeping families.

Introduction
Epilepsy is a chronic neurological condition occurring in 0.3-1.0% of children, characterised by recurrent unpredictable seizures. Sleep disturbances are reportedly frequent in children with epilepsy (CWE), although most studies have relied on retrospective questionnaire data or single nights of polysomnography and we lack detailed, night-to-night, naturalistic information about families' sleep patterns in the home setting. Co-sleeping is a common practice between CWE and (usually) a primary night-time caregiver, however, in typically developing populations, this strategy has been associated with poorer child sleep outcomes compared to independent sleeping. This study aimed to i. describe the subjectively-reported sleep characteristics of a sample of CWE and their caregivers in the UK from sleep diaries, ii. examine differences in sleep characteristics (child and caregiver) between families with different sleeping arrangements.

Materials and Methods
Caregivers of CWE aged 4 – 13 years (Mdn = 9.36; 61% male), recruited in NHS clinics, completed two-week sleep diaries for their child (n = 71) and themselves (n = 67). Sleep timing and duration, night waking and sleep location variables were extracted. Data were descriptively analysed and tests for differences were carried out between child and caregiver sleep characteristics in families where children slept alone (n= 28), regularly co-slept (>50% of recorded nights; n= 27), or irregularly co-slept (<50% of recorded nights; n=16).

Results
Children averaged 9.82 hours' (SD = 48.1 mins) sleep, took 22.4 minutes (IQR = 17.7) to get to sleep and woke during 21.4% of recorded nights (IQR = 42.9%), averaging 0.21 wakes/night (IQR = 0.54). Caregivers averaged 7.64 hours' (SD = 51.2 mins) sleep, took 20.6 minutes (IQR = 16.4) to get to sleep and woke 40.0% (IQR 48.1%) of nights, with an average of 0.46 (IQR = 0.79) wakes a night.

There were significant differences in the frequency of night wakes between children who regularly co-slept and those who slept independently or co-slept less regularly ($p < .001$). Regularly co-sleeping children woke more nights/week (50.0% of nights; IQR = 67.3%), compared with independent sleepers (21.4% of nights; IQR = 18.0%) and irregular co-sleepers (9.8%; IQR = 31.0%). Regularly co-sleeping children also had more wakes/night (0.50; IQR = 0.995), compared with independent sleepers (0.14; IQR = 0.20) and irregular co-sleepers (0.14; IQR = 0.39; $p = 0.015$). There were no significant differences in caregiver sleep characteristics in families with different sleeping arrangements.

Conclusions

Night waking was common in CWE and their caregivers, especially when co-sleeping. Families of CWE may particularly benefit from behavioural sleep interventions which address co-sleeping and night-waking. Future research using objective measures is needed to identify whether CWE who regularly co-sleep actually wake more frequently than those who sleep independently, or whether these results represent parents' awareness of their child during the night.

Acknowledgements

The authors would like to thank the parents and children who have shared their time to contribute to the development of, and participate in, the CASTLE research programme; the charities, organisations and Hospital Trusts which have helped with recruitment

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Presentation Day and Board Number
Saturday, April 27, 2024 | P45

Title
Parental cognitions about the sleep of children with epilepsy and the impact of a behavioural sleep intervention on these thoughts, feelings, beliefs and attitudes

Introduction
In typically developing and some neurodevelopmental disorder (NDD) populations, certain parental cognitions about child sleep (e.g. difficulty setting limits to resist child demands and feelings of anger) are associated with poorer child sleep. These cognitions also affect how parents behave at bedtime, which in turn affects child sleep, with more active involvement linked to poorer outcomes. However, parental cognitions have not been explored in parents of CWE. The study aimed to; (i) describe parental cognitions about child sleep in parents of CWE, (ii) investigate how these thoughts relate to child sleep problems, and (iii) determine if parental thoughts about child sleep change after engaging with an online behavioural sleep intervention (Baseline - T0 vs 3 months after being granted access to the online sleep intervention - T1).

Materials and Methods
Primary night-time caregivers in the treatment arm of a randomised control trial for an online behavioural child sleep intervention (n=41) were invited to participate. Parents provided; i. demographic details about their CWE (gender, age and presence of comorbid NDDs e.g. Attention Deficit Hyperactivity Disorder (ADHD) or Autism Spectrum disorder (ASD)), ii. their child's night-time epilepsy (frequency of seizures) and sleep (questions about a range of sleep behaviours, from which a composite sleep disturbance score was calculated) and iii. an adapted version of the Maternal Cognitions about Infant Sleep Questionnaire (MCISQ) suitable for use with parents of school-aged children. This was completed at baseline (T0) and repeated post-treatment (T1). Four MCISQ subscales were derived: (i) problems setting limits on their child's behaviour (0-25), (ii) child-directed anger (0-25); (iii) parenting competence doubts (0-25), (iv) child safety concerns (0-10), and a total score (0-85). Higher scores indicate more problematic cognitions.

Results

Twenty four parents (n=22 mothers) completed demographic details about their CWE (mean age = 8.9 years, SD = 2.4, n=19 males and n=10 with comorbid NDD) and their epilepsy (n=4 regularly having seizures during sleep), as well as MCISQ assessments at T0. Eleven parents also completed the MCISQ at T1. At T0 mean (and SD) MCISQ scores; Setting Limits = 13.6(4.8), Anger = 4.2(2.6), Doubt = 7.3(3.9), Safety = 5.5(2.6) and Total = 30.6(9.1). At T1 MCISQ scores; Setting Limits = 11.8(4.5), Anger = 5.0(3.8), Doubt = 6.9(3.9), Safety = 5.8(2.5) and Total = 29.6(10.5). At T0, there was no significant correlation between total MCISQ and the severity of children's sleep disturbance ($r=0.359$, $p=.085$, $n=24$). The only significant change observed between T0 and T1 was a reduction in difficulty setting limits ($z=-2.09$, $p<.05$).

Conclusions

Although parental cognitions about sleep did not appear to relate to child sleep problem severity at baseline, some dysfunctional parental cognitions were improved by intervention. Comparing mean scores to previously published work, parents of CWE had higher MCISQ total scores compared to parents of children with Developmental Coordination Disorder (DCD) and lower scores for anger but higher scores for safety concerns compared to parents of children with ADHD. These results highlight the need for sleep interventions tailored to parents of CWE, emphasising the importance of addressing parental thoughts about child sleep.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P46

Title
Improvement in quality of life with continuous positive airway pressure outweighs the treatment burden in children with obstructive sleep apnea

Introduction
Continuous positive airway pressure (CPAP) for treatment of obstructive sleep apnea (OSA) may pose a significant burden on families. We assessed the impact of CPAP for children on quality of life (QOL) and caregiver treatment burden.

Materials and Methods
Prospective cohort study of children commencing outpatient CPAP in a specialist sleep centre 2020-2022. Questionnaires regarding sleep-related symptoms (PROMIS Pediatric Sleep Disturbance and Sleep-Related Impairment), QOL (OSA-18, QI-Disability), caregiver burden (Caregiver Strain Questionnaire) and overall health impact (Glasgow Children's Benefit Inventory) were completed by caregivers at CPAP commencement and 6 weeks later.

Results
42 caregiver-child dyads consented; 2 withdrew, 6 did not complete any questionnaires, 3 stopped CPAP due to surgery for OSA in the follow-up period and 5 were lost to follow-up. 26 patients completed follow-up (7F; median age 11.4y, baseline OAHI 10.3/h; 77% overweight or obese, 73% comorbidity other than obesity). OSA-related QOL (OSA-18) significantly improved at follow-up ($p<0.01$), as did child general QOL ($p<0.001$), sleep disturbance ($p<0.01$) and sleep-related impairment ($p<0.001$). Caregivers mostly rated CPAP as beneficial to their child's health but 19% rated CPAP as harmful or having no effect. Caregiver strain reduced at follow-up ($p<0.001$) and benefit outweighed inconvenience ($p<0.0001$) in 81%. CPAP adherence was correlated with overall health impact ($r=0.67$, $p<0.01$) but not with caregiver rating of inconvenience.

Conclusions
CPAP resulted in improvements in QOL and sleep-related symptoms, and reduced caregiver strain. Perceived benefits outweighed the burden of treatment for most but not all families.

CPAP adherence was moderately correlated with family-reported measures of benefit but not related to perceived inconvenience. This study provides reassuring evidence regarding the benefits and impacts of CPAP for children, many of whom already have complex health care needs.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P47

Title
Contributory Factors for Teen Insomnia Symptoms: A Prospective Cohort Study in Sweden

Introduction
Insufficient sleep is a public health problem that impacts the mental and physical health of children and adolescents. Complaints of insomnia are particularly pervasive among adolescents. This longitudinal study investigates factors that contribute to teen insomnia symptoms.

Materials and Methods
Five-year prospective follow-up study.
The dependent variable of insomnia symptoms at follow-up was assessed with the Minimal Insomnia Symptom Scale-Revised. The independent variables at baseline were the perceived family financial situation, tiredness at school, problems waking up, short sleep duration, sleeping difficulties, having a bedroom Television (TV), and time spent with a TV/computer. Multivariate binary logistic regression analyses were used to examine whether the independent variables at baseline predicted insomnia symptoms at follow-up.

Results
Perceived quite bad/very bad family financial situation (OR 3.1; CI 1.4–6.7) and short sleep duration (<10 h) (OR 2.3; CI 1.0–5.3) among girls at baseline were associated with insomnia symptoms at follow-up. Having problems waking up among boys at baseline was associated with insomnia symptoms at follow-up (OR 4.9; CI 1.6–14.4).

Conclusions
Short sleep duration, problems waking up, and perceived bad family
financial situation during childhood were linked with adolescent insomnia symptoms. The sex-based differences in these associations warrant further investigation to effectively mitigate adolescent insomnia.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P48

Title
Adjusting Apnea Hypopnea Index (AHI) in Children with Low REM% by Polysomnography and its Potential Impact on OSA Diagnosis and Severity

Introduction
Polysomnography (PSG) is the gold standard test for the diagnosis of obstructive sleep apnea (OSA) in children. Obstructive events occur predominantly during REM sleep and can result in frequent arousals and decreased REM, with subsequent underestimation of AHI. We, therefore propose adjusting AHI to a normalized REM% in these children. We validated the resulting adjusted AHI against REM-AHI and evaluated its impact on OSA diagnosis and severity.

Materials and Methods
We reviewed demographic, clinical and PSG data of all patients at risk for OSA who had completed diagnostic sleep study at Sidra Medicine (Doha/Qatar) between 2016 and June 2023, including patients with obesity, neuromuscular disease, Down's Syndrome and Prader Willie Syndrome. Only patients with sleep efficiency of > 40% and decreased REM percentage of < 15% were selected for AHI adjustment. PSG parameters including total sleep time (TST), REM% (i.e., total REM time divided by TST X 100%), AHI and REM-AHI were used to adjust AHI and REM-AHI.

AHI and REM-AHI were adjusted by assuming a normal REM percentage of 20% and a uniform distribution of apnea and hypopnea events during REM sleep (7). The adjusted AHI and adjusted REM AHI were calculated as follows.

- Adjusted AHI = Actual AHI X (Normal REM percentage (20%)/ Actual REM%)
- Adjusted REM-AHI = Actual REM-AHI X (Normal REM percentage (20%)/ Actual REM%)

Diagnosis with OSA was made if actual AHI or adjusted AHI were > 1.5 events per hour. OSA was considered mild if actual AHI or adjusted AHI were >1.5 events per hour but <5 events per hour, moderate if actual AHI or adjusted AHI were > 5 events per hours but <10 events per hour, and severe if AHI or adjusted AHI were > 10 events per hours. Comparison between

the frequency of patients diagnosed with OSA before adjustment vs after adjustment of AHI was conducted. Also, comparison in the frequency of patients in each category of OSA severity before adjustment vs after adjustment of AHI was also made.

We also validated the adjusted AHI using REM AHI as the gold standard test, which is also established as a clinically relevant parameter in patients with OSA. We compared the level of agreement between AHI and REM-AHI versus the level of agreement between adjusted AHI and REM AHI. Intra class correlation (ICC) analysis and Bland-Altman plots were utilized for the comparison. We hypothesized that the adjusted AHI has better level of agreement with REM AHI and has less bias than the non-adjusted AHI.

Results

Clinical and PSG data for a total of 380 patients were reviewed. Only 79 patients fulfilled the inclusion criteria of low REM sleep (≤ 15% of TST) with acceptable sleep efficiency (≥ 40%). Of these 79 patients, 42 patients were diagnosed with obesity, 20 patients were diagnosed with neuromuscular disease, 16 patients were diagnosed with Down Syndrome and one patient was diagnosed with Prader Willi syndrome. Median (range) age was 12.8(0.9-18) years. Male to female ratio was 2.3:1. Median (range) BMI was 31.5 (8.9-63.3) Kg/m2. Mean (SD) sleep efficiency was 64.7 % (12.3). Mean (SD) REM time was 34 (13.8) minutes, and mean (SD) REM% was 10.5% (3.4) of TST.

Median (range) AHI before adjustment was 1.7 (0 - 44) events/hour. Median (range) AHI after adjustment was 4.1 (0 - 74.4) event/hour, with significant difference between non adjusted AHI and adjusted AHI ($P<0.001$). Median(range) REM-AHI before adjustment was 6.9 (0 - 89.2) events/hour and median(range) REM-AHI after adjustment was 14.4 (0 - 169) events/hour, with significant difference between non-adjusted REM- AHI and adjusted REM-AHI ($P < 0.001$).

Before AHI adjustment, 42% of the patients had no obstructive sleep apnea OSA, 27% fit the criteria for mild OSA, 14% for moderate OSA and 18% for severe OSA. After adjustment of AHI, 25% had no OSA, 28% fit the criteria for mild OSA, 11% for moderate OSA and 35% for severe OSA. OSA severity was changed from normal to mild OSA in 12 (15%) patients, from mild to moderate OSA in 7 (9%) patients and from moderate to severe OSA in 9 (11%) patients.

Validation analysis revealed that Adjusted AHI had better level of agreement with REM- AHI (ICC=0.691, 95% CI:0.58,0.80) than the level of agreement between non-Adjusted AHI and REM-AHI (ICC=0.485,95%CI:0.39,0.58).

Conclusions

Adjusting AHI in patients with low REM sleep to a normalized percentage may be necessary to avoid underestimation of OSA.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P49

Title
Narcolepsy – diagnosis challenges in pediatric age

Introduction
Narcolepsy is a rare sleep disorder characterized by excessive daytime sleepiness (EDS) that appears before 15 years old in one-third of cases. Diagnosis in pediatric age is challenging due to atypical presentation and lack of age-tailored criteria, adulthood criteria being currently used.

Materials and Methods
Transversal study including narcolepsy patients followed in a Portuguese Pediatric Sleep Center between January/2018 and December/2023.

The aim of this study was to characterize this disorder in a pediatric population, analyze and discuss the diagnosis challenges in this age.

Results
A total of 30 patients were enrolled, 29 narcolepsy type 1 and 1 type 2. Sixteen (53%) were females and the median age of symptoms presentation was 8 years (min 3, max 13). Referral to specialized consultation and diagnosis happened on average 3 (min 1, max 10) and 4 years (min 1, max 12) after the first symptom, respectively.

EDS was the first symptom in 28 (93%): 29 fell asleep in class/monotonous circumstances, 19 had sleep attacks and 1 only referred daytime napping. Cataplexy was present at diagnosis in 24 cases (80%): in 13 (43%) was reported from the onset of complaints, without EDS in 2; in 11 it occurred on average 3 years (min 1, max 10) after EDS. In 4 the loss of muscle tone was not triggered by emotions (2 with sudden falls) and in 11 facial muscles were involved. Patients with cataplexy were referred to consultation on average 4 years earlier than those without. Sleep paralysis was reported by 6 (20%) and vivid dreams/hypnagogic or hypnopompic hallucinations by 18 (60%). Decrease in school performance was present in 17 (57%), behavioral changes in 23 (77%), and increased appetite/weight gain in 19 (63%).

Psychiatric conditions were present in 8 (27%) (4 under psychotropic medication), 8 reported restless sleep (2 with restless leg syndrome criteria) and 15 snoring. Polysomnography revealed periodic limb movements (PLMS) ≥5/hour in 2, obstructive sleep apnea (OSA) in 6, and SOREMP (sleep onset rapid eye movement period) in 8.

First MSLT confirmed the diagnosis in 19 (63%) patients. The remaining 11 were inconclusive (4 mean sleep latency >8min and 8 <2 SOREMP), leading to a second MSLT in 6 which confirmed the diagnosis. The 4 remaining cases were diagnosed based on decreased CSF hypocretin-1. One patient awaits MSLT repetition.

Conclusions

Median age of presentation and diagnosis were lower than reported in the literature.

Cornerstone symptoms like sleep attacks and cataplexy were absent respectively in one-third and over half of the cases. Cataplexy not triggered by emotions or evolving facial muscles can be present in pediatric age. These factors, as well as comorbidities like OSA, PLMS and psychiatric conditions can delay the diagnosis.

Children and adolescents can have higher sleep latencies and ≥2 SOREMP may not be present in early stages. This often requires serial sleep studies or invasive procedures for hypocretin-1 measurement, which is the most specific and sensitive diagnostic test. Therefore, in pediatric age, the absence of standard diagnostic criteria on MSLT should not rule out narcolepsy, reinforcing the need to redefine criteria.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P50

Title
Can Brief Behavioral and Sleep Hygiene Education with Mindfulness Intervention Improve Sleep Patterns in Adolescents? A Pilot Study.

Introduction
Misalignment between sleep-opportunity and chronotype-preference during adolescence may affect their sleep and quality of life. The aim of this study was to objectively evaluate sleep patterns, chronotype, relationship with anxiety- and depression-symptoms and observe if sleep hygiene education with mindfulness intervention can improve sleep health.

Materials and Methods
Community-based cohort-study (n=65), conducted in northern-Europe. Participants volunteered for intervention- (IG) or control-group (CG) to record their sleep during regular school-schedule for 3-school- and 2-free-nights with FDA-cleared/EU-Medical Device Directive (CE-2862) compliant home sleep test, filled-in validated questionnaires to evaluate chronotype (Morningness-Eveningness-Questionnaire; MEQ), sleepiness (Epworth-Sleepiness-Scale; ESS), insomnia- (Insomnia-Severity-Index), anxiety- (General-Anxiety-Disorder-7), and depression-symptoms (Becks-Depression-Inventory-II; BDI-II). Data was collected during the last week of February and first 2-weeks in March 2023 and repeated after intervention, which included one-hour session, twice weekly for four-weeks that included sleep hygiene education followed by mindfulness and breathing practices.

Results
Average sleep-duration on school-nights was 7-hours;15-minutes, with 18% of participants on average sleeping 8-hours. Average sleep onset was significantly later on free-nights (1-hour-47-minute; $p<0.0001$).

Prevalence of identifying as evening-chronotype was 15.4%. A significant negative correlation was observed between MEQ-scores and ESS ($r=-0.287$; $p=0.001$), ISI ($r=-0.343$, $p<0.0001$),

GAD-7 (r=-0.185, p<0.0001), BDI-II (r=-0.501, p=0.0001) and suicidal-thoughts (r=-0.294, p=0.017).
25 in IG (86%) and 30 in CG (77%) finished data collection, 10 participants quit (QUIT).
average age 17.3-years.

Compared to IG and CG, QUIT are significantly more; sleepy (ESS) 3.0 (p=0.017)/4.5 (p<0.0001), with more insomnia- (ISI) 4.5 (p<0.0001)/5.6 (p<0.0001), anxiety (GAD-7) 3.2 (p=0.034)/4.3 (p=0.002) and depression-symptoms (BDI-II) 18.6 (p<0.0001)/20.9 (p<0.001) and more eveningness (MEQ) -15.7 (p<0.0001)/-13.1 (p<0.0001).

After intervention, IG advanced sleep-onset on average 30-minutes (p=0.027) and sleep-midpoint 31-minute (p=0.010) compared to CG. When stratified into response-groups defined based on SJL-at baseline and changes in SJL with intervention; 1) 61% of participants with severe-SJL decreased SJL 88-minutes (p=0.003) and 2) 39% with severe-SJL improved sleep-duration on school-nights (34-minutes), advancing sleep-onset (22-minutes) and while maintaining late sleep-onset on free-nights they slept longer (63-minutes).

Conclusions
Adolescents are sleep deprived and evening-chronotypes have shorter sleep-duration, more severe-SJL and significantly more sleepiness-, insomnia-, anxiety- and depressive-symptoms. This may indicate possible benefits in identifying this group with the aim to assist them in improving their sleep-habits with potentially positive effects on mental-health. Sleep-education and mindfulness program lead by teacher can improve sleep-duration and SJL in adolescence and is possibly more effective of subgroups with shorter sleep-duration and more SJL.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P51

Title
Testing the Preliminary Efficacy on Child Sleep Outcomes in a Psychoeducation-Based Brief Behavioral Intervention in School-Aged Children

Introduction
Parental sleep knowledge has rarely been evaluated in parents of school-aged children, a largely overlooked and high-needs population in sleep intervention literature. It is unclear whether improving parent's knowledge of sleep enhances sleep outcomes in school-aged children. Therefore, we designed a brief, personalized intervention aimed to increase parental sleep knowledge, promote parental self-efficacy, and provide evidence-based sleep interventions to parents. We aimed to determine whether this intervention improved parent-reported knowledge of sleep and child sleep outcomes, as well as behavioral measures of child sleep (i.e., actigraphy).

Materials and Methods
44 parents of school-aged children (between the ages of 5-11) completed the study protocol. After baseline consent, parents completed a battery of parent-report measures (including the Pediatric Insomnia Severity Index (PISI), the Sleep Knowledge Questionnaire (SKQ). After 7 days of monitoring the child's sleep via actigraphy, the parent met with the interventionist on day 8 of the study protocol; this meeting included brief motivational interviewing, psychoeducation around healthy sleep in children, functional analysis around sleep habits for their child, reviewing of actigraphy data, and 1-3 personalized interventions aimed to help improve their child's sleep. Parents were given a new actigraph and were coached on how to follow through with the personalized interventions. At a follow-up appointment occurring 2 weeks after the intervention, parents completed identical measures from baseline and reviewed actigraphy data to examine changes in their child's sleep. We used paired-sample t-tests to compare pre-intervention to post-intervention scores/outcomes in PISI total score, SKQ total score, and actigraphy-derived estimates in sleep efficiency (time asleep/time spent in bed), time spent asleep (i.e., duration), sleep onset and offset timing, and wake after sleep onset (minutes spent awake after falling asleep). The pre-registered study can be found here: https://osf.io/4v7fa

Results

Self-report pre- and post-comparison indicated significantly higher scores in the SKQ ($d=0.50$, $p>0.001$) and significantly lower PISI scores ($d=0.54$, $p>0.001$). For actigraphy outcomes, we did not see changes in time spent in bed, sleep efficiency, sleep duration, or sleep timing ($p>.45$). However, we did see some small, clinically significant changes from pre- to post-wake after sleep onset ($d=0.25$, $p=0.13$) and sleep offset timing, though these comparisons were not statistically significant ($p=0.67$, $p=0.12$).

Conclusions

Parents of school-aged children who participated in this brief, personalized sleep intervention reported improvements in their knowledge around sleep and in their child's insomnia symptoms, despite having minimal changes in sleep outcomes as assessed by actigraphy. These findings mirror sleep intervention findings at large, where effects are more readily demonstrated through subjective (vs objective) measures of sleep. Reasons for the lack of significant changes in actigraphy outcomes may also be due to a small sample size or the need for a longer follow-up period. However, given that parents are reporting this intervention to be effective, and that the actigraphy trends towards positive improvement, we encourage future research to replicate this work with a larger sample and more opportunities for follow-up assessment.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P06

Title
Sleeping Tight, Feeling Right: Unveiling the Impact of Circadian Misalignment on Adolescent Mental Health

Introduction
Circadian misalignment, or the incongruence between an individual's intrinsic circadian rhythm and their observed sleep patterns, is thought to be associated with risk of mental health disorders. Adolescents may be at a heightened risk of poor mental health outcomes due to circadian misalignment (largely driven by early school start times and developmental considerations). Our study experimentally manipulated the sleep timing of adolescents, hypothesizing an increased incidence of depression and anxiety symptoms in a period of misaligned sleep compared to aligned sleep.

Materials and Methods
Thirty "night owls", ages 14-18, slept for 5 days in both an aligned condition (12:30AM-9:30AM) and a misaligned condition (9:30PM-6:30AM), the order of which was randomly assigned, with a two-day washout period in-between each condition. Following each experimental condition, participants completed the Emotion Regulation Questionnaire for Children and Adolescents, the Suicidal Ideation Questionnaire, the Generalized Anxiety Disorder-7, and the Patient Health Questionnaire-9. We used paired t-tests to compare mental health outcomes between aligned and misaligned sleep.

Results
We observed no significant differences in means between the aligned and misaligned conditions for the Emotion Regulation Questionnaire for Children and Adolescents, Suicidal Ideation Questionnaire, Generalized Anxiety Disorder-7, and Patient Health Questionnaire-9 ($p>0.05$, effect sizes<0.2).

Conclusions

While our study found no significant mental health differences between aligned and misaligned sleep, insights regarding the impact of circadian alignment on mental health remain valuable. Factors like the brief duration of conditions or that all teens were obtaining adequate sleep in both conditions may have influenced results. Future research, especially focusing on individuals with more severe circadian misalignment that impacts the duration of their sleep, may increase our understanding and inform targeted interventions for adolescent mental well-being.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P52

Title
Paediatric obstructive sleep apnoea in an ethnically diverse population: data from a single Centre

Introduction
Paediatric obesity is a growing epidemic both in the UK and globally. Nearly 40 per cent of all London's children are overweight or obese, with the highest rates occurring in the areas of greatest deprivation. Obesity complications include type 2 diabetes (T2DM), metabolic dysfunction-associated steatotic liver disease (MASLD), hypertension and obstructive sleep apnoea (OSA). It is widely accepted that South Asian populations are more likely to have certain metabolic co-morbidities such as type 2 diabetes and fatty liver disease at a lower BMI compared to their white counterparts but it is unclear whether OSA has a similar relationship. Increasingly there is understanding for the need of diverse and paediatric data to understand onset of ethnic differences. Here we describe our experience from a single centre in North East London.

Materials and Methods
We conducted a retrospective, single centre study using patients from a diverse population who were referred to a specialist respiratory clinic between March 2017 and December 2023. Demographics such age, gender, comorbidities and ethnicity were recorded. Objective measurements of blood pressure, body mass index (BMI), mean oxygen saturation (SpO2), SpO2 nadir, and oxygen desaturation index (ODI) at sleep studies were also acquired. OSA was defined as per the American Association Sleep Medicine (AASM) criteria.

Results
495 children (55.2% male) were referred for assessment. Mean age at referral was 11.5 years (range 3 to 18 years), mean BMI +3.33 SDS (range 1.5-6.2). Of these, 12 children had a BMI SDS<2 and were excluded from subsequent analysis. Out of 495 children, 437 underwent a sleep study and 208 were diagnosed with OSA. Looking at ethnicity within the cohort 233 were Asian and 262 were non-Asian (121 Caucasian, 96 Black, 45 mixed or other). We analysed the groups and found that there was a statistical difference between BMI SDS (Male

Asian with OSA) compared to BMI SDS (Male White with OSA), Mean BMI SDS 3.07 vs 3.69 respectively, p=0.0021. BMI was significantly different between White Males with OSA vs those without OSA, mean BMI SDS 3.69 vs 3.21, p=0.04. This was also seen in White Females where mean BMI SDS 3.46 vs 2.91, p=0.006. There was not difference between OSA and non-OSA groups in Asian or Black ethnic groups of either sex and no difference in BMI SDS in females between White and Asian ethnicity with OSA.

Conclusions

Our data demonstrates a lower mean BMI in male children of Asian ethnicity compared to White ethnicity who have OSA. There is a statistical difference between mean BMI between OSA and non OSA groups but only in White ethnicity (females and males). Overall, BMI SDS is not a good predictor of OSA in Asian and Black groups. Our data could also suggest that OSA, like other obesity co-morbidities, is associated with lower BMI SDS in paediatric South Asian populations.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P53

Title
Widening the access of sleep studies to patients with disability

Introduction
The Children's Sleep and Respiratory Centre performed an audit of the efficacy of its home respiratory polygraphy service in 2020. This revealed a large degree of failures was prevalent in children with autism spectrum disorder (ASD), attention deficit hyperactivity disorder (ADHD), cerebral palsy (CP) and those aged <5 years. The findings from this audit led to the development of a pre-sleep study acclimatisation service (P-SSAS) with a new planned referral pathway to minimise failures of home and in-patient studies due to tolerance. The aim was to perform a follow-up audit questionnaire to measure success and efficacy of the P-SSAS and to identify possible areas of improvement

Materials and Methods
Parent/guardian/patient satisfaction and feedback were measured and collated via a survey.

Results
Results indicated that P-SSAS was effective in reducing failure rates with 18 (85.7%) out of 21 patients audited having a successful study following the implementation of acclimatisation techniques. In addition to this 90.5% of families would recommend acclimatisation to others whilst the remaining 9.5% were unsure; these were those where acclimatisation had not been effective in preventing a failed study. Tolerance issues still remained for the majority of studies that failed. Qualitative results indicated that families found the acclimatisation process helpful in terms of allowing the child to become used to the equipment prior to the sleep study. Results of the survey revealed that patients 68% of families found the social story, 58% found the dummy sensors and 100% found the support calls effective.

Conclusions
Allowing time for P-SSAS is key in enhancing adherence and success in those with ASD and ADHD as issues with sensory processing are frequently documented 2. Further auditing needs to continue to increase sample size. This will improve reliability of data and further enable identification of improvement as well as assessing areas of success.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P07

Title
The Xploro Project: The Creation and Rollout of a Digital Therapeutic App in Evelina London Sleep Study Service: A Quality Improvement Project.

Introduction
Evelina London's sleep medicine service sees around 3,000 children and young people (CYP) each year. Its 5-bed sleep centre can diagnose any type of sleep disorder, including complex sleep and seizure disorders in CYP from South London, South East England and beyond. Clinical experience shows that hospital stress and anxiety exist in CYP accessing the centre. The aim of this project is to co-produce a previously evidenced-based Xploro digital therapeutic (DT) app to help reduce hospital stress and anxiety for CYP accessing the centre (Bray et al, 2020).

Materials and Methods
Funding for an Evelina London, Xploro DT app collaboration was secured through a NHS England – digital transformation innovation grant and matched by the Evelina Hospital Charity. This funding supports the creation, facilitated by a 0.3 WTE project manager, and a 3-year licensing period of the Xploro DT sleep centre product. It also comprises a small budget to support with hardware provision to CYP where required.

The Xploro DT sleep centre product is still in production. Upon launch, an invite to download the app will be sent one week prior to sleep study. It includes a customisable friendly avatar that will guide CYP through a carousel of customisable professional avatars, an interactive environment, an interactive treatment pathway, and games. It also has an artificially intelligent chatbot that answers CYP's hospital and sleep centre questions. With time, it will integrate with our existing electronic patient record (EPR), where clinicians can push important dates into CYP's Xploro calendars and CYP can share moods and feelings with clinicians as well as engage with patient-related outcome measures (PROMs).

Efforts have been made to co-produce this product with sleep study CYP; however, engagement with this has been low. Clinicians have therefore led on ideas and content based on their clinical experiences. This content has been reviewed by Xploro and the Evelina

health information teams to make it appropriate, fun, engaging, and ensure its consistency and accessibility for CYP.

Results

Results are not yet known. We will collect data regarding engagement and seek feedback from those who engaged with the app via questionnaire sent to grown-ups of CYP. We plan to review the feedback obtained to improve existing content and invite those who have engaged with the app to future focus groups to assist with the co-production of future content. We hope to collect PROMs pertaining to levels of hospital stress and anxiety pre and post Xploro use once our EPR allow.

Conclusions

Patient and public engagement is challenging. Many stakeholders are involved in the creation and production of an innovative DT. Creation and revision of work takes time. This leads to delays in delivery. However, our Xploro DT sleep centre product is almost ready to be shared with CYP. We will collect data on levels of engagement post sharing, and review feedback to make revisions on current content where required. We hope this will ensure the product is as effective as it can be to improve PROMs in the centre in the future.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P54

Title
Caregiver Preferences for Narcolepsy Treatment: A Discrete Choice Experiment

Introduction
Once-nightly sodium oxybate extended-release oral suspension (ON-SXB; LUMRYZ™) is approved to treat excessive daytime sleepiness and cataplexy in adults with narcolepsy. Currently, a once-nightly oxybate option is not available for pediatric patients with narcolepsy. A discrete choice experiment was conducted among caregivers of pediatric patients with narcolepsy to determine drivers of preferences for oxybate therapy.

Materials and Methods
Thirty-minute web-based surveys were provided to adult caregivers of a pediatric (<18 years old) patient with narcolepsy and prior or current use of twice-nightly SXB. Participants were recruited online or via patient advocacy groups. Two hypothetical product profiles with attributes of twice-nightly SXB and ON-SXB were created for 10 choice sets. For each choice set, participants indicated their preferred product overall, the product they would be more adherent to, and the product that would result in less anxiety or stress for the patient when thinking about taking the medication. A hierarchical Bayesian model was used to analyze the results.

Results
Caregivers (n=75) of pediatric patients with narcolepsy participated; 88% of patients cared for were age 10–15 years, 80% of caregivers had a household income of $60,000–$120,000, and 96% of patients currently used twice-nightly SXB. Caregivers indicated that the most important attribute driving overall product choice was dosing frequency (relative attribute importance [RAI], 23.7), with once-nightly preferred over twice-nightly dosing (relative preference weight [RPW], ±45.1), followed by treatment efficacy at the highest dose (RAI, 21.7). The most important attribute driving adherence was the efficacy of the drug at the highest dose (RAI, 25.7), followed by dosing frequency (RAI, 21.6), with once-nightly preferred over twice-nightly dosing (RPW, ±31.3). The most important attributes associated

with less anxiety/stress were efficacy of the drug at the highest dose (RAI, 24.6) and side effects (RAI, 18.7).

Conclusions

Among caregivers of pediatric patients with narcolepsy, efficacy and dosing frequency were identified as the most important attributes driving preference for overall treatment choice and adherence; efficacy and side effects were important for reducing patient anxiety/stress. If approved by the US FDA for pediatric patients, ON-SXB will provide an effective, once-nightly treatment option that eliminates the chronic forced awakenings required by twice-nightly SXB.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P55

Title
Bedtime Stories Sleep Health Education Program for Caregivers in a Community Sample

Introduction
Effective and preventive strategies to target sleep health practices for caregivers of school-age children can help mitigate the risk for future sleep disturbances. Sleep health education is a viable preventive model and when paired with mobile health technologies and other online platforms, it becomes a viable treatment option for individuals that may lack access to healthcare. Targeted mobile health technologies using tailored specific sleep health messaging provides a novel avenue to address the unique needs of the caregiver. Here, we describe an application of a health equity-informed approach called the Bedtime Stories Sleep Health Education Program for Caregivers (BTS- C), which is aimed at school-aged children from minority backgrounds and/or low socioeconomic status.

Materials and Methods
This is a multiphase study that incorporates Assessment, Decision, Adaptation, Production, and Topical Experts (ADAPT) to inform BTS-C. Following the ADAPT approach, we identified areas of need, iteratively adapted content, and conducted semi-structured interviews (SSIs) with caregivers of school-aged children to inform the development of BTS-C.

Results
Twenty-one caregivers participated in the SSIs and were primarily Mothers (95%), between 22 to 45 (31.9 ± 5.48) years of age and identified as African American/Black (25%), Latine (25%), mixed racial/ethnicity (20%), American Indian (5%) Asian (5%), White (5%), and the remaining did not respond. Caregivers acknowledged that any information about sleep for their child would be helpful and asked about age-appropriate recommendations for sleep duration, considerations for screen and media use, resources to encourage a routine, and some with specific questions about Melatonin use in children. Many Caregivers wanted information that was tailored to them, from a respected source, which could be delivered preferably via an app, website or telehealth. In collaboration with Mind-Easy, we have developed the BTS-C, which utilizes asynchronous avatar-based interactive learning and educational videos that are

targeted to the caregiver's goals and expectations for change surrounding principles of healthy sleep and paired with tailored messages. These principles include sleep routines, the sleep environment, considerations for screen time, timing of sleep and activities surrounding sleep, expectations for healthy sleep and sleep duration. Using a combination of AI generated algorithms and decision tree logic, the avatar model allows for both asynchronous and synchronous tailored and individualized sleep health recommendations and goals, further reinforced with tailored messages.

Conclusions

Sleep health educational programs that utilize a multicomponent strategy that have been adapted for the end-user and subsequently tailored to their goals are viable strategies for the prevention of future sleep problems.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P08

Title
Parent perceptions of sleep routines in newborns and young infants

Introduction
Consistent sleep routines are associated with better sleep and well-being in young children. However, little is known about the prevalence of both bedtime and naptime routines in newborns and infants, and their perceptions by parents.

Materials and Methods
Parents (67% mothers, 33% fathers) of 135 newborns (1-15wks; M=8.2wks) from the UK (70%) and US (30%) completed an online questionnaire addressing questions about sleep routines in newborns, with questionnaires completed again at the first follow-up (FU1) 4 months later (Mage = 5.4 mos) and again at a second follow-up (FU2) post-8 months (Mage = 9.3 mos) by 106 (80%) and 103 (76%) of parents, respectively.

Results
In the newborn period, 62% (n=84) reported having a bedtime routine. Of these families, 49% started a bedtime routine before 4 weeks of age. At approximately 5 months and 9 months of age, 81% and 89% of families reported engaging in a bedtime routine. At every time point, the majority of parents who reported a bedtime routine indicated ("quite a bit" and "very much") that they liked it (78% newborn, 90% FU1, 85% FU2), it was easy (70%, 79%, 78%), it helped their baby fall asleep (63%, 65%, 75%), and stay asleep (54%, 51%, 52%), as well as helped them bond with their baby (88%, 86%, 75%). For newborns, cuddling was most frequently endorsed as the favorite bedtime routine activity (43%), followed by bath (25%), and breast/chestfeeding (11%). The most challenging activity was considered changing a diaper (31%), followed by bath (11%), and changing clothes (9%). A large percentage of parents believed there was a benefit to a bedtime routine for newborns, recording reasons such as helping newborns to sleep better, setting their internal clock, and the overall importance of consistency and routines. For those who did not have a bedtime routine for their newborn, the primary reason was the perception that their baby was too young for a routine. For naptime routines, only 20% engaged in a naptime routine for their newborn,

which increased to 38% and 43% at approximately 5 and 9 months of age. Overall, parents reported that they liked their baby's naptime routine (54% newborn, 68% FU1, 61% FU2), it was easy (50%, 70%, 75%), it helped their baby fall asleep at naptime (35%, 55%, 68%) and sleep for longer stretches at naptime (35%, 43%, 50%), as well as helped parents bond with their baby (69%, 73%, 64%).

Conclusions

Just over half of all newborns had a bedtime routine in this sample, increasing to almost all eight months later. However, naptime routines were much less common with only 20% of families with newborns having a naptime routine and increasing to less than half throughout infancy. At all ages, parents report liking bedtime routines, report that they are easy to implement, and help with bonding. Overall, naptime routines are perceived as less beneficial for naptime sleep but do help with bonding. These results suggest that sleep routines, both at bedtime and naptimes, are perceived positively by parents, even in families with newborns.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P56

Title
Maternal Perceptions about Implementing Safe Sleep Guidelines and Optimizing Infant Sleep

Introduction
The American Academy of Pediatrics recommends a safe sleep environment to reduce the risk of sleep-related deaths for infants, including supine position, firm sleep surface, and no bedsharing. One potential contributor to unsafe sleep practices is poor infant and caregiver sleep. Thus, the aim of this study was to investigate mothers' engagement in unsafe infant sleep practices in relation to their infant's sleep.

Materials and Methods
Virtual focus groups regarding implementing safe sleep recommendations and optimizing infant sleep were conducted with mothers of infants ¬< 6 months of age who engaged in at least one high-risk SIDS-related behavior (e.g., unsafe sleep position or location) at least twice in the past week. Twenty-five mothers (Mage = 28.1 years; Mbaby age = 3.7 mos; 80.0% White, 12.0% Black, 8% Hispanic/Latina; 76.0% married) participated (3 to 7 per group).

Results
Almost all mothers were aware of the ABCs (Alone, Back, Crib) of safe sleep, with original intentions to follow them. However, many felt that the ABCs were unrealistic and contributed to sleep challenges. Sleep challenges primarily centered around difficulty getting their baby to fall asleep and stay asleep, especially at naptimes. Comments were made about allowing their baby to sleep in unsafe ways in order to optimize sleep, including perceiving their baby as not comfortable sleeping on their back or on an uncomfortable crib mattress. Mothers noted being more willing to engage in unsafe sleep practices during the day when they are awake and can closely monitor their baby. Some questioned whether the ABCs are the only way to have safe sleep, and some prioritized other environmental safety aspects (e.g., preventing falls or suffocation). Finally, the mothers were confident about getting their baby to sleep, but not as confident that they can get their baby to sleep while strictly following the safe sleep recommendations.

Conclusions

Mothers who engage in unsafe sleep practices at least twice in the past two weeks report often doing so in order to improve their baby's sleep, although they are well aware of the ABC guidelines. The overall guidelines are often considered unrealistic. Justifications for unsafe sleep practices include being able to keep their baby safe, especially during the day, and prioritizing other safety concerns. Interventions are needed to increase sleep safety practices while also improving infant and caregiver sleep.

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Saturday, April 27, 2024 | P57

Title
Actigraphic and Self-reported Sleep Outcomes and Relationships to Anxiety and Depression Symptoms in Adolescents and Young Adults with Cystic Fibrosis: A Mixed Methods Study

Introduction
Despite significantly elevated levels of anxiety and depression in the cystic fibrosis (CF) population, the effect of poor mental health and its relationship to sleep has been distinctly underexamined. The adolescent and young adult (AYA) developmental period marks a particularly vulnerable time for both sleep and mental health concerns, and this may be additionally compounded for those with CF. Research Questions: Do significant differences exist between AYA with CF and healthy controls in objective or self-reported sleep outcomes, or in anxiety or depression symptoms? In AYA with CF, are anxiety or depression symptoms associated with objective or self-reported sleep outcomes? How do AYA with CF describe/experience sleep? How do the qualitative and quantitative findings of this study relate to each other to create a more comprehensive understanding of sleep in CF?

Materials and Methods
Methodology: Using a convergent parallel mixed-method design, CF participants were recruited from out-patient CF clinics in Toronto; healthy controls were recruited from the community. Measures: Actigraphy: Recording over 7-days for total sleep time, sleep efficiency, wake after sleep onset, number of nighttime awakenings. Self-reported Sleep: PSQI, PROMIS-SD, PROMIS-SRI, Sleep diary. Anxiety & Depression: STAI-S, CES-D. Other: Demographic information, Brief Pain Inventory-Short Form, daily caffeine consumption, physical activity, screen time and effects of the pandemic on sleep/mood. CF participants were also asked about enteral overnight feeding, and modulator therapy's effects on sleep/mood. For CF participants, disease characteristics were collected from the Canadian CF Registry. Interviews: Purposive sampling of CF participants aimed for maximum variation in sleep experiences. Open-ended questions focussed on overall sleep experience and factors perceived to be associated with a good/poor night's sleep. Quantitative Analysis: Multiple linear regression will address whether significant differences exist between groups on sleep and mental health outcomes and will assess the relationship between sleep outcomes and

anxiety and/or depression symptoms in participants with CF. Qualitative Analysis: Interviews were audio-recorded, de-identified, and transcribed verbatim. Data will be analyzed through content analysis, independently by two researchers. Codes will be categorized into over-arching, mutually exclusive themes. A third investigator will serve as an inquiry auditor. Integrated Analysis: Results will be integrated through side-by-side joint display to identify and discuss points of convergence, divergence or expansion of findings.

Results

A total of n=86 participants were recruited. 45 CF participants (18.58 +/- 3.12yrs.; 51.1% female) and 41 controls (16.56 +/- 2.64yrs.; 53.7% female) completed questionnaires and 40 completed actigraphy in each group. 19 CF participants (19.74 +/- 3.19yrs; 63% female) completed interviews. Data analysis is underway, completed analyses will be presented at the conference in April.

Conclusions

A high-quality mixed-method comparative study is needed to comprehensively understand psychological factors related to sleep disturbance in AYA with CF. Better understanding this relationship could have a significant impact on well-being and quality of life.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P58

Title
Burden of Paediatric Narcolepsy on Patients and Caregivers

Introduction
Narcolepsy is a rare, chronic sleep disorder with symptoms including excessive daytime sleepiness (EDS), cataplexy, hypnagogic/hypnopompic hallucinations, sleep paralysis, and disrupted nighttime sleep that present primarily between the ages of 7 and 25 years. Currently, no real-world studies have assessed the burden of narcolepsy on paediatric patients and their caregivers. To address this need, the Children, Adolescents, and Their providers: the Narcolepsy Assessment Partnership (CATNAP, NCT04899947) registry collects data about the burden of paediatric narcolepsy on patients and their caregivers based on participant and caregiver reports of quality of life, social functioning, and work productivity. This cross-sectional analysis includes 29 participants enroled at clinical sites with complete data across the measures of interest.

Materials and Methods
CATNAP is a prospective, longitudinal, multicentre registry that is collecting real-world data from 16 clinical sites (starting in September 2020) and a decentralized virtual site (starting in August 2022). This analysis includes children and adolescents aged 18 or younger, with clinician-confirmed narcolepsy diagnosis, enroled at the clinical sites through February 2023. Participants, caregivers, and clinicians answered questions on sociodemographic characteristics; diagnostic, medical, and treatment history; comorbidities; and disease progression. Patient burden was measured by the Epworth Sleepiness Scale for Children and Adolescents (ESS-CHAD; higher scores indicate more sleepiness), Pediatric Quality of Life Inventory (PedsQL; higher scores indicate better outcome), and Patient-Reported Outcomes Measurement Information System: Peer Relationships (PROMIS; higher scores indicate better relationships). Caregiver burden was measured by the Work Productivity and Activity Impairment questionnaire (WPAI; higher percentages indicate greater impairment) and Caregiver Well-Being–short form (CWB-sf; higher scores indicate greater well-being).

Results

Participants (N=29) were 14.3 (3.1) years of age (mean [SD]) and mostly White (12/29, 41.4%) or Black (11/29, 37.9%). The mean (SD) ESS-CHAD score was 14.0 (4.8); 69.0% of participants had clinically significant EDS defined as an ESS >10 (mild EDS=11–12: 10.3% [3/29]; moderate EDS=13–15: 24.1% [7/29]; or severe EDS=16–24: 34.5% [10/29]). Mean (SD) PedsQL total and domain scores were below normative values: total, 62.1 (20.1); physical functioning, 63.3 (26.9); emotional functioning, 60.2 (20.1); social functioning, 75.0 (23.5); and school functioning, 49.5 (22.4). The mean (SD) PROMIS score was 44.2 (11.6), below the mean population-standardized T-score of 50. Most caregivers were employed (19/29, 65.5%), and reported mean (SD) missed work time of 1.5% (3.2%), mean reduction in productivity at work (presenteeism) of 30.0% (19.0%), overall work productivity loss of 31.5% (19.6%), and activity impairment of 35.0% (21.3%) due to problems related to paediatric narcolepsy. Caregivers reported a mean (SD) well-being score of 51.7 (9.7) on the CWB-sf.

Conclusions

This descriptive study of children/adolescents and their caregivers in the CATNAP registry illustrates the broad burden of narcolepsy on both groups. Patient-reported scores suggested pathologic sleepiness, impacts to quality of life, and impaired peer relationships; the greatest burden was related to daytime sleepiness and school functioning. The greatest observed burden on caregivers was work and activity impairments.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P59

Title
Analysis of mandibular movements to improve ventilatory management of children with obstructive sleep apnea syndrome treated with Continuous Positive Airway Pressure or Non-Invasive Ventilation

Introduction
Polysomnography (PSG) is the gold standard for the diagnosis of obstructive sleep apnoea syndrom (OSA) and its follow-up after treatment in children. Recently, a very innovative digital medicine solution with a mandibular movement sensor has been developed. In children, a good correlation between mandibular movements and the apnoea hypopnoea index (AHI) has been reported (Martinot et al., Pediatr Pulmonol, 2022).

This study aims to assess the reliability of Mandibular Jaw Movement (MJM) measurement by a sensor for the assessment of residual obstructive airway events in children with OSA ventilated with noninvasive ventilation (NIV) or continuous positive airway pressure (CPAP).

Materials and Methods
In this open prospective non-randomized multicentric trial, we included children aged from 5 to 18 years with a diagnosis of severe OSA. The AHI calculated from Mandibular Jaw Mouvements (MJM) monitoring (MJM-AHI) was compared with PSG (PSG-AHI) using the intraclass correlation coefficient and Bland-Altman analysis.

Results
Fifteen (60% males) children were included with a median age of 12 years [interquartile 8-15]. Two (17%) were ventilated with NIV and 13 (83%) with CPAP. There was good agreement between MJM-AHI and PSG-AHI with a median bias of -0,25 (95% CI -3,40 to +2,04) events/hour. In addition, there was a significant reduction in AHI under treatment demonstrated both by PSG and MJM device in the lab or at home.

Conclusions

Automated analysis of mandibular movement is a reliable method to assess residual obstructive airway events in a population of children with CPAP or NIV.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P09

Title
Assessment of nocturnal alveolar hypoventilation and obstructive sleep apnoea in otherwise healthy children

Introduction
Nocturnal CO2 monitoring does not seem to influence the therapeutic management of children without co-morbidities suffering from Obstructive Sleep Apnoea (OSA), but it is not known what the situation is in the absence of OSA, nor whether alveolar hypoventilation (AH) can be observed in this case.

The aims of this study were first to describe the distribution of AH in otherwise healthy children suspected of OSA, and second to evaluate whether the presence of AH influenced medical decisions.

Materials and Methods
In this retrospective, descriptive, single-centre study, we retrieved data from sleep recordings of otherwise healthy children (0 to 18 years) referred for OSA screening between 2018 and 2023. AH was defined as transcutaneous partial pressure of CO2 >50mmHg >25% (AH25%) or >2% (AH2%) of total sleep time.

Results
Among the 130 sleep recordings studied (median [IQR] age: 5.4 [3.7; 8.9] years, 48 (37%) females) 38 showed no OSA, including 2 (5%) with AH2%, and none with AH25%. OSA was more severe in children with AH compared to children without AH ($P < 0.0001$), severe OSA being present in 9/10 with AH25% and in 7/14 with AH2%.. The management of the 32 children with severe OSA did not differ according to the presence of AH25%. The 2 children without OSA in whom AH2% had been detected were only clinically followed.

Conclusions

In otherwise healthy children, AH without OSA is very rare and does not modify severe OSA management. These results are in favour of not systematically recording CO2 in these children.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P60

Title
Specialist Sleep Practitioner therapeutic support in a tertiary paediatric sleep service - a new model of working.

Introduction
The specialist sleep practitioners (SSPs) offer therapy for chronic insomnia in children with co-morbid chronic conditions, or neurodevelopmental disorders and for circadian rhythm disorders. Increased volume of referrals to our tertiary paediatric sleep service (>500/yr) resulted in long wait times (> 8months) for therapeutic support after initial assessment. During the intervening time, patient history had often changed. This resulted in a longer initial appointment with SSP's to obtain further information.

Materials and Methods
A structured clinic format was piloted with the aim of reducing these waiting times and provide more timely intervention.

Working practice was re-designed, with the aim of developing a more streamlined approach to caseload management. Individual SSP clinics were introduced offering an initial video appointment and two telephone reviews. The aim of this was to empower families to set their own goals and agree on the appropriate sleep management plan to address their child's chronic insomnia. Data from before and after the pilot scheme was analysed to compare the effectiveness of these changes on wait list times for SSP support.

Results
During the pilot scheme, we were able to reduce the wait for an initial SSP appointment from >8 months to under 6 weeks. This in turn, resulted in the information provided in the initial sleep assessment remaining largely unchanged, allowing SSP's to provide appropriate timely support for families in addressing their child's chronic insomnia.

Conclusions

The new model has been successfully adopted across the specialist sleep practitioner team, enabling families to receive more timely support.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P10

Title
Accuracy of clinical diagnosis versus polysomnography in the assessment of non-complex paediatric obstructive sleep apnoea.

Introduction
In 2019 ENT-UK published guidelines on the diagnosis of obstructive sleep apnoea, recommending that in non-complex children with adenotonsillar hypertrophy and no underlying risk factors, clinical assessment following ENT-UK guidelines is sufficient to assess the severity of OSA accurately. After adopting these guidelines, we previously showed cost and efficiency benefits to our secondary care paediatric sleep service (Johnson, Burrows and Trinidade, 2022). However, many clinical tools used to diagnose obstructive sleep apnoea have poor validity compared to polysomnography (Borgstrom, Nerfedlt and Friberg, 2013) Parenti et al, 2020 demonstrated that some clinical questionnaires have appropriate sensitivity to diagnose OSA within a paediatric population, however further research into the accuracy of these tools is required. This cohort observational study aims to explore the accuracy of diagnosing OSA in non-complex children with adenotonsillar hypertrophy clinically using ENT-UK-derived guidelines (Johnson, Burrows and Trinidade, 2022).
This proposed research aims to address the following research aims. 1) To explore differences in the diagnosis of OSA in non-complex children with adenotonsillar hypertrophy when given a clinical diagnosis compared to Polysomnography. 2)To explore the differences in the diagnostic threshold of OSA.

Materials and Methods
We propose to compare data from children aged 3 months to 16 years referred to the sleep clinic for the investigation of OSA. Patients will be seen virtually by a Paediatric consultant before the sleep study, and patients that would typically be diagnosed clinically using the clinical guidelines will be offered a voluntary sleep study. Data from this voluntary sleep study will be scored, and AHI will be compared to the clinical diagnosis. Approximately 60 patients will be included in this study, and exclusion criteria will be taken from the clinical guidelines (Johnson, Burrows and Trinidade, 2022). Only non-complex patients will be included in the study, excluding patients with comorbidities such as obesity, craniofacial disorders, cardiovascular disorders.

Results

A MANOVA will compare the differences between three groups: clinical diagnosis, sleep study-scored diagnosis and clinical diagnosis with sleep study-scored diagnosis.

Conclusions

It is expected that there will be no significant difference between the three groups that will support the validity of using clinical guidelines in the diagnosis of non-complex obstructive apnoea in paediatric cases.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P11

Title
A 3 year Analysis of UK Cerebrospinal Fluid Hypocretin-1 data, comparison of results from paediatric and adult patients and the phenotype of those with intermediate levels. What does it mean when the result is neither up or down?

Introduction
Type 1 Narcolepsy typically starts in teenage years and is clinically defined by excessive daytime sleepiness and cataplexy. The diagnostic criteria for type 1 Narcolepsy include the analysis of cerebrospinal fluid (CSF) levels of hypocretin 1 (hcrt-1)/Orexin A. CSF hcrt-1 values below 110 pg/ml are currently defined as the diagnostic cut off for Type 1 Narcolepsy. Those with levels above 200pg/ml are considered to be in the normal range. However, those within 110-200 pg/ml are defined as intermediate, and previously published case series have suggested that these intermediate value results are rare. The significance of intermediate results remains uncertain as reduced levels of hcrt-1 can also be seen in other structural brain pathologies outside of Narcolepsy. Many practitioners still do not routinely use CSF hcrt-1 levels but instead use video polysomnography and multiple sleep latency tests.

In the United Kingdom, all requests for CSF hcrt-1 are processed within a single immunology laboratory which has allowed the opportunity for a comprehensive service evaluation of the different regional patterns of requests over 3 years, whether there was any change in referral patterns over the Covid 19 pandemic and the total numbers of both children and adults who have hcrt-1 levels below 110pg/ml, those within intermediate range and above 200pg/ml. A higher number of intermediate levels were found than expected based on previously published series which led to a more detailed service evaluation.

Materials and Methods
All samples within the United Kingdom are analysed within a single laboratory in Oxford University Hospitals. The CSF samples are stored immediately at -80°C until the measurement of hcrt-1. Hcrt-1 levels are determined in duplicate for each CSF sample by the standard validated direct I125 radioimmunoassay (RIA) (Phoenix Pharmaceuticals,Belmont, CA) with an intra-assay variability less than 10% and an inter-assay variability between 20% and 30%.

There has been a validation performed for UKAS accreditation to ISO 15189 and comparison to reference laboratory results.

A service evaluation was undertaken of 3 years of consecutive requests for CSF hcrt-1 November 2018-November 2021 to review results and to understand referral patterns from paediatric and adult services. The total number of monthly requests sent before and during the Covid19 pandemic was reviewed, an evaluation of those with low, intermediate and normal hypocretin levels was compared by age with children defined as under 18 years of age.

There was then analysis of the clinical phenotype of those found to have intermediate hypocretin levels (110-200 pg/ml) and in particular whether the referring clinician had described clinically typical type 1 narcolepsy or whether there were other brain pathologies.

Results

416 samples were received from 85 different UK hospital laboratories. These represented 143 child (0-18) and 273 adults. The table below shows those in normal, intermediate and low range. Therefore in total, 36.3% were abnormally low and in diagnostic range for type 1 narcolepsy, 20.7% were intermediate and 42.3% were normal. For those under 18; 47.6% were low, 14% were intermediate and 36.3% were normal range.

Although 85 different uk hospitals requested CSf hcrt-1, only 9 hospitals requested more than 10 samples in a 3 year period suggesting that many hospitals used the test very infrequently.

There was an analysis of referral patterns pre and post Covid to see whether there was a change in requesting pattern due to lack of access to polysomnography and multiple sleep latency testing during this time. The data was divided into the number of requests received per month and the 15months before the first National lockdown (March 2020) and the 20months after that date. There was a fall in total requests for hcrt-1 testing in the COVID time period by 40% (12.2 per month compared 22.9 per month). This was comparable between adults and children.

There was an analysis of results based on median age and those with results above 110 were older with a median age of 27. Those with undetectable hcrt-1 levels below 50 had a median age of 18.

Clinical data was available for 37 (16 F, 21M) of those with intermediate levels (9 children, 28 adults). 8 had other structural brain pathology, although this was not always apparent at the point of initial testing as all had presented with initial, excessive daytime sleepiness. Of the remaining 29, a single patient had repeat hcrt-1 which was then normal over 200 with a final diagnosis of dissociative seizures. No other patient had the test repeated. 4 patients had

clinically typical type 1 narcolepsy symptoms including cataplexy, and a sustained response to stimulant. However, the remainder did not have cataplexy.

Conclusions

In a service evaluation of all samples of hcrt-1 requested in the United Kingdom over a 3 year period, intermediate levels were found more commonly than previously reported in 24% of all adult samples and 14% of those under 18. Previous data has reported very few patients with intermediate levels but these results came from large, specialists sleep services with access to additional polysomnography and multiple sleep latency testing for all patients. For some UK patients, this highlighted requests made due to other brain pathologies where the clinical validity of the results and benefit to the patients remains uncertain. It also highlighted requests made very infrequently by a large number of hospitals who may have less experience of clinical diagnosis of narcolepsy. Given that narcolepsy is a rare condition affecting 1 in 2000 - education around both the diagnosis and the diagnostic benefit of the test may be appropriate prior to testing. Only 4 patients had clinically typical cataplexy which highlights the work of others associating abnormally low levels of CSF hcrt-1 most strongly with cataplexy. Limitations of the study include limited access to clinical data as this was a service evaluation of the UK hcrt-1 data itself but strengths include a complete pattern of all UK hospital requests and the ability to measure changes in requests over the covid pandemic. Given the diagnostic uncertainty of an intermediate level, those with intermediate levels but with excessive daytime sleepiness and without another sleep disorder, warrant further investigation and possibly consideration of repeat testing over time.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P12

Title
Enabling Non-contact Sensor Devices with Ensembled AI for Sleep Apnea Detection

Introduction
It's estimated that approximately 936 million people worldwidenhave moderate to severe obstructive sleep apnea (OSA). This study aims to address protentional usage of Non-contact Radar to detect OSA. The accurate prediction of sleep apnea events can offer insight into the development of treatment therapies. However, research related to this prediction is currently limited. We developed a covert framework for the prediction of sleep apnea events based on FMCW radar(60Ghz, TI AOP6843) with Differentiate and Cross Multiply(DACM) algorithm.

Materials and Methods
Our approach employs a simple Ensemble method comprising Convolutional Recurrent Neural Networks (CRNN), Continuous Wavelet Transformation (CWT), and random forest analysis of Heart Rate Variability (HRV) signals. This ensemble effectively extracts local and global features from heart and respiratory vibration signals to predict sleep apnea events accurately.

Results
Validation on overnight recordings of 64 subjects using leave-one-out cross-validation demonstrates promising results. The ensemble achieves an average accuracy of 73.2% and an F1 score of 64.1%. Specifically, CRNN achieves an accuracy of 70.1% with an F1 score of 61.4%, CWT achieves an accuracy of 68.7% with an F1 score of 58.9%, and HRV random forest analysis yields an accuracy of 67.4% with an F1 score of 56.6%. Our ensemble framework offers a new perspective for enhancing OSA treatment modalities and clinical management by removing abnormal erroneous data.

Conclusions
Furthermore, our results reveal an 86% correlation coefficient with Apnea-Hypopnea Index (AHI), indicating the potential clinical relevance of our approach. This research opens avenues for non-contact sensor devices empowered by ensemble AI to revolutionize the detection and management of sleep apnea.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P13

Title
Comparison of clinical decision-making by oxycapnography or cardiorespiratory polygraphy in children on long-term ventilation

Introduction
Annual review sleep studies are recommended for all children on long-term ventilation (LTV). There is variation in the test modalities used between centres with some sites using cardiorespiratory polygraphy sleep studies (CR poly) and others favouring measurement of oxygen saturations (SpO2) and transcutaneous carbon dioxide (tcpCO2) only (known as oxycapnography).

We sought to understand the utility of oxycapnography versus CR poly in our LTV population.

Materials and Methods
We undertook a retrospective review of children on invasive or non-invasive (NIV) long-term bi-level ventilatory support that had undergone an annual review CR poly either in hospital (SOMNOScreen plus™) or at home (SOMNOTouch™) during 2023.

Data were scored as CR poly and clinical decisions in regards to changes to ventilation were made on this basis. This retrospective analysis subtracted all airflow and inductance plethysmography measures to leave oxycapnography alone. These data were anonymised, and re-analysed by the same clinician that had scored the original CR poly. The only clinical information available during oxycapnography analysis was the diagnostic category. Any recommended changes to ventilation were noted.

Agreement was assessed for changes to ventilation on basis of oxycapnography and CR poly findings.

Results

Sleep study data from 25 children were included. The study population comprised 25 children (10 male) with a median age of 10.88 years (range 1.84-16.36). Eighteen children were on non-invasive support with 7 children tracheostomy ventilated. Children were assigned a diagnostic category: 13 (52%) neuromuscular; 1 (4%) neurodisability; 1 (4%) skeletal dysplasia; 3 (12%) airway abnormality; 5 (20%) central hypoventilation; 1 (4%) chest wall abnormalities; 1 (4%) other.

The utility of oxycapnography compared to CR poly was evaluated on the basis of whether there was a clinician suggestion for ventilation changes. In 6 cases there was agreement on a change between CR poly and oxycapnography, in 13 cases there was agreement on no change to ventilation. In 2 cases a change was suggested based on oxycapnography data but not on CR poly and in 4 cases a change was suggested on CR poly but not on oxycapnography (Sensitivity 60%; Specificity 87%; Positive Predictive value 75%; Negative predictive value 13/17 = 76 %).

When changes were suggested both based on CR poly or Oxycapnography data (n=6), the same changes were suggested in 4 cases while the advice differed in 2 cases. In two cases changes were recommended based on Oxycapnography reporting alone but not based on the corresponding CR poly report; in one case this was based on a period of high transcutaneous CO2 reading elevated tcpCO2 classified as artefact during CR poly not having been removed during analysis of but remaining for oxycapnography analysis.

In three cases where changes were recommended based on CR poly data and not on Oxycapnography, the report analysis of the CR poly contained comments such as “consideration on whether to increase pressure or leave settings” and “recommend a small increase”.

Conclusions

The utility of oxycapnography compared to CR poly is limited with reasonable specificity but a sensitivity of only 60% in this study. In most cases when no change to ventilation was suggested based on CR poly data there was agreement with the recommendation based on oxycapnography. The same changes were suggested in two thirds of cases. CR poly reports with suggestions for changes (and not on oxycapnography) usually contained comments providing a degree of flexibility in decision making. Additional data about patient background and history are important to be able to provide best possible advice.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P14

Title
Breast milk and infant sleep

Introduction
The synchronicity between infant and mother might be greater than we think. Research shows that breast milk exhibits a 24-hour circadian rhythm pattern, synchronous to the mothers' circadian rhythm with melatonin secretion high during the evening and night but barely detectable during the day. Infants are not born with an established circadian rhythm; it develops after about 3-4 months. Therefore, it is hypothesized that the presence and timing of melatonin in breast milk may help provide sleep timing information to infants, thereby supporting the development of their own circadian cycle. The team conducted two projects 1). To evaluate whether giving expressed breast milk at a different time of the day to when it was pumped, 'mistimed', would impact of an infant's sleep and 2). To investigate whether maternal circadian disruption, from working night shift, would impact on melatonin timing in breast milk.

Materials and Methods
A survey of 329 mothers was used to compare different feeding types against infant sleep outcomes (sleep latency, duration, nighttime awakenings) and a prospective repeated measures study on 12 mothers was undertaken to compare melatonin levels in breast milk across shift types (day shift/non-workdays vs night shifts). Four x 10ml breast milk samples were collected by participants the same time of the day, across five consecutive days.

Results
Infants fed 'mistimed' expressed breast milk had significantly delayed sleep onset ($p < .001$), compared to infants who were directly breastfed. In addition, there was an observed decrease in breast milk melatonin ($p = .026$) at the 12-6 am time interval on subsequent night shifts, with more melatonin evident in non-workdays, compared to subsequent night shifts, suggestive of a shift in circadian timing.

Conclusions

These results provide preliminary evidence that breastmilk melatonin timing may be important for an infant's sleep development and that disturbances to a mother's circadian rhythm may also impact on breast milk hormonal timing. Consideration of the timing of expressed breast milk and the impacts circadian rhythm on melatonin seems therefore important. It is unknown whether perinatal health professionals (e.g. those assisting parents of sleep disturbed infants, community health nurses, lactation consultants) are familiar with this potentially important information. Therefore, this team will explore this starting with an international survey of sleep and perinatal health professionals in order to better understand how to optimize sleep promoting breastfeeding practices for young infants including expressing/pumping and mixed feeding methods.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P61

Title
Gas exchange parameters for the prediction of obstructive sleep apnea in infants

Introduction
Sleep laboratory polysomnography (PSG) is the gold standard for obstructive sleep apnea (OSA) diagnosis in infants, but its access remains limited.

Oximetry-capnography is another simple and widely used tool that can provide information on the presence of desaturations and alveolar hypoventilation. However, its reliability is debated. This study aimed at examining its use in determining OSA severity in infants.

Materials and Methods
This retrospective study was conducted in a sleep unit in a tertiary hospital, in infants < 4 months old with clinical signs of OSA or Pierre Robin Sequence (PRS) who underwent a one-night PSG coupled with oximetry-capnography.

Results
Among the 78 infants included (median [IQR] age: 61 [45-89] days at PSG), 44 presented with PRS, and 34 presented with isolated airway obstruction. The clinical, sleep and respiratory characteristics were not significantly different between the two subgroups. In the entire cohort, 63.5% had severe OSA. Median OAHI was 14.5/h [7.4-5.9], Spo2 was 97.4% [96.5-98.1], and PtcCO2 was 41.1 mmHg [38.3-44.9]. The optimal threshold to predict OAHI > 10/h was 6/h for OD3% (sensitivity 95.7%, specificity 51.9%) and 2/h for OD4% (sensitivity 95.7%, specificity 48.1%).

Conclusions
Whereas transcutaneous capnography does not appear to be sufficient in predicting severe OSA in infants < 4 months old with PRS or clinical signs of OSA, oximetry may be a useful alternative for the screening of severe OSA in infants in the absence of PSG.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P15

Title
Persistent and symptomatic periodic breathing beyond the neonatal period in full-term infants: a case series

Introduction
Periodic breathing (PB) is considered physiological in the neonatal period and usually disappear in the first months of life. Few data regarding persistent PB after the neonatal period are available. The objective of this study was to characterize infants born at term with persistent PB after the age of 1 month on polysomnography (PSG) performed on symptoms.

Materials and Methods
This retrospective case series included infants born at term between 2012 and 2021, without underlying disease, and who presented during a PSG performed on symptoms persistent PB, defined as more than 1% of total sleep time (TST) of PB after 1 month of life, and PB defined as a succession of at least 3 central apneas lasting more than 3 seconds and separated by less than 20 seconds of normal breathing.

Results
Overall, 10 infants born at term were included, they underwent a PSG for brief resolved unexplained event, desaturation, pauses in breathing, cyanosis, and/or signs of respiratory distress. The percentage of TST spent with PB was 18.1% before 3 months (n=7), 4.7% between 3 and 6 months (n=10). During the first PSG, ≥ 3% desaturations were observed in 77% to 100% of the PB episodes. At the first PSG, 9/10 infants had an obstructive apnea hypopnea index > 10/h and 5/10 had a central apnea index > 5/h. Gastro-esophageal reflux (GER) was suspected in 8/10 infants. All infants showed improvement in initial symptoms during the first year of life.

Conclusions

The present study shows cases of persistent and symptomatic PB after 1 month of life in infants born at term. The interesting finding was the presence of OSAS and/or CAS in the majority of children, along with GER.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P16

Title
Father perceptions of sleep quality with intentional and unintentional co-sleeping

Introduction
Nearly 45% of Australian families intentionally or unintentionally co-sleep, including bedshare. Parents' intentionality to co-sleep can influence their perceptions of sleep quality, family functioning and overall satisfaction. Yet very little is known about fathers' perspectives and experiences of co-sleeping with their children. This mixed method study aimed to explore paternal co-sleeping intention and its association with perceived sleep quality.

Materials and Methods
Fathers with children that co-slept completed an online survey about their sleep arrangements and intentionality from the Sleep Practices Questionnaire, and their sleep quality from the Sleep Quality Scale. Open-ended responses about intentionally were analysed thematically.

Results
One hundred and forty-one fathers were included in the analysis.

Quantitative analysis found that fathers' whose children were sleeping where definitely intended had significantly better perceived sleep quality than fathers whose children were sleeping in an unintended location. A thematic analysis provided insight into the reasons for this relationship. Across the three intention groups, there were subtle but nuanced differences in intention and its relationship to perceived sleep quality.

Conclusions
This study offers insight into fathers' experiences of co-sleeping including bedsharing, and responsive nighttime infant care practices. Paternal nighttime involvement in infant care can influence father-infant bonding, maternal and paternal mental health and overall family functioning. The results and its implications for professional working with fathers in the perinatal period are discussed.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P62

Title
Sleep architecture of children with specific learning disorder (SLD disorder), associated or not with ADHD

Introduction
Patients with specific learning disabilities (SLD) represent 8% of the population. There are very few studies on this field despite the frequent complaints of sleep troubles and excessive daytime sleepiness (EDS) in this population. Only a few studies, mainly on dyslexic disorders, have shown changes in the sleep architecture of dyslexic patients. The results of these studies are, however, not consistent. SLD disorders are frequently associated with ADHD. This last one has also been associated with changes in sleep architecture.

Objective
To evaluate whether children with SLD associed to ADHD or not, presenting EDS complaints have specific sleep characteristics compared to a group of control children.

Materials and Methods
Sixty-two children (n = 21 girls), aged 5.3 to 13.8 years (M 10.1) divided into three groups: DYS (n = 33 ; age M = 9.9), ADHD (n = 12 ; age M = 10.6) and DYS with ADHD (n = 17 ; age M = 10) filled out the following questionnaires : Epworth Sleepiness Scale (ESS), Insomnia Severity Index (ISI) and the Childhood Depression Inventory (CDI) and performed a laboratory Polysomnography in as part of an SDE complaint. These measurements were also carried out in 17 healthy children (age M = 9.7). Sleep characteristics and questionnaire scores were compared using a Kruskal Wallis test.

Results
SLD with or without ADHD have higher EPWORTH and ISI questionnaire scores. The sleep efficiency was reduced compare to the control group.

Sleep efficiency was correlated with subjective daytime sleepiness. In addition, SLD and ADHD children showed a lower proportion of N1 sleep than control children.

Conclusions

This preliminary study showed than children with SLD presenting EDS complaints, had a lower sleep efficiency than the control in relation to their subjective complaints of sleepiness.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P17

Title
Effect of caregivers' perception on short-term adherence of children with OSAHS treated with CPAP

Introduction
To explore the effect of caregivers' perception on short-term adherence of children with OSAHS treated with CPAP.

Materials and Methods
72 children with OSAHS who were treated with CPAP in our department from 2018 to 2020 were retrospectively analyzed. First, according to the difference of caregivers' perception on OSAHS and CPAP treatment, the patients were divided into two groups: group I (n =27) for CPAP treatment and group II (n= 45) for operation. The related parameters of the two groups were compared. Then, the children in group II are divided into good adherence group (n = 18) and poor adherence group (n =27) according to the standard that the AHI decreased by more than 50% after 2 months, which the above parameters are compared. Finally, the trend of day1 and day 2 among group I, good and poor adherence group are analyzed.

Results
The average time of use(h) of group I is more than group II(p=0.046). the AHI of good adherence group in group II is severer than poor adherence group(p=0.046). In the trend chart, the day1(h) and day2(h) of group I remain ahead, while day1(h) of good adherence group falls behind the poor adherence's, but exceeds it in the day2(h).

Conclusions
The short-term adherence of CPAP treatment can be improved by sufficent education of caregivers. It is suggested that the education of preoperative CPAP treatment should be carried out in outpatient department for the children with severe OSAHS. In addition, improving the short-term adherence of CPAP treatment in children with severe OSAHS can promote the implementation of long-term adherence, especially in the first two days of CPAP treatment.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P18

Title
Approaches to decision making when initiating non-invasive ventilation in children

Introduction
Long-term non-invasive ventilation (NIV) is increasingly utilized globally for various sleep and respiratory disorders, often extending to conditions previously considered unsuitable for this treatment. Despite the exponential growth of paediatric NIV centres internationally, there is a notable scarcity of research, evidence-based guidelines, and educational resources regarding NIV use in children with complex needs. Current healthcare practices often deviate from accepted indications, necessitating a comprehensive examination of the existing literature to understand the current approaches to NIV initiation in children.

Materials and Methods
This scoping review adheres to the Joanna Briggs Institute (JBI) methodology for scoping reviews (Peters et al., 2015). A systematic search was conducted on Embase, PubMed, PSCHYinfo, and CINAHL to identify studies related to NIV initiation in children.

Results
The systematic methodology initially identified 1,361 studies, with the final inclusion of 18 studies. The majority of studies were single-centre and retrospective. NIV use was observed across various medical conditions, with obstructive sleep apnoea and neuromuscular disorders being the most prevalent. Descriptive data, including predictors for initiation and factors influencing adherence, were commonly reported. Additionally, studies addressed decisions and barriers impacting initiation of NIV.

Conclusions
In conclusion, this scoping review provides a comprehensive summary of the literature related to the current approaches to NIV initiation in children. The findings emphasise the need for further research, evidence-based guidelines, and educational initiatives to bridge the gap between validated indications and current healthcare practices.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P19

Title
The CASTLE Online Sleep Intervention (COSI) for children with epilepsy: Parents' use of COSI in a clinical trial

Introduction
Many children with epilepsy (CWE) have sleep problems (SPs) which include the same behavioural SPs commonly occurring in typically developing children. Behavioural sleep interventions (BSIs) – including delivered online - are used to treat these SPs in children and are hypothesised to be effective for CWE. However, specific considerations need to be addressed and incorporated into a BSI for parents to use with CWE to ensure the intervention is tailored to this population's needs. An online BSI for parents of CWE was developed for use in the CASTLE (Changing Agendas on Sleep, Treatment and Learning in Epilepsy) Sleep-E clinical trial. Analysis to investigate effectiveness of the CASTLE Online Sleep Intervention (COSI) for child sleep outcomes is ongoing.

Online paediatric sleep interventions have obvious potential benefits, including cost-effectiveness and accessibility. However, there can be low engagement and high attrition rates and practical challenges for families associated with their use, perhaps especially for families also contending with their child's complex clinical needs. This paper describes families' use of COSI in the Sleep-E trial, to understand how the intervention was engaged with and perceived by parents of CWE.

Materials and Methods
Participants: 41 families with a CWE (5-12 years), recruited in hospital epilepsy clinics, randomised to the intervention (COSI) arm of the Sleep-E trial.

Measures:

Use of COSI - Number of page views (automatically captured at each log-in) of the different sections of COSI from randomisation to 'post treatment' (3 months later).

Evaluation of COSI - An online evaluation questionnaire assessed i) functionality – the frequency with which families could access the different features of COSI (e.g. viewing videos, navigating the site) on a 5-point scale of 'never' (0) to 'always' (4) and ii) use of COSI content - for each of the suggested 20 behaviour change techniques included in COSI, families reported if they had used the technique and, if 'yes', how helpful they found this on a 5-point scale from 'very unhelpful' to 'very helpful'; if 'no', they indicated why not.

Results

Of the 41 families assigned to COSI in the Sleep-E trial, 33 logged-on to the COSI website. Ten of these only viewed the introductory modules (educational information about sleep and seizures). Twenty three progressed beyond this, completing a screening questionnaire which allowed personalisation of the rest of COSI, directing them to behaviour-change content most salient for addressing their child's particular SPs.

Eleven families completed the evaluation questionnaire. All elements of COSI functionality were reported to work well (mean scores all > 3.6). All 20 strategies were reportedly used. There were 99 reports of a strategy being used and 85 of these were reported to be 'helpful or 'very helpful'; the other 14 uses had no impact (none were reported to make sleep worse).

Conclusions

COSI functioned as intended and the strategies suggested in COSI, when used, were perceived as helpful for CWE's sleep. However, 18/41 families who were given access to COSI did not engage with the core material. Reasons for this lack of engagement are considered.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P63

Title
A preliminary common threads analysis of the views of clinicians working with families of children with ADHD and sleep difficulties

Introduction
Attention-Deficit/Hyperactivity Disorder (ADHD) is defined by developmentally inappropriate, persistent, and impairing levels of inattention and/or hyperactivity-impulsivity (APA 2013). It is the most common neurodevelopmental disorder in school-aged children. ADHD is frequently comorbid with sleep problems, reported in up to 73% of children. (Cortese et al., 2013). Meta-analytic evidence shows that parents of children with ADHD, compared to parents of children without ADHD, reported significantly more severe bedtime resistance, problems falling asleep, night awakenings, difficulties with morning awakenings, sleep disordered breathing, and daytime sleepiness in their children. This study aimed to develop sleep e-learning resources to support clinicians in ADHD clinics working with children and their families. It is part of a larger programme of work (https://www.discasleep.org.uk) to develop and trial a digital sleep intervention for children with ADHD.

Materials and Methods
15 multi-professional NHS clinicians who work with children with ADHD and sleep difficulties were recruited from clinics. They were asked to take part in individual semi structured interviews with the aim of completing a Thematic Analysis following the six phases guided by Braun & Clarke, 2006. A preliminary common threads analysis was completed with 8 out of the 15 clinicians due to time constraints to inform the first stages of e-learning development as well as the first stage of the thematic analysis in which researchers are encouraged to become more familiar with data.

Results
Some of the developed themes included; technology, parental expectations and understanding surrounding medication, good sleep habits, social economic status (SES) impact on schooling, and clinical skills beyond sleep and ADHD. One key finding was the use of technology, and whether this was a help or a hindrance for children with ADHD and their

sleep. The participants also identified the need for skill development above and beyond basic knowledge on sleep, specifically around tackling difficult conversations involving the challenges that these families face. One conversation that clinicians struggled with was managing the disappointment of parents who had misconceptions about sleep medication and how they thought the medication would work for their child.

Conclusions

Professional experiences and opinions supported the need for comprehensive training for health professionals around managing sleep in children with ADHD. The themes identified were helpful in providing early content development for the e-learning intervention.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P20

Title
Item overlap analysis of parent reported ADHD and sleep difficulties

Introduction
Attention-Deficit/Hyperactivity Disorder (ADHD is the most common neurodevelopmental disorder in school-aged children. ADHD is frequently comorbid with other (neuro)psychiatric disorders, such as anxiety or mood disorders and/or somatic conditions. Amongst comorbidities, sleep problems are reported in up to 73% of children. (Cortese et al., 2013). Meta-analytic evidence shows that parents of children with ADHD reported significantly more severe bedtime resistance, problems falling asleep, night awakenings, difficulties with morning awakenings, sleep disordered breathing, and daytime sleepiness in their children. However, there is no ADHD specific sleep screening questionnaire and considerable concern that sleep problems in children with ADHD maybe over reported by parents due to the presence of ADHD. This study aimed to develop a low cost, rapid sleep screening questionnaire tailor-made for sleep problems associated with ADHD for use at annual clinical reviews.

Materials and Methods
Carers of 289 children aged 6-12 years (mean 9.64 SD 2.25) were recruited from charities and online support groups, 233 children had an ADHD diagnosis and the child sample was 84.42 White British. All participants completed the Omnibus Sleep Problem Questionnaire (OSQ) and the Swanson, Nolan, and Pelham (SNAP) Questionnaire (Swanson, 1992). By using an item overlap analysis of well-respected and validated ADHD and sleep questionnaire items, we aimed to develop an ADHD specific sleep screening questionnaire in a demographically representative sample of UK families.

Results
Analysis strategy- An exploratory factor analysis was conducted following the guidelines advocated by Fabrigar, Wegener, MacCallum, and Strahan (1999). Principal axis factoring (PAF) was conducted with an oblique rotation (Promax) because some correlation between the factors was expected. The Kaiser–Meyer–Olkin measure for sampling adequacy (KMO =

.0.81), and Bartlett test of sphericity ($\chi 2 = 5172.48$, $df = 946$, $p < .001$) indicated that the data were suitable for factor analysis.

Results- An examination of the scree plot indicated a six-factor solution. This solution only yielded five complete factors, so the analysis was repeated specifying five factor model which contained the factors 1) SNAP Inattention 2) SNAP Hyperactive impulsivity 3) OSQ Bedtime anxiety and night arousal. 4) OSQ sleep disordered breathing and restless sleep and 5) OSQ sleep routine and morning tiredness. Factor loadings of 0.35 were interpreted as a minimum acceptable level (Tabachnick & Fidell, 2001). On this basis items from the OSQ were considered unstable and removed if they loaded more than 0.35 on a SNAP factor. Results of the item overlap analysis indicated no overlap between sleep and ADHD items. Results of a confirmatory factor analysis will also be reported.

Conclusions

Preliminary analysis suggests that despite sleep difficulties such as restless legs in bed mimicking ADHD symptoms such as fidgeting, the presence of ADHD does not appear to inflate parents reporting of their child's sleep symptoms.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P21

Title
Canada's First 'Week for Better Sleep' – An initiative to promote healthy sleep for Canadians

Introduction
World Sleep Day, an awareness activity of the World Sleep Society, has successfully promoted sleep health across the globe for 16 years. In 2021, World Sleep Day had over 300 official delegates, 200 activities, and 45 participating countries.

The Canadian Sleep Research Consortium, funded by the Canadian Institutes of Health Research, recognized the capability of large-scale initiatives to promote sleep health, and developed the 'Week for Better Sleep' – a Canadian national campaign. Its purpose was to help Canadians recognize the importance of sleep for health; promote healthy sleep practices; understand participants' typical sleep; and evaluate their experiences in implementing sleep tips to inform future initiatives. The basis of this campaign was an interactive web-based program that encouraged individuals to try a new healthy sleep practice each day of the week after completing a brief sleep diary.

Materials and Methods
Canada's inaugural Sleep Week (March 15-21, 2024) was promoted to Canadians through social media and schools. Persons of all ages from across the country registered to receive age-adjusted (preschoolers, children, youth, adults, older adults) daily sleep tips. Participants were asked to provide demographic information and answer questions regarding their typical sleep duration, quality, and behaviours. They had the option to link their profile with family members (parents and children) to promote mutual support and motivation through family participation.

The recommendations were developed by a team of sleep researchers and clinicians and were based on current evidence and best practices. At the end of the week, participants were asked to share their experiences and opinions on the sleep recommendations in an evaluation survey.

Results

Demographics of those who engaged in the 'sleep week' will be presented along with an overview of their typical sleep experiences. We plan to produce a graphic based on a live map showing how people across Canada were sleeping, that was accessible online at https://www.researchsleep.ca/

Results of the evaluation survey will include which recommendations were feasible, most used, and deemed impactful by different demographic groups.

Conclusions

We hope this is the first of what will become an established annual opportunity to bring public attention to the importance of sleep for health and wellness. Lessons learned from the 2024 'Week for Better Sleep' initiative will provide valuable insights into ways of improving engagement, inclusivity, and relevance of future large-scale sleep-promotion activities.

Acknowledgements

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Presentation Day and Board Number
Sunday, April 28, 2024 | P22

Title
Sleep respiratory disorders in children with the congenital Zika virus syndrome- a polysomnography and magnetic resonance analysis

Introduction
Children with the congenital Zika virus syndrome (CZS) and microcephaly presents neurological vulnerability for sleep-wake regulation [1-3]. However, there is a lack of studies that address the impacts of CZS brain structural changes on sleep abnormalities in this population [1][2]. The aim of this study is to evaluate whether there is an association between sleep respiratory disorders and the degree of structural brain abnormalities observed in this population.

Materials and Methods
This is a cross-sectional study in which patients were included from the cohort of Brazilian children with microcephaly and CZS, evaluated with PSG and cranial MRI in Porto Alegre (at Hospital São Lucas and Instituto do Cérebro do Rio Grande do Sul) and in Maceió (at the Hospital Universitário Alberto Antunes e Diagnóstico por Imagem - Dirad) between 2017 and 2019. Skull MRIs were analyzed independently by experienced neuroradiologists. 13 structural abnormalities were investigated, as described in Santos et.al [4], scored from 0-3 points (0-4 points in the Brain calcifications item), according to the degree of brain structural abnormalities identified, so that the total severity score of brain abnormalities is the result of the sum of the 13 items analyzed. A total score of 0-12 points is classified as mild, 13-25 as moderate and >25 as severe [4]. The brain stem was one of the brain structures evaluated, being classified according to the degree of hypoplasia as normal (0 points), mild (1 point); moderate (2 points) or severe hypoplasia (3 points) [9]. Diurnal PSGs, with 60-90 minutes duration were performed and apneas and hypopneas were classified during the total sleep time (TST), generating, for each patient, an apnea index and a hypopnea index, classified as mild, moderate and severe, according to the number of events per hour (Mild: 1 to <5; Moderate: 5 to <10; Severe: 10 or more). The total time of hypopnea during TST was also collected. The Apnea and Hypopnea Indices, as well as the total time of hypopnea by TST,

were compared to the degree of brainstem hypoplasia and the general microcephaly severity score.

Results

The present study included 35 children with congenital microcephaly caused by ZIKV. Among the 35 children included in this study, 17 (48.57%) were female and 18 (51.43%). The Pearson correlation test was conducted to evaluate the relationship between the variables hypopnea time by TST, apnea index and hypopnea index with the microcephaly severity score, without significant differences resulting, presenting very weak correlations between the variables. The Kruskal-Wallis test was conducted to evaluate whether there are significant differences in the medians of the variables hypopnea time per TST, apnea index and hypopnea index with the degrees of hypoplasia of the brainstem, with no significant differences resulting. The e ordinal regression model suggested a tendency between apnea index, hipopneia index and duration of hipopneia in relation to TST and degree of brain stem hypoplasia. However, results were not statiscally significant.

Conclusions

Previous studies report that sleep disorders were common in children with CZS, with central sleep apnea being the main finding [5]. Despite this, our study did not show significant associations between structural changes in the central nervous system and apnea and hypopnea/indexes in children with microcephaly due to CSZ. More studies are needed, with more sensitive techniques, to investigate the origin of sleep disorders in these children.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P64

Title
Adolescents' Suggestions on how to support their sleep

Introduction
The proportion of adolescents lacking sleep has increased in recent years, and the percentage of adolescents who do not sleep the recommended eight hours varies between 20 and 70 percent (Alves et al., 2020; Galland et al. 2020; Gariepy et al., 2021; Garmy & Ward, 2018; Twenge et al. 2017). Consequently, adolescents are at risk of mental illness, reduced learning ability, concentration difficulties, incomplete grades, obesity, diabetes, and cardiovascular diseases (Shochat et al., 2014; Sun et al., 2019). Promoting good sleep among adolescents is, therefore, of the utmost importance. School-based sleep education in classes effectively increases adolescents' knowledge about sleep; however, it has been less effective in improving sleep behavior (Blunden & Rigney, 2015; Gruber, 2017; Illingworth, 2020). This study aimed to explore adolescents' suggestions on how their sleep could be supported. By getting the adolescents' perspective, sleep promotion work can be targeted.

Materials and Methods
To address the aim of this study, an inductive qualitative design was adopted, and focus group interviews were held. The participants were n = 43 adolescents divided into eight focus groups, with 18 boys (42%) and 25 girls (58%). The participants were in grade nine, aged 15–16, from five socioeconomically diverse schools in a Swedish city. Data were analyzed using qualitative content analysis (Lindgren et al., 2020).

Results
The results describe the adolescents' suggestions on how their sleep could be supported in three themes:

1. Being supported by involved parents– the adolescents ask for routines, engagement, and warmth, which are vital for sleep.
2. Being supported to achieve knowledge on the "whys" and "hows" of sleep–the adolescents wish for increased knowledge about sleep, which gives them the ability to make well-grounded sleep choices.

3. Being guided into finding balance—adolescents mean that balance in life is challenging, and they desire support.

Conclusions

According to the adolescents, the parents' routines, security, and guidance play a key role in relation to their sleep. Hence, by involving parents more clearly, the sleep-promoting work may be more successful. The adolescents' suggestions of supporting sleep consistently include a desire to receive knowledge and support directed at them as individuals. For this purpose, adolescents need to be listened to; then, the opportunity is given to influence and prevent the individual's sleeping difficulties.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P23

Title
School nurses' experiences of sleep-promoting work

Introduction
The widespread lack of sleep and difficulties falling asleep among students (Alves et al., 2020; Friel et al., 2020; Galland et al., 2020; Gariepy et al, 2020; Jakobsson et al., 2019), means that several students in each class are in school without optimal conditions due to their sleep. Since too little sleep can negatively affect memory, learning ability, concentration, social interactions, and mood - the students' school results, education, and health can be negatively impacted (Matricciani et al., 2020; Shochat et al., 2014; Short et al., 2020; Hirshkowitz et al., 2015). Lack of sleep is a health aspect that affects the ability to assimilate the school's teaching and falls within the responsibility of school health care.

Materials and Methods
An inductive qualitative design was adopted to address this study's aim. Using an open-ended question asking for (n = 61) school nurses' written narratives of their sleep-promotion work. The study was performed in January 2023. Data were analyzed using qualitative content analysis (Lindgren et al., 2020).

Results
School nurses' experiences of sleep-promoting work are described in three main categories:

1. Informing and providing knowledge is the primary task.
School nurses inform and provide knowledge systematically through dialogues with an individual student, with several students simultaneously, or with parents.
2. Benefits take place when the needs of the student guide the work.
Through curiosity about the student's personal story, the keys to sleep-promoting work can be found, appropriate strategies can be given, and the student can be guided further if needed.
3. Barriers challenge the outcome of the work.

The school nurses experience these barriers in the form of unmotivated students, unsupportive parents, and lack of prerequisites, which make the school nurses unsure of their performance.

Conclusions

School nurses experience a significant benefit in their sleep-promoting work when the needs of the student guide the sleep-promoting information, strategies, and follow-ups. To avoid feeling insecure in sleep-promoting work, school nurses need updates on the state of knowledge and evidence-based tools. Further research on sleep-promoting work at school is necessary.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P65

Title
Theory of Mind impairment in childhood Narcolepsy type 1: a case-control study

Introduction
Narcolepsy type 1 (NT1) is a central disorder of hypersomnolence characterized by excessive daytime sleepiness, cataplexy, and other rapid eye movement sleep-related manifestations.

Neurophysiological studies suggest that NT1 patients may experience impairment in emotional processing due to structural and functional changes in limbic structures and associated areas.

However, the only study exploring NT1 behavioral responses found no impairment in the ability to recognize emotions, possibly due to compensatory mechanisms. The present study was designed to fill this gap in the literature by investigating the behavioral impairment related to emotional processing focusing on an advanced socio-cognitive skill, namely Theory of Mind, in pediatric NT1 patients.

Materials and Methods
Twenty-two NT1 children and adolescents (6 F; Age range: 8.0 – 13.5) and 22 healthy controls (HC) matched for age and sex (6 F; Age range: 8;9 – 13;0) underwent a neuropsychological evaluation to assess socio–economic status, verbal abilities, working memory, social anxiety, and Theory of Mind via a verbal (i.e., Strange Stories task) and a visual task (i.e., Silent Films). NT1 patients were also evaluated for disease severity.

Results
NT1 patients exhibited impairment in ToM skills, as assessed both through both verbal (HC Median = 8; NT1 Median = 5; p = .009) and visual tasks (HC Median = 8; NT1 Median = 6; p = .003), compared to healthy controls.

Correlation analyses showed that verbal and visual ToM was negatively related to narcolepsy severity (ρ = -.45, p = .035 and ρ = -.52, p = .012), and daytime sleepiness (ρ = -.48, p =.025 and ρ = -.45, p =.038).

Conclusions

Our study shows a selective impairment in the ToM domain in children and adolescents with NT1.

In addition, our results highlight a link between symptom severity and Theory of Mind, suggesting that lower Theory of Mind levels are associated with higher symptom severity. Further longitudinal studies are needed to disentangle the direction of this relation and to disambiguate if NT1 severity impaired children's Theory of Mind or if ToM skills modulate the severity of NT1 symptoms by providing a greater ability to avoid cataplexy.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P24

Title
Visual and automatic analysis of REM sleep atonia in patients with Rett syndrome

Introduction
Rett syndrome (RTT) is a rare genetic disorder, mainly affecting females, characterized by loss of purposeful hand skills and spoken language, stereotypic hand movements, gait abnormalities, epilepsy and sleep disturbances.

REM sleep without atonia (RSWA) is characterized by the absence of the physiological loss of muscle tone during REM sleep. Once thought to be characteristic of old age, according to literature it is emerging in the pediatric population, even associated with Rem Sleep Behaviour Disorder (RBD), being described in diseases such as Narcolepsy, Idiopathic Hypersomnia, and Pediatric Acute Onset Neuropsychiatric Syndrome (PANS).

The aim of this study is to investigate the occurrence of RSWA to provide a more comprehensive characterization of the sleep among individuals with RTT.

Materials and Methods
Thirteen consecutive patients with RTT referred to Gaslini Institute Sleep Centre and a group of healthy controls matched for sex and age were recruited. Both groups underwent a complete overnight polysomnography.

We performed the visual and automatic analysis of chin EMG signal to assess the REM sleep muscle tone.

A Mann-Whithney U test was employed to evaluate the differences between patients and healthy controls in sleep macrostructure and REM sleep parameters.

Results
We found statistically significant differences between the two groups in REM sleep atonia index (p-value < 0.001) and in visual analysis variables (p-value < 0.001). We showed that

patients with RTT have an increased amount of RSWA assessed by both an automatic method and manual analysis.

Conclusions

We believe that this evidence can play an important role in shedding light on the mechanisms underlying the pathology and deepening the understanding of comorbidities in terms of sleep disorders. Further longitudinal studies with video-polysomnographic analysis are needed to assess the presence of concurrent RBD aiming to improve therapeutical strategies and increase patients' quality of life.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P25

Title
Analysis of Melatonin RCTs in Children with Neurodevelopmental Disorders: Do We Need to Harmonize Sleep Research?

Introduction
Melatonin is available over-the-counter in North America, in contrast to many countries and has been used for many conditions in various ways. National/international societies are trying to structure the use of prescription melatonin with guidelines. To contribute to the discussion on melatonin application, we reviewed the investigated domains in prescription-based melatonin RCTs.

Materials and Methods
Three NDD-RCTs (Tuberous Sclerosis, n=2; Rett Syndrome, n=1; 1998-2005) and four ADHD-RCTs (ADHD, n=3; ADHD/NDD, n=1; 2006-2012) were sourced from the German Sleep Society's Melatonin Consensus, whereas the five ASD-RCTs with additional NDDs (2012-2021) were sourced from the IPSA Melatonin Statement. The National Institutes of Health (NIH) Quality Assessment Tool (14 criteria) was used for assessing RCTs. Measures were divided and listed as child or caregiver-related, and sleep and/or wake behaviour-related. We categorized the outcomes as day- and nighttime-related domains and assessed which domains were reported.

Results
NIH Scores (max. 14) were higher for recent RCTs than older ones: NDD-RCTs: 5/6/8; ADHD-RCTs: 11/11/12/12; ASD-RCTs: 10/11/11/13/13. The NDD-RCTs used child-related measures, whereas the ADHD- and ASD-RCTs used both child- and caregiver-related measures. Sleep diaries were used by all RCTs, except 1 ADHD-RCT and 1 ASD-RCT; 1 ASD-RCT tracked naps. Actigraphy was used by 1/3 NDD-, 3/4 ADHD- and 4/5 ASD-RCTs. Sleep questionnaires were used by 0/3 NDD-, 3/4 ADHD-, and 5/5 ASD-RCTs. Behavioural questionnaires were used in 0/3 NDD-, 4/4 ADHD-, and 3/5 ASD-RCTs. 2/9 sleep questionnaires were not validated, while all behavioural questionnaires were validated.

Daytime restlessness was captured in 0/3 NDD-, 3/4 ADHD-, and 4/5 ASD-RCTs but reported only in 2/5 ASD-RCTs. Bedtime restlessness was captured in 0/3 NDD-, 1/4 ADHD-RCTs and 1/5 ASD-RCTs and nighttime restlessness in 3/3 NDD-, 4/4 ADHD-, and 2/5 ASD-RCTs, but not reported in any of the studies. Similarly, sleep hyperhidrosis was captured by 0/3 NDD-, 1/4 ADHD-, and 1/5 ASD-RCTs, but was not reported in any of the studies. Excessive daytime sleepiness was captured in 0/3 NDD-, 2/4 ADHD- and all ASD-RCTs but reported only in 4/5 ASD-RCTs.

Conclusions

RCT's measuring the effect of melatonin on patients with three neurodevelopmental disorder complexes were conducted in different settings from various perspectives using different outcome measures. However, a harmonized approach to assess sleep is missing due to the various applications of methodologies. For example, 2 validated sleep questionnaires captured sleep hyperhidrosis and restlessness before/during, but this information was systemically missed and not utilized. Such oversights limit the impact of the studies, raising the question: independent of researchers' interests, do we approach sleep in a standardized way?

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Presentation Day and Board Number
Sunday, April 28, 2024 | P26

Title
Sleep Quality and Daytime Activity in Children with Obesity

Introduction
Obesity has been associated with poor quality sleep in both adult and paediatric populations and is a major risk factor for Obstructive Sleep Apnoea (OSA) and Sleep Disordered Breathing (SDB). Acting through a variety of hormonal and metabolic pathways, OSA is also a contributing factor to obesity (1). There is currently significant interest in how daytime physical activity may have positive effects on sleep. Previous studies in healthy paediatric populations have published contrasting results (2,3), indicating a complex relationship. This study aimed to characterise the relationship between actigraphy assessed daytime activity level (DAL) and sleep quality in a population of children with excess weight.

Materials and Methods
This was a retrospective review of case notes, actigraphy and polygraphy data of a paediatric cohort of 24 children with median age 14yr6m, (range 6yr6m-17yr8m). 50% were female, and median BMI 38.97 kg/m2, (range 25.05kg/m2 - 54.90kg/m2).

Results
Total sleep time (TST) was below the age specific recommendations for 14/24 patients. Average sleep efficiency (SE) was 86.12% (range 49.2%-98.7%), which is below the average of a control paediatric population (4), with 11/24 having a sleep efficiency below the 88.3% threshold. Sleep latency (SL) was increased at an average of 37.1min (range 301.8min-0.3min), compared to 19.4min in controls (4). 11/24 children had a SL>19.4min, and 5/24 children had a SL at least 2x greater than 19.4min. OSA was uncommon, 2/20 patients had mild OSA, and 3/20 had moderate or severe OSA. There was a positive correlation between mean DAL and TST ($r(22) = .49$, $p=.014$), and SE ($r=(22) = .46$, $p=.024$). There was no correlation between DAL and SL.

Conclusions

Higher mean DAL correlated with improved TST and SE in a group of children with excess weight and low-quality sleep. These correlations were exclusive of the presence of SDB.

Acknowledgements

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Presentation Day and Board Number
Sunday, April 28, 2024 | P27

Title
Perceptions of 24-hour Movement Behaviours in Adolescents with Type 1 Diabetes: A Qualitative Study

Introduction
Type 1 diabetes (T1D) necessitates 24-hour management, involving careful monitoring of blood glucose levels, insulin administration, and lifestyle adjustments. Research exploring the importance of physical activity (PA), sedentary behaviour (SB) and sleep in adolescents with T1D has been explored in isolation, demonstrating their individual influence on glycaemic control and psychosocial outcomes. However, there is a growing consensus for an integrated approach, treating all 24-hour movement behaviours as part of a continuum from no movement (e.g., sleep) to high movement (e.g., vigorous physical activity). These behaviours are considered relative or time-dependent, meaning a change in one behaviour can impact another. Importantly, the way these movement behaviours are combined throughout the day is found to have significant implications for the physical and mental health of adolescents. The aim of this qualitative study is to investigate adolescents with T1Ds perspectives and values towards 24-hour movement behaviours together.

Materials and Methods
This qualitative study utilised online semi-structured interviews and were informed by concepts of interpretivism (i.e., to understand experience) and pragmatism (i.e., facilitate the practical implications of the research). Interview questions were open-ended and conducted by a 28-year-old female who utilised video conferencing platform interview techniques. The recordings of the interviews were transcribed using intelligent verbatim due to the volume of utterances and repetitions present within this population. Transcription was completed by the researcher who conducted the interview to ensure familiarity of the data. Transcribed interviews were transferred to NVivo and were analysed using thematic analysis.

Results
Fifteen adolescents (6M, 9F) participated, averaging 14.6±2.0 years in age, with HbA1c at 7.4±1.0%, and diabetes duration of 3.7±3.1 years. Predominantly, continuous glucose

monitors (80%) and insulin pumps (67%) were utilized. Four overarching themes emerged: 1) Sleep and PA were understood and valued above SB ("I definitely think about how much physical activity and how much sleep I am getting quite a lot but sitting doesn't really play into it."); 2) Recognition of 24-h MBs Interconnection ("I feel like if you don't get a lot of sleep you're going to be sitting for ages. You're not going to be kind of physical as well. They all kind of interlink."); 3) 24-h MBs are relative to health, with subthemes revealing positive effects of improved sleep and increased physical activity, with sedentary behaviour negatively influencing mood and 4) Social-ecological Environment Influences 24hr MBs, with subthemes revealing school and caregivers having significant influences on 24-h MB participation and understanding.

Conclusions

This study highlights adolescents with T1D's awareness of the interconnectedness of 24-hour behaviours and the positive influence of a balanced approach on mood. Additionally, the school environment and adolescent caregivers were highlighted as key contributors to 24-h MB understanding and participation. The findings provide important information for future interventions and clinical care to promote healthy 24-hour movement behaviours and advocate for a holistic approach in T1D management targeting the adolescent, their school environment and their caregivers.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P28

Title
Treatment outcomes and cost effectiveness of using multi-channel studies to assess children with sleep disordered breathing

Introduction
Current UK guidance recommends the selective use of sleep studies to assess children with sleep disordered breathing (SDB) when there is diagnostic uncertainty, in those with comorbidities or to assess perioperative risk when severe obstructive sleep apnoea (OSA) is suspected. We have developed a novel paediatric sleep service based on the routine use of multi-channel sleep studies (MCSS) in children with SDB prior to adenotonsillectomy and report the findings of a service evaluation assessing the impact of our service on treatment outcomes and cost.

Materials and Methods
We conducted a retrospective service evaluation of 264 children with SDB seen between July 2018 and June 2019 and a prospective evaluation of 49 children seen between July 2021 and August 2022. Otolaryngologists completed a questionnaire prior to MCSS in the children assessed prospectively to evaluate the impact of sleep study findings on surgical decision making. We used medical records and a sleep study database to determine treatment outcomes. We assessed the costs of our service using standard National Health Service Healthcare Resource Group tariffs and compare this with estimated costs of alternative models of care.

Results
Questionnaire responses (n=49) showed that Otolaryngologists thought 66% of children were 'likely', 'very likely' or 'definitely' would require surgery prior to MCSS, however 54% of children underwent surgery following their sleep study. We estimate that the use of MCSS was associated with a 21% reduction in children undergoing surgery in the prospective cohort and a 44% reduction in surgery in the retrospective cohort. We found that our service

costs were higher than our estimate of the standard UK model of care costs. However, we estimate that use of home multi-channel studies in our service would result in potential cost savings (~£50,000 - £80,000 per annum) compared to standard UK care.

Conclusions

We conclude that our routine use of MCSS facilitates conservative management and a significant reduction in children undergoing surgery for SDB. We estimate that the use of home MCSS would be associated with significant cost savings.

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We acknowledge the contribution of Dr Nabeel Ali to the conceptualisation of this work.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P29

Title
Impact of a sleep literacy program on sleep patterns and sleep behaviors of preschool aged children: preliminary results

Introduction
Sleep is critical for a child healthy growing and development. Yet, sleep difficulties and sleep related problems are often observed within the pediatric range of ages with many parents complaining from multiple conflicts impacting important familiar and societal aspects of life. On the other hand, sleep disorders frequently favor a negative interaction between children and caregivers which may perpetuate a deleterious cycle of mental instability, affective problems, loss of neurocognitive performance, as well as other health related issues. Even though that behavioral strategies are recommended as a standard approach directed to pediatric patients with inadequate or insufficient sleep, they are often difficult to implement with full adherence from parents or caregivers compromising its efficacy. Sleep health literacy is an important aspect eventually related with an acquisition of knowledge and standards of preventive care in adults and children, but no systematic evaluation of its impact has been done.

This study aimed to preliminarily assess whether health literacy by means of an implementation of a sleep story reading program directed to preschool children may impact sleep related behaviors and sleep patterns.

Materials and Methods
From a pool of 192 preschool children engaged in a sleep literacy program, 125 (62 male; mean age 3.732.21 years old) were selected for further analysis after excluding those inadequately reporting on the initial Children Sleep Habits Questionnaire or in the Visual Analogue Scale (VAS) for changes before and after program implementation. Literacy program consisted on a 3 week daily sessions of reading and interpretation of two sleep related stories based on the circadian disruption, insomnia, sleep hygiene and sleep apnea. Variations on critical aspects of sleep habits and patterns were assessed through a VAS evaluating bedtime resistance (BR), sleep onset autonomy (SOA), inadequate behaviors after

sleep onset (IBASO), daytime impairment (DI) and parents proactive finding of specialized help (PPFSH) to children sleep related problems.

Results

After concluding the sleep literacy program all the assessed items improved in all children as showed by VAS, with means of 6.86+-2.27 for BR, 6.1+-2 for SOA, 6.23+-2.19 for IBASO, 6.61+-2.09 for DI and 6.63+-2.33 to PPFSH.

Conclusions

Results from our study are highly suggestive that a program directed to sleep health literacy of young children may be effective both in improving sleep habits and sleep patterns therefore preventing deleterious consequences of inadequate sleep on this vulnerable pediatric population.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P30

Title
Risk assessment of attention deficit hyperactivity disorder in children with sleep-disordered breathing

Introduction
as the attention and planning function of Das-Naglieri cognitive assessment system has a good ability of prediction in the diagnosis of children with attention deficit hyperactivity disorder(ADHD), we can analyse the risk of ADHD in children with sleep-disordered breathing(SDB) with the system. this study was to explore risk of ADHD in children with SDB and the benefit of continuous positive airway pressure(CPAP) treatment.

Materials and Methods
a total 64 of children with snoring were recruited, completing standard PSG as well as cognitive assessment. The attention and planning functions of children with different severity of SDB were analyzed according to the examination. 8 children with severe SDB were selected for CPAP and followed up for 2 months.Finally, factors of ADHD in children with SDB were analyzed by multiple linear regression.

Results
There was no difference in attention and planning function between children with sleep breathing by severity. 8 children with severe SDB had improved oxygen saturation and attention function, but there was no difference between sleep structure and planned function and baseline.Multiple linear regression analysis found stage 3 sleep as a contributing factor for decreased attentional and planning function in children with SDB.

Conclusions
The risk of ADHD in children with SDB is not related to severity, but may be related to decreasing in stage 3, and CPAP treatment can improve ADHD-like symptoms

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Presentation Day and Board Number
Sunday, April 28, 2024 | P31

Title
Caregiver experiences of accessing and implementing tailored behavioural sleep interventions for children with neurodevelopmental conditions.

Introduction
Children with neurodevelopmental conditions (NDCs) experience poor sleep which can negatively impact their mood and behaviour and increase stress and anxiety for their caregivers. In particular, children with NDCs often experience insomnia. The first-line treatment for insomnia is sleep hygiene, which may be recommended alongside exogenous melatonin for children with NDCs. However, these strategies are not viewed as effective by caregivers, who would benefit from support to implement behavioural sleep interventions, which use principles of operant and classical conditioning to reduce signalling behaviours. Despite evidence which suggests behavioural interventions are effective in individuals with NDCs, little is known about caregiver experiences of accessing and implementing strategies in the family home. This study explores caregiver perspectives on the feasibility of implementing a tailored support package and priorities for sleep intervention.

Materials and Methods
Forty-two caregivers completed The Children's Sleep Habits Questionnaire (CSHQ) online and were invited to attend focus groups. Twenty-six caregivers (mean age 39.85, 24 female) participated in focus groups (6 in total) to discuss their experiences of accessing sleep support and implementing tailored behavioural sleep interventions for their child (mean age 8.77 years, range 4-15 years). Focus groups were transcribed verbatim and thematic analysis used to identify themes in caregivers' accounts.

Results
Themes were identified across caregivers' accounts. These include frustration around sleep diaries; fear of parental blame; attitudes towards melatonin; caregiver exhaustion; and lack of options. Caregivers often expressed hesitations to complete sleep diaries and felt they were used as a means of "proving" sleep difficulties exist and used to blame caregivers for their children's poor sleep. There was frustration at the apparent lack of options, and reliance on

"off the shelf" methods, rather than tailored support. However, some caregivers were wary of using behavioural interventions either due to the lack of support available through clinicians, or due to previous bad experiences with methods such as "cry it out".

Conclusions

Overall caregivers were positive about the possibility of improving sleep, but highlighted the need for increased support and guidance to implement changes. The implications of the findings, including fear of parental blame and dismissal of caregiver reports, for clinical services will be discussed.

Acknowledgements

A huge thank you to the caregivers who took the time to share their experiences with us. Thanks to Waterloo and Cerebra for funding the project and advertising the study.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P66

Title
Diagnosis of pediatric obstructive sleep apnea syndrome using smartphone home sleep video recording: SMARTSAS Study (NCT03743558)

Introduction
Pediatric obstructive sleep apnea-hypopnea syndrome (OSAHS) diagnosis can rely on sleep recordings. Home sleep video recordings (HSVR) were previously assessed as a possible diagnostic tool for pediatric obstructive sleep apnea-hypopnea syndrome (OSAHS) in 1996, yielding promising results. Nowadays, the wide availability of smartphone videos puts in a new light the diagnostic value of this tool. Our objectives were to assess the reliability of a smartphone HSVR-based scoring system for the diagnosis of pediatric OSAHS.

Materials and Methods
This prospective multicenter study involved 56 children suspected of OSAHS without comorbidities, aged 5.1 ± 1.6 years. All patients underwent a respiratory polygraphy (RP). Within 4 days before or after the RP, parents performed a 10 minute-HSVR, in which they indicated the minute they considered the worst in terms of obstructive sleep disordered breathing (OSDB) symptoms. A ten-minute (RS10) and 1-minute (RS1) risk score were established by analyzing seven parameters. The RS10 and RS1 were correlated with clinical examination data, a sleep questionnaire, the obstructiveapnea-hypopnea index (OAHI) and the oxygen desaturation index (ODI) obtained on the RP.

Results
A RS10 ≥ 6 had a specificity of 100% to diagnose OSAHS and a RS10 ≤ 2 a sensitivity of 100% to exclude the presence of moderate to severe pediatric OSAHS. A RS1 ≥ 3 can diagnose moderate to severe OSAHS with a sensitivity of 86% and a specificity of 63%

Conclusions

A RS10 ≥ 6 had a specificity of 100% to diagnose OSAHS and a RS10 ≤ 2 a sensitivity of 100% to exclude the presence of moderate to severe pediatric OSAHS. A RS1 ≥ 3 can diagnose moderate to severe OSAHS with a sensitivity of 86% and a specificity of 63%

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Presentation Day and Board Number
Saturday, April 27, 2024 | P67

Title
Diagnosis of pediatric obstructive sleep apnea hypopnea syndrome using a risk score based on polysomnography sleep video recordings: a pilot study

Introduction
Because access to sleep recordings is limited, there is a need for new reliable diagnostic tools for pediatric obstructive sleep apneahypopnea syndrome (OSAHS) diagnosis. A score calculated from a 30 minutes-home sleep videotape recording has already been proposed in 1996 with interesting results. The main objective of this pilot study was to assess the reliability of a similar score applied to reference PSG video recordings and calculated on two different time windows (30 and 10 minutes).

Materials and Methods
Sixteen children suspected of OSAHS, aged between two and ten years, underwent video recording during overnight PSG. Video analysis was made during the second complete sleep cycle. A 30-minute risk score (RS30) and a 10-minute risk score (RS10) were established by analyzing seven parameters. The RS30 and RS10 were correlated with clinical examination data, a sleep questionnaire, the obstructive-apnea-hypopnea index (OAHI) and the oxygen desaturation index (ODI) from synchronized PSG results.

Results
There was a significant correlation between both the RS30 and RS10, the OAHI and ODI. A RS30 ≥ 6.09 was predictive of an OAHI ≥ 5 per hour with a sensitivity of 83% and a specificity of 90%. A RS10 ≥ 6.50 was predictive of an OAHI ≥ 5 per hour with a sensitivity of 67% and a specificity of 100%.

Conclusions
A risk score based on PSG video recordings shows a good correlation with PSG results, confirming previous reports. Further work should focus on applying this risk score to home sleep video recordings for the diagnosis of pediatric OSAHS.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P68

Title
Respiratory events after adeno-tonsillectomy in children: what does really happen on the first night?

Introduction
Adeno-tonsillectomy (AA) is the first-line treatment for obstructive sleep apnea hypopnea syndrome (OSAH) in children without comorbidities.

Its performance in outpatient surgery is limited by the fear of respiratory complications the first night. If a few articles deal with events in the recovery room, there is little data in the literature on the first post-operative night.

The objective of this study is to analyze the occurrence of respiratory events on a respiratory polygraphy (RP) performed during the night following an AA in children.

Materials and Methods
This study included 19 patients aged 4.9±1.8 years with an indication for AA for OSAHS without comorbidities.

All patients benefited from:

- an inpatient preoperative RP coupled with a JAWAC® device
- an AA
- a post-operative RP on day 0

Pre- and post-operative recording data were compared.

Results
The median preoperative OAHI was 4.42 compared to 1.14 postoperatively (p=0.0001). The median preoperative IDO was 4.7 compared to 1.95 postoperatively (p=0.0004).

The median preoperative mandibular lowering was 8.16mm compared to 9mm postoperatively (p=0.49). The median preoperative respiratory effort (RE) was 27.45% compared to 33.24% postoperatively (p=0.21).

OSAHS was resolved (OAHI<1.5) for 15 patients (78.9% of cases) on postoperative PV. Twelve patients had a greater ER postoperatively than preoperatively.

Conclusions

There is a clear improvement in OSAHS from the first post-operative night after AA. No respiratory event that could contraindicate outpatient surgery was observed in this preliminary study. There is a non-significant trend towards an increase in respiratory effort on the evening of surgery.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P32

Title
Oxygen saturation indices in healthy neonates born after 32 weeks gestation: longitudinal change and differences between term and pre-term infants

Introduction
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Background: Rapid change occurs during the neonatal period. Moving to an extrauterine existence demands respiratory cycle regulation. Developmental immaturity means that published reference ranges for oxygen saturation indices (OSI) of older children are not applicable to infants. Comparative data for healthy term and pre-term infants is lacking.
Aims: To observe how OSI change over the first five weeks of life and the differences between healthy pre-term and term infants.

Materials and Methods
Participants were separated into two groups, 'pre-term' (32+0 – 36+6 weeks corrected gestational age (CGA) at birth) and 'term' (37+0 – 42+0 weeks CGA at birth). Weekly nocturnal pulse oximetry was carried out at 7, 14, 28, 35 and 42 +/- 3 days postnatal age. VisidownloadTM software generated OSI. This is part of an ongoing longitudinal cohort study aiming to establish OSI reference ranges for term and pre-term infants.

Results
Data from 34 infants was analysed; 14 (41.2%) were pre-term. The median CGA (in weeks) at birth was 34+3 (25th, 75th percentiles: 33+4, 34+6) for pre-term and 39+5 (25th, 75th percentiles: 39+1, 40+5) for term infants. Oxygen desaturation index 3% (ODI3) was lower in term than pre-term infants in weeks 1 ($p = 0.045$), 2 ($p < 0.001$), 3 ($p < 0.001$) and 5 ($p = 0.029$) (Mann-Whitney U test). Mean peripheral oxygen saturation (SpO2) increased between weeks 2&3 ($p = 0.035$) and 4&5 ($p = 0.019$) in term infants and between 1&5 ($p = 0.010$) and 3&5 ($p = 0.006$) in pre-term infants. ODI3 decreased between weeks 1&5 (term, pre-term: p =

0.006, p = 0.010) and weeks 3&5 (term, pre-term: p = 0.002, p = 0.030) in both groups (Wilcoxon Signed-Rank test compared weeks).

Conclusions

This study highlights important differences between term and pre-term infants alongside changes over time of OSI in healthy infants. Ongoing data collection will allow publication of reference ranges.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P33

Title
Exploring the impact of bedtime routine consistency and bedtime electronic use on infant sleep

Introduction
Consistent bedtime routines have long been shown to help improve infant sleep and be beneficial in developing healthy sleep habits. Over the past few years, the use of electronics by infants and toddlers has become ubiquitous with evidence that these devices are also used at bedtime, not just during the day. Data on associations between infant sleep duration and electronics usage at bedtime are limited, although there are data to support the negative association between electronics usage at bedtime and sleep duration in older children and adolescents. The Brief Infant Sleep Questionnaire (BISQ) was fairly recently revised (Brief Infant Sleep Questionnaire - Revised [BISQ-R]) to include a question on electronic usage ('e.g., television, smartphone, or tablet') at bedtime. In this study we leveraged information from the BISQ-R together with objective sleep metrics from Nanit autovideosomonography to investigate the association between bedtime routines, electronics usage at bedtime and sleep duration in infants

Materials and Methods
This study was approved by the Institutional Review Board of the University of California, Los Angeles. Caregivers of 598 infants ages 4-22 months (10.74 ± 3.7) were recruited for this study. Caregivers completed items on the BISQ-R and objective Total Sleep Time at night (TST) was collected using Nanit autovideosomnography for a period of 14 nights. Multiple linear regression analyses were used to model the relationship between average TST (outcome) and consistency of bedtime routines and presence of electronics during bedtime (predictors), while controlling for infant age and gender

Results
Caregivers reporting a consistent bedtime routine with their infants 6-7 nights per week had infants who slept 22±9.78 minutes more on average than those with only 0-3 nights of

bedtime routine consistency ($p<0.001$). Infants whose caregivers reported that they did not use electronic devices at bedtime slept approximately 25±8.22 minutes longer compared to those infants with electronics present at bedtime ($p=0.003$). We found no significant relationship between bedtime routine consistency and electronic usage at bedtime ($\beta = -0.224$, $p=0.231$)

Conclusions

Our findings suggest the importance of a consistent bedtime routine and avoidance of electronic device usage at bedtime to ensure longer infant sleep duration. While there does not appear to be a relationship between consistent bedtime routines and electronic device usage, more research is needed to further elucidate the knowledge, beliefs, and attitudes that underlie parents' use of electronic devices at bedtime. A limitation of the study is that we do not know specifics about the type of electronics used nor the length of time they were used. These preliminary findings, however, emphasize the importance of establishing stable bedtime patterns and avoidance of electronic distractions for promoting optimal sleep outcomes in infants

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Presentation Day and Board Number
Sunday, April 28, 2024 | P34

Title
Nonlinear Effects of Harsh Parenting on Changes in Children's Sleep Duration and Sleep Quality

Introduction
The family context is proposed to play a critical role in creating an optimal sleep environment (high levels of security, low arousal) (Worthman & Melby, 2002); yet, research has only recently attempted to understand how children's sleep is embedded in the family (El-Sheikh & Kelly, 2017; El-Sheikh & Sadeh, 2015). Although harsh parenting has been identified as a risk factor for children's sleep problems, this work has strictly examined linear associations (Bell & Belsky, 2008; Kelly et al., 2014). The broader family risk literature suggests that effects of harsh parenting may be nonlinear (Hidalgo et al., 2023). Risk saturation (Morris et al., 2010) and family risk models (Davies et al., 2022) indicate prolonged exposure to intense levels of family risk may activate processes designed to prevent sustained arousal in ways that decouple risk and development. We break new ground by examining the nonlinear effect of harsh parenting on prospective changes in children's sleep.

Materials and Methods
Children (N=339; Wave1: Mage=9.44 years, 48% girls, 65% White, 35% Black) and their parents from socio-demographically diverse backgrounds participated in two waves of data collection spaced two years apart. Harsh parenting was assessed via mothers' and fathers' report on the well-established Parent-Child Conflict Tactics Scale (Straus, 1999). Sleep parameters were measured with actigraphy over one week including sleep minutes (total number of minutes scored as sleep between onset and wake time), efficiency (percentage of time between onset and wake time scored as sleep), long-wake episodes (number of wake episodes lasting for longer than 5 minutes), and activity (percentage of epochs during the night with activity). Children reported on sleep-wake problems over the past two weeks using the School Sleep Habits Survey (Wolfson & Carskadon, 1998).

Results

We examined effects of harsh parenting on changes in children's sleep across two years controlling for race, sex, body mass index, family income, and marital problems. No linear effects of harsh parenting emerged. There were significant nonlinear effects of harsh parenting on sleep minutes (p=.05), sleep efficiency (p=.02), long-wake episodes (p=.01), and sleep activity (p=.04). Low to moderate levels of harsh parenting predicted increases in poor sleep (shorter duration, worse quality). Consistent with risk saturation models, high levels of harsh parenting predicted less steep increases in poor sleep until associations eventually plateaued. At very high or intense levels of harsh parenting, slight improvements in sleep (longer duration, better quality) were observed. Notably, these children still had worse sleep than children exposed to low to moderate levels of harsh parenting.

Conclusions

Novel findings build on the literature to consider sleep in the family context (El-Sheikh & Kelly, 2017) and illustrate that prospective relations between harsh parenting and children's sleep may be nonlinear. At low to moderate levels of harsh parenting, sleep worsened. At high levels of harsh parenting, associations with poor sleep attenuated; this pattern is consistent with risk saturation perspectives suggesting that prolonged exposure to intense levels of familial risk may activate processes designed to prevent chronic arousal. Findings highlight the importance of considering nonlinear associations in investigations between family risk and sleep.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P35

Title
Sleep disorders in children with Prader-Willi Syndrome referred for polysomnography: case series in a sleep center in Thailand.

Introduction
The loss of a specific genetic segment, 15q11.2-q13, leads to Prader-Willi Syndrome (PWS). This syndrome often involves sleep problems, excessive daytime sleepiness, and disruptions in (rapid eye movement) REM sleep. In Thailand, diagnosing and treating PWS is made more challenging by difficulties accessing growth hormone treatment and the limited availability of sleep labs.

Materials and Methods
This case series included PWS children with sleep disorders diagnosed and followed up at Siriraj Sleep Center, Bangkok, Thailand. We aimed to reveal clinical characteristics, polysomnographic findings, treatments, and outcomes.

Results
Six children diagnosed with PWS, and sleep disorders were included, three of whom were male (50%) with a median age of 11 years (range 5-14). They were diagnosed with PWS at a median age of 1.8 years (range 0.7-6.0) and underwent their first polysomnography at a median age of 3.9 years (range 3.3-7.0). The most common sleep concerns included habitual snoring (100%) and excessive daytime sleepiness (33%). Additionally, they were diagnosed with severe obstructive sleep apnea (OSA) (100%), central sleep apnea (0%), sleep-related hypoventilation (50%), daytime hypoventilation (50%), and periodic limb movement disorder (17%). Among them, 50% had REM-related OSA, and 17% had positional OSA. The median sleep efficiency was 93.1% (range 83.4-95.7%), with median sleep latency at 3.7 minutes (range 1.5-24.3) and median REM latency at 74 minutes (range 62-119). The median percentage of NREM3 sleep was 39.6% (range 15.7-56.9%), and the median percentage of REM sleep was 22.4% (range 7.3-25.8%) of the total sleep time (TST). Median REM arousal was 6.7 events/hour (range 3.4-9.6). Treatment varied, with one child (17%) receiving growth

hormone, two children (33%) undergoing adenoidectomy and tonsillectomy, and four children (67%) treated with continuous positive airway pressure (CPAP) while two (33%) treated with bilevel positive airway pressure (BiPAP). Adherence with treatment was generally poor, with only one child (17%) showing good adherence to CPAP usage. Analysis of downloaded data revealed a median (IQR) residual apnea-hypopnea index (AHI) of 2.5 events/hour (range 0.1-3.0).

Conclusions

Children with PWS commonly experience significant sleep issues, particularly during REM sleep, requiring CPAP and BiPAP treatment. Additionally, early diagnosis leads to favorable outcomes. However, treatment effectiveness is often hindered by poor adherence due to behavioral issues associated with the syndrome.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P36

Title
The Relationship Between Timing and Variability of Bedtime in Infants and Parent Perception of Infant Sleep

Introduction
Infant sleep plays a crucial role in overall development and well-being. Research indicates that longer sleep duration is associated with better infant health and development and early bedtime is one strong predictor of longer total sleep duration. Fewer studies, particularly utilizing objective sleep measures, have focused on bedtime variability and its effects on infant sleep. Our study aimed to investigate the relationship between timing and variability of bedtime and infant sleep duration and parental perceptions of their child's sleep

Materials and Methods
This study was approved by the Institutional Review Board of the University of California, Los Angeles. A total of 405 parents of infants aged 6-12 months (8.63 ± 1.99) residing in the US participated in this study, with 70.3% being mothers. Parents completed the Brief Infant Sleep Questionnaire-Revised (BISQ-R), reporting bedtime routines and parent behavior around infant sleep. Objective measures of infant total sleep time at night (TST), bedtime (BT), and bedtime variability (standard deviation of bedtime-BTV) were collected using Nanit autovideosomnography over a 14-night period preceding the survey date. Multiple linear regression analysis, with TST as the outcome, was conducted, incorporating BT, BTV as predictors, while controlling for infant age and gender. Multinomial logistic regression was also employed to determine the relationship between parents' perception of how well their child sleeps at night and BTV less than 30 minutes compared to more than an hour

Results
Infants with an objective BTV of more than an hour had a TST of 24.96±8.58 min less than those with a BTV of 30 mins or less ($p<0.001$). Infants with an average objective BT before 8 pm, had a TST of 39.96±5.82 min ($p< 0.001$) more than those with an average BT between 8-9PM, and 88.14±10 min ($p< 0.001$) more than those having BT after 9PM. Parents with infants

having an objective BTV of more than an hour were 78% less likely to perceive their child sleeping 'Very/Fairly Well" compared to those who had an objective BTV of less than 30 minutes (p =0.0276)

Conclusions

We found that infants with objectively measured higher BTV and later BT had significantly lower TST. Our study underscores the importance of consistent and early bedtimes in fostering healthy sleep habits in infants. It also sheds light on the significant relationship between bedtime variability and parental perception of infant sleep quality and more work needs to be done to better understand this relationship. A limitation of this study was its cross-sectional design. Future research should collect longitudinal data, to understand causal pathways and the long-term implications of high bedtime variability

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Presentation Day and Board Number
Sunday, April 28, 2024 | P37

Title
An association of Self-Reported Symptoms and Sensations among Children Mobile Phone users who hold Mobile Phones near their heads during sleep.

Introduction
In an era of increasing mobile phone usage among children, it is crucial to understand their habits and the potential risks associated with mobile phone usage. This study aimed to explore the self-reported symptoms and sensations among children mobile phone users and their association with specific usage habits. By doing so, we aimed to identify potential risks associated with mobile phone usage in this vulnerable population.

Materials and Methods
This study focused on establishing a connection between Electromagnetic Hypersensitivity (EHS) and self-reported symptoms and sensations among children mobile phone users. The common self-reported symptoms and sensations examined included headache, ringing delusion, forgetfulness, carelessness, laziness, extreme irritation, a habit of telling a lie, neurophysiologic discomfort, and warmth on the ear. Demographic and social characteristics of children cellular phone subscribers in India were also collected. The study aimed to determine the correlation between self-reported symptoms and sensations and the extent of mobile phone usage. The survey was conducted in various regions of Uttar Pradesh India, encompassing both urban and rural areas, using a well-designed questionnaire. Four different exposure groups were considered based on the duration of mobile phone usage: Low Users (≤500 hours), Normal Users (>500 to ≤1000 hours), Moderate Users (>1000 to ≤5000 hours), and Heavy Users (>5000 hours). The study collected information from 1151 children mobile phone users, aged 10 to 20 years, in urban and rural areas over the course of four years. Some participants (19 users) were unable to provide complete information on the prescribed form, while individuals without mobile phones were not included in the study. Data collected through the questionnaires were transformed into a Microsoft Excel sheet and cross-tabulated using SPSS 16.0 software. The significance of symptom prevalence in relation to age, sex, and duration of mobile phone use was assessed using the Chi-Square Test, with a significance level set at 5 percent.

Results

The study found a significant association ($p<0.05$) between self-reported symptoms, including headache, ringing delusion, carelessness, laziness, neurophysiologic discomfort, and holding the mobile phone near the head during sleep at night. Additionally, a trend toward experiencing irritation ($p=0.055$) was observed among children mobile phone users who placed their devices near their heads during sleep compared to those who did not.

Conclusions

The results of this study suggest a notable link between certain self-reported symptoms and the habit of holding a mobile phone near the head during sleep among children. This association could indicate a potential risk factor for health issues related to mobile phone usage in this age group. Notably, symptoms such as headache, ringing delusion, carelessness, laziness, and neurophysiologic discomfort were more prevalent among children who kept their mobile phones near their heads during sleep. While further research is needed to establish a causal relationship, the findings emphasize the importance of understanding and mitigating potential risks associated with mobile phone usage among children. It is advisable for parents, caregivers, and policymakers to consider these findings and encourage safer mobile phone practices, especially during night-time use.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P69

Title
Narcolepsy in children – a challenging diagnosis

Introduction
Narcolepsy in children is rare, with a global average prevalence between 20 and 50 per 100000. Narcolepsy type 1 (NT1) diagnostic criteria are excessive daytime sleepiness (EDS) and cataplexy and/or low CSF hypocretin 1 concentration (< 110 pg/ml). Diagnosis can be difficult, and caution must be present in the interpretation of multiple latency sleep test (MSLT) and CSF hypocretin 1 concentration in children.

Materials and Methods
Case report of child referred to our Sleep Laboratory.

Results
A 6 years-old boy was referred with EDS in the last 18 months. During pandemic lockdown, he restarted napping after lunch and initiated episodes of irresistible sleep (while walking, talking, or eating). Parents also reported excessive weight gain (increase in 25% in weight in 2.5 months),and denied disturbed nocturnal sleep, cataplexy, sleep paralysis or hallucinations. No family history for sleep disorders was reported. Adapted Epworth Sleepiness Scale score was 24. Brain computed tomography scan and thyroid hormones were normal. HLA DR15/DQ6 analysis was positive. Polysomnography (PSG) showed PLMS index of 13/h and paroxysmal activity in electroencephalogram (EEG), with no SOREM or respiratory compromise. MSLT showed average sleep latency of 7.6 minutes and one SOREM. As ferritin was 41 ng/ml, iron supplementation was conducted for three months. Patient was referred for epilepsy consultation, where an EEG was performed, revealing focal left frontal, and generalized paroxysmal activity during intermittent photic stimulation at 10Hz. Clinical case was discussed, and complementary investigation was decided. CSF hypocretin 1 concentration was 328 ng/ml. Second EEG showed no paroxysmal activity. Due to important ESD and no response to iron therapy, and maintaining narcolepsy as the most probable diagnosis, methylphenidate was started. During follow-up, cataplexy episodes were noted, although very sporadic. PSG and MSLT were conducted again: PSG showed SOREM, no EEG

alterations, PLMS index of 4.5/h and no respiratory compromise; MSLT showed average sleep latency of 2.6 minutes and 4 SOREM in 4 naps. Currently he is 8 years-old and treatment plan includes scheduled naps and methylphenidate on a dose of 1 mg/kg/day. He is performing well in school, without ESD and no cataplexy episodes.

Conclusions

NT1 diagnosis can be challenging in children and high index of suspicion must be present, maintaining follow-up and repeating complementary exams. In this case report, possible epilepsy diagnosis was a confounder factor. First MSLT was negative,and CSF hypocretin 1 concentration was normal adding difficulty in the diagnosis. NT1 was established with the second MSLT and the presence of cataplexy. Although rare, normal CSF hypocretin 1 concentration can be present in NT1, with literature describing the possibility of decreasing concentration with time or an alternative mechanism of disease with nonfunctional hypocretins receptors.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P38

Title
Sleep-disordered breathing in infants with achondroplasia

Introduction
Achondroplasia is the most common skeletal dysplasia, with an incidence between 1/10000 and 1/30000 live births. Sleep-disordered breathing (SDB) is common in these patients. Obstructive sleep apnea syndrome is related with hypoplasia of midface, nasal bridge depression, ogival palate, among other factors, and can occur in 22 to 93% of children. Compression of brainstem secondary to the stenosis of foramen magnum may result in pathological central apnea. Early referral of patients with achondroplasia is essential to identified and treat SDB, and international guidelines recommends conducting a polysomnography (PSG) as early as possible after the diagnosis.

Materials and Methods
Retrospective, descriptive study, based on the clinical data of patients with achondroplasia referred during the first year of life to the multidisciplinary consultation of bone dysplasia, between 2015 and 2023.

Results
Fourteen infants with achondroplasia (9 males / 5 females) were referred, with first assessment at a median age of 4 months (1 to 11 months). Two infants presented with snoring. PSG was carried out at a median age of 5.5 months (2 to 26 months). Seven of those fourteen (7/14) patients had obstructive sleep apnea syndrome (OSAS) in PSG, five without any symptoms. PSG results were: mild OSAS in three, moderate OSAS in one and severe OSAS in three. In those with moderate/severe OSAS (4/14) non-invasive ventilation was started. Neuroimaging showed foramen magnum stenosis in twelve patients, none had abnormal central apnea index in PSG.

Conclusions
The prevalence and severity of OSAS in infants with achondroplasia justifies early referral to sleep specialist and PSG, even in the absence of symptoms.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P39

Title
24h urinary melatonin excretion patterns in children with ASD : link with objective sleep-wake rhythms, behavioral patterns and family quality of life

Introduction
Over 50% of people with autism experience sleep difficulties, with negative impact on their daily functioning and quality of life. Melatonin secretion is known to be lower in people with autism and melatonin treatment has shown a positive impact on sleep for most patients. Nevertheless, the efficacy of this treatment remains insufficient for some patients, and further research is needed to better understand the specificities of melatonin's circadian secretion in children with autism. The aim of our study was to provide a precise description of melatonin secretion patterns in a cohort of children with autism and explore it's associations with their sleep and behavioral characteristics.

Materials and Methods
30 patients with autism aged 3 to 10 y.o. were assessed for subjective sleep parameters with the Children Sleep Habit Questionnaire (CSHQ) and for behaviour with the Aberrant Behavior Checklist(ABC). Objective sleep was measured through a 15-days actigraphy recording. Excretion of the urinary metabolite of melatonin, 6-sulfatoxymelatonin (6SM), was monitored during a 24h hospitalization, divided in 5 daytime periods of 3hours (p8=8am-11am, p11= 11am-2pm, ...) and one nighttime 12 hours period (p20= 8pm-8am).

Results
81.5% of subjects experienced sleep issues (CSHQ>=41). 73.3% of children exhibited high 6SM at p8, associated with phase delay actigraphy indicators such as longer sleep latency and later midsleep. Those patients had higher behavioral scores. Various patterns of 6SM excretion were identified, including normal, high at p8, high at p11, biphasic and reversed, each associated with specific sleep and behavioral parameters associated.

Conclusions

Addressing sleep disorders is a crucial concern in the ongoing care of children with autism, and our findings lay the groundwork for a more personalized and targeted approach to managing these disorders.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P70

Title
Teaching paediatric sleep medicine - sleep diaries as a tool for collecting relevant behavioural information in children and adolescents with neurodevelopmental disorders

Introduction
Keeping a sleep log (synonyms: sleep journals, sleep logs, somno-logs) is a simple yet efficient way to describe and assess sleep and sleep-related disorders. Nevertheless, not all sleep diaries are identical; they differ in regards to their use (e.g., standardised instructions, observation period) and their specificity to identify sleep disruptions and other factors that influence not only the sleep quantity, but also quality.

Materials and Methods
Students attending a facultative lecture series on paediatric sleep disorders at the Medical University of Vienna were instructed to analyse the use of sleep diaries in a sample of 12/15 publications (3 did not use any sleep diaries). 8/12 studies used sleep logs in conjunction with actigraphy. The selected publications from 1998 to 2021 included studies that were used by the International Pediatric Sleep Association (IPSA) and the German Sleep Society (DGSM) to create melatonin guidelines for the treatment of insomnia in children and adolescents with neurodevelopmental disorders (i.e. Rett syndrome, Tuberous sclerosis, ADHD, ASD). The sleep diaries used in these studies were analysed regarding their degree of standardisation, scope of instructions for their use, and comparability in outcome measures.

Results
Details about standardisation (e.g. sensitivity in detecting sleep problems) and instructions on how to use the protocols were missing completely in 9/12 papers, and partially in 2/12 papers; only Appleton et al. (2012) provided detailed information. With regard to outcome measures, all 12 studies provided information on total sleep time (TST), sleep onset latency (SOL) and/or sleep efficiency (SE). Further, 8/12 publications reported details about nocturnal waking times (e.g., wake after sleep onset, number of nighttime awakenings); information on quality of sleep during the night (e.g., the symptoms restlessness, sleep hyperhidrosis, and/or

the question ‘can you describe your child’s sleep quality last night’) and parasomnias were reported only in 1/12 studies, respectively. None of the papers provided any information on subjective awakening quality in the morning.

Conclusions

Although sleep diaries are frequently used, information on standardisation and instructions about their application was not available in the majority of the studies. This gap in information on standardisation and instructions hinders a discourse on which parameters are most suitable to describe sleep in the home setting, namely qualitative versus quantitative information (TST, SE, SOL versus restlessness before/during sleep, hyperhidrosis). In consequence, for collecting more patient-oriented outcome measures in a structured and harmonised way and improving study concepts from a patient-centred perspective, we need to involve parent advocates in study design discussions.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P40

Title
Pediatric Sleep Training in Medical Curricula: The Perspective of the ChildRight2Sleep Initiative

Introduction
The origin of pediatric sleep medicine can be traced back to the seventies when interest was on researching sudden infant death syndrome (SIDS) and the behavioural concept that every child can learn to fall asleep. After decades of research, there is a unified agreement that transient sleep disturbances of children and adolescents, which do not affect emotional, cognitive and physical development, are within the spectrum of the accepted and anticipated natural growth process. However, we also acknowledge that chronic sleep disturbances need to be identified and treated to avoid aggravating underlying neurodevelopmental and/or mental health disorders. Despite this common understanding, pediatric sleep disorders are often not taught in medical curricula. Therefore, we investigated how pediatric sleep disorders have been integrated in the medical curriculum at three exemplary medical universities from a "ChildRight2Sleep" perspective.

Materials and Methods
The medical curricula at the University of British Columbia (UBC, Canada), Medical University of Vienna (MedUni, Austria) and Charité School of Medicine (Humboldt University and Free University Berlin, Germany) were reviewed by current students and faculty members who are involved in curriculum management. Questions regarding educational methods, content and sustainability, defined as 'enables trainees to apply knowledge in real life' were investigated.

Results
The UBC curricula teaches pediatric sleep medicine during the second, third, and fourth years of medical studies with focus on prevention (focus on SIDS and shaken baby syndrome), and case studies. Further, adult sleep medicine has 3.75 hours of dedicated lecture time in second, third and fourth year and is included as a segment of 13 additional sessions, 2 of which are electives. These sessions focus on psychiatry, endocrinology, cardiology,

respirology, and family practice. At MedUni adult sleep medicine is lectured for 4.5 hours over 6 years, appearing in the first, second and fifth years with focus on neurology, physiology and psychiatry. Similarly, adult sleep medicine is trained for 9 hours over 6 years in second, third and fourth years at the Charité School of Medicine with focus on pulmonology, psychiatry, endocrinology and a practicum in the sleep lab. None of the curricula offered self-reflection exercises (e.g. monitoring own sleep) or stepped care approach for identifying community-based physicians input in work up of pediatric sleep disturbances and/or disorders.

Conclusions

Pediatric sleep has been integrated in prevention and case studies at UBC and might also be referenced less prominently at Charite and MedUni in case studies, which we were unable to pick up. However, all three curricula lack a structured approach which would enable graduates to face sleep disturbances in the community. The lack of pediatric sleep knowledge can cause strain on medical systems where patients go undiagnosed and their families have to endure long wait times to be seen by subspecialty pediatricians. From a ChildRight2Sleep perspective, the missing integration of pediatric sleep in medical school raises concern for a systemic gap in healthcare, disproportionately affecting those who live in rural/remote areas.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P41

Title
Polysomnography features of nocturnal short sleepers at two years of age

Introduction
Being a short sleeper is often thought to be a genetically determined feature (Pellegrino et al., 2014). However, in early childhood, inter-individual sleep duration is highly variable, and the prevalence of short or insufficient sleeping is much higher than genetic studies predict (Wheaton and Claussen, 2021). The structure and quality of sleep in short sleeping young children are poorly studied. We analysed sleep EEG of toddlers with short nocturnal sleep.

Materials and Methods
Sixty-three healthy two-year-old children (aged 23 to 26 months) underwent an ambulatory overnight home polysomnography (PSG) during the years 2013 and 2014 in Tampere city region, Finland. The PSGs were scored according to current standard rules (Berry et al., 2011). Because 25 of the 63 children lacked parental questionnaire data regarding the duration of their daytime and nocturnal sleep, 38 children were included in this study.

The parental report of the length of the children's nocturnal sleep was used to determine the groups of short and regular sleepers as follows: the 25th percentile (less than 9.5 h of nocturnal sleep) was defined the cut-off for short sleepers. In the groups of short (n=13) and regular sleepers (n=25), the median durations of the questionnaire-reported nocturnal sleep were 9.0 h (range 8.0 to 9.5 h) and 10 h (range 9.8 to11.0 h), respectively. Together with the reported median daytime sleep duration, this 9.5 h cut-off equalled quite closely to the international consensus for insufficient 24 h total sleep time of this age group, which is less than 11 hours (Hirskowitz et al., 2015; Paruthi et al., 2016). PSG data and the parent-reported length of the daytime sleep were compared between the short and regular sleepers.

Results
There were 13 children in the short and 25 children in the regular nocturnal sleepers' groups. The PSG variables of the groups are presented in Table 1. The short nocturnal sleepers fell asleep later and their PSG stop time was later. In agreement with the parental report, the

short nocturnal sleepers´ over-night TST was shorter. The short nocturnal sleepers' REM% and SEI% were lower. N3%, WASO and arousal index did not differ statistically between the groups. In addition, although the difference was not statistically significant, the parent-reported median length of daytime sleep was longer in the short (median 2:00 h; range 00:45-3:00) than in the regular nocturnal sleepers (median 1:30 h; range 1:00-4.00).

Conclusions

These present preliminary PSG results validate the parental reports of short nocturnal sleep of the participating toddlers. The results imply that the sleep-wake rhythm of short nocturnal sleepers may be later. In addition, some nocturnal short sleepers compensate by sleeping more during the daytime. Some of the findings can associate with sleep difficulties, such as insomnia, sleep associations, or immature circadian sleep-wake rhythm. The findings underline the importance of sleep hygiene, routines, and earlier bedtimes, which can help to secure sufficient sleep for short nocturnal sleepers.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P71

Title
Iron Deficiency and Restlessness in Sleep/Wake Behaviours in Developmental Pediatrics and in Child and Adolescent Psychiatry

Introduction
Iron plays an essential role in oxygen transport and multiple physiological functions in the body and brain, affecting sleep and wake behaviours causing restlessness (hyperkinesia and hyper-arousability). Iron deficiency (ID) is a key factor in sleep disorders, yet a standardised assessment approach is missing. Most commonly associated with ID are RLS and PLMs. We reviewed iron status data in a quality improvement study over a time period of 18 months (2021–2023) at a Sleep/Wake-Behaviour Clinic, located in Child and Adolescent Psychiatry in Vancouver, Canada.

Materials and Methods
All referred patients completed an electronic intake form, exploring sleep/wake-behaviours, transitions, and the SDSC and ADHD rating scale-IV. Information on parental iron status and the patient's most recent iron status was collected. In cases where this information was not available, a fasting iron status was conducted. Non-anemic ID was defined as ferritin <50ug/L (negative CRP; no signs of inflammation/infection, and/or a fasting iron status with low fasting iron, low iron saturation and/or high TIBC). Further, MCV, MCH, and MCHC were reviewed as supportive indicators. Clinical assessment consisted of family sleep history, narratives of sleep/wake-behaviours of the patients, and application of a provocation test and the suggested clinical immobilisation test, for patients and accompanying caregivers, to develop a shared language regarding restlessness-associated challenging/disruptive behaviours.

Results
Among the 250 referred patients, 199 met the inclusion criteria (intake forms, iron status, clinically screened and assessed). 94% of patients were iron deficient, out of which 43% had a family history of ID. ADHD (46%) and ASD (45%) were the most common neurodevelopmental conditions, followed by neurologic conditions (e.g. traumatic brain injury) (19%), global developmental delay/intellectual disability (13%), and neuro-behavioural

conditions of externalising and internalising disorders (50%; 42%). 61% had chronic insomnia, 50% showed signs of sleep disordered breathing, 22% experienced parasomnias, and 16% had CRSDs. Among those with ADHD, a family history of ID significantly increased the odds of familial RLS (OR: 5.98, p=0.0002), insomnia/DIMS (OR: 3.44, p=0.0084), and RLS (OR: 7.00, p=0.01). Within patients with ASD, a family history of ID raised the odds of insomnia/DIMS (OR: 4.77, p=0.0014), RLS/PLMs (OR: 5.83, p=0.009), RLS (OR: 4.05, p=0.01), and familial RLS (OR: 2.82, p=0.02).

Conclusions

Our findings show the interconnections between neurodevelopmental disorders, sleep disturbances, and family sleep histories. We found that in ADHD and ASD subgroups, ID raises the risk for multiple sleep disorders. These results highlight the need for a more comprehensive blood-work-based screening approach for capturing non-anemic ID in children with restlessness.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P42

Title
Applicability of the vigilance concept in real life: teaching lay-people the recognition of sleepiness

Introduction
Vigilance, as suggested by Henry Head in 1923, is an innovative concept on describing daytime functioning. We revisited the applicability of this 'functioning-based' concept in real life and to what degree vigilance fluctuations caused by sleep deprivation could be captured by lay-persons after a standard training with a self-reflection exercise.

Materials and Methods
28 video sequences of nighttime drivers with cameras directed towards the drivers' bodies, monitored with EEG, EOG, and chin muscle activity (ambulatory polysomnography), were collected for 2 hours (2.00 to 4.00 am). Drivers assessed their individual sleepiness with Karolinska Sleepiness Scale (KSS) before starting and immediately after driving as well as concentration, psychomotor performance and saliva samples for cortisol and alpha-amylase (data not shown). The data was analysed in a masters-thesis (MK) at the Institute for Behavioural, Neurological, and Cognitive Sciences (Department of Zoology) with focus on the recognition of vigilance loss, defined by changes in EEG and spontaneous behaviours.

6 research assistants (RAs) were trained for three 90 min sessions, which included theoretic background knowledge on vigilance, vigilance tests, and recognition of sleepiness-related behavioural cues. For supporting the latter task RA's kept sleep logs/diaries and conducted snapshots for self-reflection of tiredness/vigilance and own behaviours. The RAs were invited to review their perception of 'vigilance Gestalt' based on personal observations. In the self-reflection exercise and during the analysis of the drivers' videos, behaviours were separated into the categories 'task-oriented' and 'non-task-oriented'. Further, RAs had to differentiate between videos at the beginning and end of the nighttime driving exercise and evaluate the drivers' sleepiness using the KSS. This task was repeated twice, once with open-ended descriptions and then with a series of pictograms. The results of the RAs were compared with the results in the thesis.

Results

Analysis of the behaviours associated with EEGs and EOGs showed that non-task oriented spontaneous behaviours increased with time on task and acted as a self-stimulating countermeasure to combat tiredness. In contrast to EOG-results, EEG-results did not show any consistent changes. KSS ratings of RAs corresponded with participants ratings, 3.0/6.5, versus 4.25/6.1, respectively. Open-ended descriptions from later videos showed a 5.3% increase in non-task and 5.4% decrease in task-oriented behaviours. Using pictograms, recognition improved by 7.3% and 7.9%, respectively.

Conclusions

Assessment of vigilance via tests has been a subject of research for the last 100 years. We stepped back and reviewed the original clinical functioning-based vigilance concept of Henry Head and applied it to the recognition of tiredness/sleep in nighttime drivers. 3 short training sessions with a self-reflection exercise enabled lay-persons to differentiate between task- and non-task- oriented behaviours, and this differentiation was consistent with the timing of the videos. The use of pictograms improved the descriptive results. This is a proof of concept study, showing how the original vigilance concept could be utilised for the assessment of functioning and recognition of daytime sleepiness, triggering non-task oriented behaviours.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P43

Title
Impact of vosoritide on polysomnography parameters among children aged 3-59 months

Introduction
Vosoritide is an analog of C-type natriuretic peptide which increases chondrocyte proliferation in endochondral bone, resulting in increased linear growth in children aged 3 months and older with achondroplasia. Sleep disordered breathing (SDB) is a common disorder in children with achondroplasia, including obstructive sleep apnea (OSA) and central apnea which can be associated with sudden death (SIDS).

Materials and Methods
An open-label 52-week placebo-controlled trial (111-206) studied the impact of vosoritide on linear growth in children with achondroplasia who initiated treatment before the age of 5 years. Polysomnography was conducted at baseline and week 52. Children were not eligible to participate in 111-206 if they had severe sleep apnea at baseline. Changes from baseline in the Apnea/Hypopnea index (AHI), the Central Apnea Index (CAI), and the oxygen desaturation index (ODI) >3% were evaluated at week 52 by treatment arm.

Results
Of the 75 enrolled participants, 84% (n=36/43) of children in the vosoritide arm and 81% (n=26/32) in the placebo arm had sleep study data at week 52. After 1 year of vosoritide, improvements in AHI were observed in 10 participants, a normal to mild AHI shift was observed in 4 (9.3%) participants, and a moderate to severe shift was observed in 1 (2.3%) participant. In the placebo group, improvement in the AHI index was observed in 9 participants, a normal to mild shift was observed in 3 (9.4%) participants, normal to moderate shift was observed in 1 (3.1%) participant, and mild to severe shift was observed in 2 (6.3%) participants. There were no worsening shifts in the CAI in either arm. For the ODI using a threshold of

Conclusions

These data demonstrate that vosoritide is not associated with detrimental effects on sleep related breathing parameters in young children with ACH after treatment for 1 year. Longer term data is needed to ascertain effect of continued treatment on these parameters.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P72

Title
Sleep habits in Swedish children and adolescents - a longitudinal study

Introduction
Sleep length recommendations for Swedish school-aged children and adolescents are 9-11 h for children aged 6-13 years and 8-10 h for adolescents aged 14-17 years. The aim was to investigate sleep length in school-aged children and adolescents from 6 to 16 years in a longitudinal study, and to investigate if shorter sleep length than recommended was associated with experience of being tired at school.

Materials and Methods
A survey was distributed to the students at 4 time points, at age 6 (n=560), 10 (n=1253), 14 (n=1489) and 16 (n=1449) in a municipality in southern Sweden. At the age of 6, the guardians responded to the survey, and at the other time points, the survey was completed by the students.

Results
The mean sleep duration decreased during the period. At age 6, the mean sleep duration was 10.2 h (SD .64), at age 10 the mean sleep duration was 9.5 h (SD .63), at age 14 the mean sleep duration was 8.1 h (SD .98) and at age 16 the mean sleep duration was 7.1 h (SD 1.0). Sleeping less than recommended was associated with being tired at school ($p < .05$).

Conclusions
The younger age group achieved the recommended sleep length, however, the oldest age group, at 16 years, they slept less than recommended. Sleeping shorter than recommended was associated with being tired at school.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P44

Title
Latent patterns of caffeine use among adolescents and its association with insomnia.

Introduction
The use of caffeine has increased among adolescents in recent years which may have an impact on the quality of sleep and development of insomnia. This study aimed to identify the different profiles of caffeine use and their association with insomnia severity.

Materials and Methods
A cross-sectional study was conducted including 1404 Swedish adolescents aged 15–17 years (56.3% girls). Current use of coffee, tea, and energy drinks was assessed, as well as insomnia with the Minimal Insomnia Symptoms Scale (MISS). Latent Class Analysis (LCA), and multivariate analyses were conducted.

Results
The sample's global score on MISS was 5.8 (SD=2.3), with 48.9% (n=687) experiencing insomnia. The LCA revealed a better fit for a three-class model classified as: 1) Low Probability Caffeine Use (28.1%; n=393) characterized by sporadic use of coffee or tea; 2) Caffeinated Soda Use (55.2%; n=784) related to high soda use weekly; and 3) Mixed Caffeine Use (16.7%; n=227) where diverse caffeine products are used daily including soda and energy drinks. Among these classes, a greater percentage of individuals with insomnia was observed in the Mixed Caffeine class (58.4%; n=132; p=0.005). Compared with the Low Probability class, the Caffeinated Soda class and the Mixed Caffeine class were significantly associated with difficulties falling asleep (OR=1.3 and OR=1.7 respectively), with the latter also exhibiting greater daytime dysfunction (OR=1.4).

Conclusions
Adolescent patterns of excessive caffeine consumption may pose potential hazards to the quality of sleep. The results underscore the need for examining in future studies how preventing inappropriate caffeine intake can contribute to reducing symptoms of insomnia.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P45

Title
Sleep problems and sleep disorders in children with dysautonomia referred to sleep clinics

Introduction
Sleep issues are one of the most common problems in patients with dysautonomia. Few previous small-sized studies focused on the association between dysautonomia and sleep disordered breathing (SDB). However, other sleep issues such as insomnia, restless sleep, daytime sleepiness as well as specific sleep disorders are still limited especially in pediatric population. The purpose of this study was to: (1.) describe the demographics, clinical sleep presentation of children with dysautonomia who were referred to sleep clinics; (2.) compare the clinical sleep presentations and diagnoses of children with dysautonomia between younger-age and older-age children (0-5 years vs 6-20 years old).

Materials and Methods
A retrospective review of medical records and polysomnography of children with dysautonomia under 20 years of age at Cincinnati Children's Hospital Medical Center from January 1, 2000 to October 31, 2022 was performed. Demographics, clinical sleep presentation, polysomnographic findings, diagnoses, and treatments were reviewed. Descriptive statistics were utilized, and the Wilcoxon test or Fisher's exact test was used to compare the data between younger and older group.

Results
One hundred and eighty-six children with dysautonomia were included, 47.3% were male (N=88). Most common presenting symptoms included SDB (N=86, 46.2%), restless sleep (N=56, 30.1%) and sleep onset insomnia (N=38, 20.4%). Compare between younger (Y) and older group (O) (N=89 and 97, respectively), younger-age children were more likely to present with SDBs than older-age children (N=44, 67.7% vs N=42, 49.4%, p=0.025), while the presenting symptoms such as sleep onset insomnia, nighttime awakening, daytime sleepiness, restless sleep were more likely to be seen in the older group. For diagnoses, OSA was more likely to be found in the younger group (N=32, 36% [Y] vs N=19, 19.6% [O], p=0.021), while, insomnia (sleep onset insomnia, sleep maintenance insomnia, or both) and

restless leg syndrome/periodic limb movement disorder (RLS/PLMD) were more likely to be found in the older group (N=38, 44.8% [O] vs N=10, 15.4% [Y], p=0.001 and N=28, 28.9% [O] vs N=7, 7.9% [Y], p=<0.001, respectively).

Conclusions

The most common presenting sleep symptoms in children with dysautonomia were SDB, restless sleep and sleep onset insomnia. Younger children were likely to have OSA, while older children were likely to have insomnia, RLS/PLMD. Physicians should recognize, evaluate and treat sleep disorders in this population. The age of patients can provide guidance toward specific sleep disorders in children with dysautonomia.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P46

Title
Polysomnographic features of children with obesity: can body mass index predict severe obstructive sleep apnea?

Introduction
Limited studies have explored polysomnographic features in children with obesity. We explored the demographic and polysomnographic features of children with obesity and determined if body mass index (BMI) can predict severe obstructive sleep apnea (OSA).

Materials and Methods
This cross-sectional study aimed to investigate the relationship between symptoms suggestive of sleep disorders and polysomnographic features in children with obesity, recruited from January 2019 to March 2022. We explored the demographic, anthropometric measures, and polysomnographic abnormalities of these children. We used receiver operating characteristic (ROC) curve and logistic regression analysis to determine the optimal cut-off values for prediction of severe OSA.

Results
A total of 132 children with obesity (76.5% male, mean age 12.5 ± 3.2 years) were included. Severe OSA was identified in 64 children (48.5%). Among these children, anthropometric measures including BMI, neck and waist circumference were identified as predictors of severe OSA. The study revealed that the proposed cut-off BMI for predict severe OSA is more than 29.2 kg/m2, with 81.3% sensitivity and 48.5% specificity.

Conclusions
Severe OSA is common in children with obesity. We recommend screening children with obesity with a BMI greater than 29.2 kg/m2 using sleep questionnaires and polysomnography.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P47

Title
Two Hours To Zzz: Preliminary Analyses on the Short- and Long-Term Effects of a Child Sleep Intervention

Introduction
Approximately 30% of preschool-aged children struggle with sleep difficulties. Research has indicated that parents play a key role in promoting good sleep habits in their children. However, only a few interventions are designed for preschoolers and involve both parents and children. This preliminary study investigated the short and long-term effects of a two-hour group intervention on child sleep, parenting practices, and parental sleep beliefs.

Materials and Methods
To date, thirty-seven families participated in the study, including one or both parents and their 3- to 5-year-old child. The intervention consists of a two-hour parent group session (with 2 to 4 families). Sleep hygiene, bedtime routine, and nightmares are some themes discussed with parents. Sleep educational activities are conducted with children simultaneously in a separate room. At the end of these sessions, a dyadic interaction between the parents and their child is scheduled to share what they learned. Two weeks later, all parents participate in a follow-up group session during which they share their successes and obstacles and receive additional support from the clinician. Data on children's and parents' sleep, parenting practices, and parental sleep beliefs were collected before the intervention (T1), at the follow-up two weeks later (T2), and seven weeks post-intervention (T3). The questionnaires administered were the Children's Sleep Habits Questionnaire (CSHQ), Pittsburg Sleep Quality Index (PSQI), Sleep Conflict and Sleep Dependence subscales of the Parent-Child Sleep Interactions Scale (PSIS), and Setting Limits, Anger and Doubt subscales of the Maternal Cognitions about Infant Sleep Questionnaire (MCISQ). One-way repeated measures ANOVAs were computed to measure changes in each variable over time. Post-hoc pairwise comparisons were conducted using the Bonferroni correction.

Results

The intervention led to significant improvements in children's sleep habits (CSHQ total scores) [$F(2, 72) = 15.39$, $p < .001$] and to a reduction in Sleep Conflict scores (PSIS) [$F(2, 72) = 12.28$, $p < .001$]. Post-hoc analyses revealed that significant changes appeared at T2 and remained significant at T3. Results also revealed significant improvement in Setting Limits [$F(2, 72) = 4.29$, $p = .019$] and Anger subscale scores (MCISQ) [$F(2, 72) = 6.16$, $p = .003$]. Post-hoc analyses showed that significant changes appeared at T3. No other questionnaires showed significant changes.

Conclusions

This study demonstrated that a short, two-hour group intervention can significantly improve parenting practices and children's sleep within two weeks. These improvements were sustained for up to seven weeks post-intervention. Interestingly, while changes in parenting practices and children's sleep were swift, changes in parental sleep beliefs took longer to manifest. This suggests that parents may need to see tangible improvements in their child's sleep before they adjust their beliefs about children's sleep.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P48

Title
Effects of discontinuation of Levothyroxine in patient with Trisomy 21 and its impact on sleep study results

Introduction
The prevalence of obstructive sleep apnea (OSA) in patients with Trisomy 21 is around 30-70%. Around 30-50% of children with Trisomy 21 continue to have OSA after adenotonsillectomy1. Since hypothyroidism is common in patients with Trisomy 21, untreated or uncontrolled hypothyroidism can impact sleep study results. Here, we present a case study of a common condition in patients with Trisomy 21 which when untreated or partially treated can affect the treatment of OSA.

Materials and Methods
This is a case report. The patient was evaluated at our Sleep Center at the University hospital.

Results
A 35-month-old male with a medical history significant for Trisomy 21, s/p adenotonsillectomy ,hypothyroidism on levothyroxine, laryngopharyngeal reflux, laryngomalacia, plagiocephaly, presents to the sleep clinic with concerns of noisy breathing and restless sleep. On examination, he was noted to have a Mallampati score of 2-3, no tonsils, and otherwise no obvious abnormalities. He underwent adenotonsillectomy at the age of 24 months but did not have a baseline polysomnogram before adenotonsillectomy. His snoring and trouble-breathing improved post-adenotonsillectomy. A sleep study done at the age of 35 months- showed moderate to severe mixed sleep apnea with obstructive hypopnea of 11.7 events/hr. and central apnea index of 10.5 events/hr. The REM AHI was 34.8 events/hr, and the supine AHI was 23.8 events/hr. He was noted to have intermittent soft snoring. During the study night, he was off levothyroxine for 30 days which was a trial off meds with support from endocrinology. A TSH obtained 6 days post-sleep study showed uncontrolled hypothyroidism (TSH 9.61 (0.465-4.680) and free T4 of 1.11 ng/dl (0.78-2.19 ng/dl). Since uncontrolled hypothyroidism can have effects on sleep study results, he was restarted on levothyroxine. A repeat sleep study was done around 4 months after his initial sleep study at the age of 39 months and almost 3.5 months after restarting levothyroxine. This

study showed significant improvement in the severity of sleep-disordered breathing events with an obstructive hypopnea index of 5.5 events/hr. and central apnea index of 1.5 events/hr. Supine AHI was 8.9 events/hr. and REM AHI was 14.3 events/hr. This showed overall improvement in the severity of OSA and no concern for CSA (central sleep apnea) post-treatment of hypothyroidism. Treatment for obstructive sleep apnea was still recommended but no further evaluation for central sleep apnea was advised.

Conclusions

The severity of OSA correlated with thyroid function tests and BMI. (2) The prevalence of OSA is high in patients with hypothyroidism where patients with hypothyroidism should be screened for OSA for early diagnosis. Treatment of hypothyroidism reduces the prevalence and severity of OSA(3). Although screening for hypothyroidism in patients suspected of OSA is recommended, it is also important to make sure that the hypothyroidism is adequately controlled before sleep study or while correlating with sleep study results.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P49

Title
The effect of melatonin in the treatment of insomnia in Iranian children with neuromuscular diseases

Introduction
The chance of sleep disorders is more than 50 % in children with neuromuscular diseases (NMD). Children with NMD are at risk for Insomnia, Parasomnias and Sleep-Disordered Breathing (SDB). The current study was designed to evaluate the effect of Melatonin for treatment Insomnia in children with NMD.

Materials and Methods
This prospective clinical trial study was conducted on 43 children with NMD aged from 7 to 12 years who were referred to the sleep Lab between 2015 and 2023. Data collection involved the completion of the Iranian children sleep habits questionnaire (CSHQ), and results of PSG analysis scored by Sleep Specialist according to the American Academy of Sleep Medicine (AASM). All patients suffered from SDB were treated by using Bilevel Positive Airway Pressure (BiPAP). Then, children with persistent Insomnia were treated with 3 mg Melatonin 1hour before bedtime routine for 1 month. Then, CSHQ was fulfilled again for them. The mean analyzed results of the variants in pre- and post-intervention were compared. Data analysis was performed using SPSS version 24 statistical software, with a significance level of 0.05.

Results
The study included 43 children, with 62.8% being boys. The average age of the participants was 7.06±3.45 years. There was no significant relationship between clinical symptoms and Apnea Hypopnea Index (AHI) in the children. The PSG results revealed low sleep efficiency (7/76 %), with 59.5% of children having an abnormal arousal index (AI). There was a higher proportion of lighter sleep stages (N1, N2), reduced deep sleep stage (N3) and a low percentage of R stage. 81.4 % of children had moderate to severe (65.1%) SDB. Results showed that Melatonin is safe and effective in improving the initiation and maintenance of sleep (87%), restless sleep (65%), frequent wakings (29%), anxiety (22%) and parasomnias (12%).

Conclusions

Insomnia and SDB are prevalent among children with NMD. Melatonin is effective treatment in improving the initiation and maintenance of sleep in children with NMD. Treating children's sleep disorders improves their quality of life.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P50

Title
Assessment of CFTR modulators impact on sleep in adolescents with Cystic Fibrosis

Introduction
Sleep quality is frequently compromised in children with Cystic Fibrosis (CF) due to various factors. The main aim of this study was to compare sleep in CF patients before and after the introduction of CFTR modulators.

Materials and Methods
Adolescents (10-18 years-old) with CF followed in our Reference Centre under CFTR modulator therapy and with documented home respiratory polygraphy studies between 2020 and 2022 were included. Obstructive Sleep Apnea Syndrome (OSAS) was considered as respiratory event index (REI) ≥ 1/hour. Data was collected retrospectively from medical records and application of the Pediatric Sleep Questionnaire (PSQ) to caregivers was undertaken to assess subjective impact of the therapy. Continuous variables are presented as medians [minimum; maximum]. Appropriate statistical analyses were performed with GraphPad Prism (p-value <0.05 as significant).

Results
A total of 10 patients were included, with a median age of 17 years-old [12; 18], 9 were female. After modulators, REI decreased from 1.6 [0; 8.6] to 0.9 [0.5; 3.9], Oxygen Desaturation Index from 1.6 [0.3; 7.9] to 0.8 [0.4; 5.1], Heart Rate from 74.5 [58.5; 83.7] to 66.8 [60.6; 79.5] and time with oxygen saturation under 90% from 0.1% [0; 29.5] to 0% [0; 6.4]. Six patients had OSAS prior to modulators initiation (4 mild and 2 moderate) versus 4 patients after (4 mild).

Accordingly, there was a significant upgrade in PSQ score with the introduction of modulators (6.5 vs 1.0; p=0.002). It changed from 3 cases with a score ≥8, suggestive of OSAS, to none. In 90% of the cases, the empirical parental notion of improvement in sleep quality was evident. Furthermore, there was a significant improvement in FEV1 (median 78.4% to 94.3%; p=0.032) and FVC (median 86.1% to 98.9%; p=0.014). There was a negative correlation

between nocturnal oxygen desaturation under 90% and FEV1 (r=-0.803; p=0.009) and a positive correlation between transcutaneous CO2 pressure (tcpCO2) and PSQ score (r=0.756; p 0.030), after modulators.

Conclusions

Our small sample limits our results. As expected, after the beginning of CFTR modulators, there was a significant improvement in lung function, which correlated with better objective sleep parameters and sleep quality perception, emphasizing the importance of addressing this domain in routine CF patient encounters.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P51

Title
Polyssomnpgraphic characterization of pinealectomizad patients

Introduction
Biological rhythms play a crucial role in the health of living beings, with the anterior hypothalamic region and the pineal gland being key structures in this process. Melatonin, a hormone produced by the pineal gland is also involved in regulating metabolic processes at different levels. It plays multiple roles in virtually every living organism. It regulates the sleep-wake cycle and is crucial for synchronizing circadian rhythms beyond many other functions.(1) However, studies in humans investigating the consequences of damage to these structures, and the consequent suppression of melatonin, and alterations in the expression of biological rhythms are scarce, due to clear ethical limitations. Patients with pineal tumors undergoing surgical resection or radioablation offer a unique opportunity to investigate these effects. Thus, investigating patients with Pineal tumors, with a chronobiological approach, can both contribute to understanding the mechanism of endogenous timing and better characterizing the role of the pineal gland in regulating biological rhythms in humans, and benefit patients with this type of tumor.

Objectives:
To compare polysomnographic data on sleep macrostructure between pinealectomized and non-pinealectomized patients.

Materials and Methods
Between December 2021 and May 2023, fifteen patients with pineal tumors undergoing surgical resection or radioablation, along with ten healthy control subjects, were evaluated. Assessments included medical history, physical examination, questionnaires about sleep and chronotype, and polysomnography at different time points. Melatonin replacement was administered following a standard dose of 0.3 mg, with systematic evaluations.

Results

Comparing pinealectomized patients without melatonin replacement and the control group, the only significant alteration observed was in the percentage of N2 sleep stage, which was statistically lower in pinealectomized patients compared to the control group. The mean percentage of N2 sleep stage was 40.5 (+- 8.20) and median was 41,5 in the pinealectomized group, while the mean was 50.49 (+- 6.74) in the control group and the median was 49,55 (p 0.003).

The decreased N2 percentage inpinealectomized patients in relation to controls may potentially serve as a marker for the absence of circulating melatonin; however, further studies and a better physiological understanding of the mechanisms leading to this process are needed. No statistically significant alterations were found in other parameters of sleep architecture.

There is a scarcity of data in the literature on this topic to compare our findings, precisely because the absence of melatonin is a rare condition and to the best of our knowledge, this is the first study assessing the impacts of the absence of circulating melatonin on polysomnography.

Polysomnographic alterations that we expected to find, such as increased sleep latency and increased REM sleep latency, were not found in this study. Aspects of microstructure and changes following melatonin supplementation are yet to be evaluated.

Conclusions

Preliminary results did not show significant differences in terms of sleep macrostructure; however, the heterogeneity of the sample and the small sample size, given the rarity of this condition, are limitations of this study, emphasizing the importance of studies with a larger sample to understand the effects of melatonin absence on sleep.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P52

Title
Paediatric Home Sleep Apnoea Testing: Service Audit

Introduction
The use of Home Sleep Apnoea Testing (HSAT) in paediatrics for the diagnosis of Obstructive Sleep Apnoea (OSA) was adopted at our Trust (Great Ormond Street Hospital for Children [GOSH]) in December 2020. A high technical quality of the recorded HSAT study is paramount to interpretability, with published data indicating wide variation in the quality achieved from 46-87% technically acceptable recordings (Gudnadottir et al., 2019; Michelet et al., 2020). A previous audit of our HSAT service between December 2020 and February 2022 revealed a 76% study success rate. Recommended improvements included improved parental teaching and modification of the SpO2 sensor attachment policy. This follow-up audit aims to assess the service development and whether implementing the previous recommendations have improved our HSAT technical quality.

Materials and Methods
An Embletta-MPR device (Natus ®) was provided to the patient and carer during a face-to-face appointment where training was provided. Printed instructions, a link to a video tutorial and contact details of the overnight physiology team were also supplied. The HSAT was performed in line with adapted American Academy of Sleep Medicine (AASM) guidelines.

Our in-house referral criteria for HSAT specified test provision for non-syndromic children aged 2-17 years with clinical suspicion of OSA. Our in-laboratory minimum requirements for quality standards were implemented to assess the interpretability of each study. A total sleep time (TST) ≥ 4hrs comprised of artefact-free SpO2 recording for ≥ 4hrs, and signals required to score respiratory events (nasal flow and/or respiratory effort bands) for ≥ 4hrs were required for a study to be deemed technically successful.

All consecutively recorded HSATs between 01/03/2022 and 31/01/2024 were retrospectively evaluated for their technical quality.

Results

347 HSATs were performed during this period. Five different Embletta MPR devices were used. Mean patient age was 8.1 years (± 3.5). Overall study success rate was 83.6% (290 pass vs 57 fail). The most common cause of failure was intolerance of sensors (71.9%). Other reasons included insufficient TST (10.5%), insufficient SpO2 recording (7%), insufficient signals required to score respiratory events (7%), incorrect parental setup (1.8%), and technical failure (1.8%).

Conclusions

A high proportion of HSATs were technically successful portraying a valuable service. The improved pass rate compared to our previous audit suggests the implemented changes were effective. Further improvements are being considered including more inclusive face-to-face teaching with an interpreter, printed instructions in several languages, video guide to include subtitles in several languages, and consideration of improved psychosocial support techniques for patients with learning disability and autism.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P53

Title
Challenges, outcomes and lessons learnt following the Philips Field Safety Notice - Children's Health Ireland experience.

Introduction
In June 2021, Philips Respironics issued an urgent Field Safety Notice (FSN) involving the voluntary recall of certain Respironics Ventilators, BiPAP, and CPAP Machines. The recall was prompted after health concerns were linked to the degradation of polyester-based polyurethane (PE-PUR) sound abatement foam in these devices. This degradation had two potential consequences. 1) PE-PUR foam may degrade into particles which may be ingested or inhaled by the user, and 2) the PE-PUR foam may emit certain chemicals. This notice affected millions of users worldwide. We describe the recall process for affected paediatric patients within Children's Health Ireland (CHI), the challenges to device swap out, and the lessons learned for the future.

Materials and Methods
A retrospective review of data was conducted, using information that had been gathered in the Field Safety Notice database in Children's Health Ireland. The type of device, the pre-existing ventilator dependency, and the resulting numbers and locations of patients who underwent device swap out were obtained from this database. In addition, any concerns that had been reported as a result of the FSN were also reviewed.

Results
A total of 394 patients in CHI were affected by the Phillips FSN. Of these, 270 (69%) were changed to a new device, 102 (26%) discontinued treatment, 16 (4%) were transitioned to adult services and 6 (2%) patients chose to continue a FSN affected device. For those patients who were changed to a new device; 157 (58%) were changed in the community, 52 (19%) were changed opportunistically during an admission to hospital for another reason, 48 (18%) were changed electively as an inpatient, and 13 (5%) patients had their device changed in another hospital. A total of 58 incident reports were made following the FSN. This included

16 reports of parental concerns, 12 reports of patient discontinuing their prescribed treatments, 11 cases of soot on/from device and a further 6 reports of soot on the interface.

Conclusions

Prior to the FSN, there had been a heavy reliance on Philips Respironics devices within CHI. As a result, the recall had a significant impact on our non-invasive ventilation service. It highlighted the importance of having a robust, up-to-date database that allows for swift and accurate identification of patients on NIV devices. It also emphasized the importance of regular patient review and re-evaluation, given the number of patients who discontinued therapy. There were many challenges in ensuring the timely swap out of devices, and this required effective collaboration from all key stakeholders throughout the process.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P54

Title
Exploring an objective measure of overactivity in children with rare genetic syndromes

Introduction
Overactivity is prevalent in several neurodevelopmental conditions, including Smith-Magenis syndrome, Angelman syndrome, and tuberous sclerosis complex, although has been predominantly measured using questionnaire techniques. Threats to the precision and validity of questionnaire data highlight the need for complementary measures of this behaviour. Previous research indicates objective measures, namely actigraphy, can effectively differentiate non-overactive children from those with attention-deficit hyperactivity disorder. This study is the first to examine the sensitivity of actigraphy to overactivity across rare genetic syndromes associated with intellectual disability, through comparisons with typically-developing peers and questionnaire overactivity estimates.

Materials and Methods
A secondary analysis of actigraphy data and overactivity estimates from The Activity Questionnaire (TAQ) was conducted for children aged 4-15 years with Smith-Magenis syndrome (N=20), Angelman syndrome (N=26), tuberous sclerosis complex (N=16), and typically-developing children (N=61). Actigraphy data were summarized using the M10 non-parametric circadian rhythm variable, and 24-hour activity profiles were modelled via functional linear modelling. Associations between actigraphy data and TAQ overactivity estimates were explored, alongside differences in actigraphy-defined activity between syndrome and typically-developing groups, and within-syndrome high and low TAQ overactivity groups.

Results
M10 and TAQ overactivity scores were positively correlated for children with Angelman syndrome, and near-significantly correlated for children with Smith-Magenis syndrome. M10 did not differ between the syndrome and typically-developing groups. Higher early morning

activity and lower evening activity was observed across all syndrome groups relative to typically-developing peers. High and low TAQ group comparisons revealed syndrome-specific profiles of overactivity, persisting throughout the day in Angelman syndrome, occurring during the early morning and early afternoon in Smith-Magenis syndrome, and manifesting briefly in the evening in tuberous sclerosis complex.

Conclusions

These findings provide some support for the sensitivity of actigraphy to overactivity in children with rare genetic syndromes, and offer syndrome-specific temporal descriptions of overactivity. The findings advance existing descriptions of overactivity, provided by questionnaire techniques, in children with rare genetic syndromes and have implications for the measurement of overactivity. Future studies should examine the impact of syndrome-related characteristics on actigraphy-defined activity, and overactivity estimates from actigraphy and questionnaire techniques.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P55

Title
Effect of Sleep Disordered Breathing Severity in Children with Down syndrome on Parental Wellbeing and Social Support.

Introduction
Sleep disorders, particularly sleep disordered breathing (SDB), are common in children with Down syndrome (DS). We investigated the relationship between SDB severity and parental psychological wellbeing and their perception of social support.

Materials and Methods
44 children with DS (3-19 years) underwent overnight polysomnography and were categorised into three groups primary snoring, Mild and Moderate/Severe obstructive sleep apnoea (OSA). Parents completed questionnaires about their child's behaviour (Child Behavior Checklist), sleep symptoms (Pediatric Sleep Survey Instrument) and SDB-related quality of life (OSA-18), together with the DUKE-UNC Functional Social Support (DUKE) and Psychological General Well-Being Index (PGWBI) questionnaires for themselves. 34 children completed a follow-up study after 2 years.

Results
There were no significant differences between SDB severity groups for parental perceived social support or psychological wellbeing. Total scores on the DUKE were below average and PGWBI scores were indicative of moderate psychological distress in in children with OSA. Reduced perceived levels of social support were significantly correlated with externalising child behaviour and sleep disturbance. Diminished parental psychological wellbeing was also significantly correlated with increased sleep disturbances and reduced quality of life in children. At follow-up there were no significant changes in any questionnaire outcome, however parents of children with improved SDB severity had improved PGWBI vitality scores.

Conclusions
The degree of parent-reported sleep disturbance in children with DS was linked to suboptimal parental social support and poor psychological wellbeing. Our results emphasise

the need for enhanced awareness of the detrimental effects of sleep problems in children with DS on parental wellbeing.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P56

Title
Umbrella Review: The efficacy and tolerability of non-pharmacological interventions for sleep problems in children and adolescents

Introduction
Chronic insomnia is common in both otherwise healthy typically developing children and in clinical populations with neurodevelopmental/psychiatric or medical disorders. Currently, there is no over-arching synthesis of the available evidence on the treatment of insomnia in children. This umbrella review aims to synthesise available literature from systematic reviews (SR) with/without meta-analysis (MA) of randomised controlled trials (RCTs) of non-pharmacological interventions for insomnia in children and adolescents. It explores (1) what non-pharmacological sleep interventions have been tested for efficacy in children/adolescents and (2) their efficacy and tolerability across different clinical and non-clinical populations.

Materials and Methods
We retained SR/MAs including RCTs of non-pharmacological sleep interventions, with any comparator, for children/adolescents (up to age 18, otherwise healthy or with any medical/neurodevelopmental or psychiatric condition). Primary outcomes were any subjective or objective sleep parameter. Other outcomes included condition related core symptoms, academic performance, health, quality of life and parental sleep, quality of life and health.

Six electronic databases (Medline, Embase, PsycINFO, Cochrane, Web of Science, CINAHL) were systematically searched to January 2024. Two reviewers independently screened all titles/abstracts and potentially eligible full texts in Endnote. Data were extracted from the level of the SR/MA by 2 reviewers, with 25% of one another's checked by the other. SR/MA

quality was assessed using the AMSTAR-2 by 2 independent assessors. In all stages, reviewers' decisions (e.g., screening, data extraction) were calibrated, and any uncertainties were resolved with a third reviewer. Statistical analyses are ongoing using the Metaumbrella R package, and all identified MA will be re-run with common metrics. Any SR/MAs not possible to meta-analyse are undergoing a narrative synthesis. Certainty of the evidence is being assessed using the GRADE criteria.

Results

Ninety-nine SR/MA were included. Twenty-five of which included extractable data for meta-analysis (effect size and dispersion) and are undergoing MA. These 25 include populations of (1) sleep problems/disorder only, 17 SR/MA and 28 trials, (2) attention-deficit/hyperactivity disorder (ADHD), eight SR/MA and seven trials and (3) autism spectrum disorder (ASD), five SR/MA and six trials. Four categories of intervention are meta-analysed; 'behavioural or behaviourally based psychoeducation', 'weighted blanket', 'light therapy', 'mattress technology'. Forest plots for subjective and objective outcomes will be presented at the conference.

Conclusions

This umbrella review will inform clinical guidelines and future management of sleep problems in children and adolescents within different clinical populations and identify areas that need further research.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P73

Title
Learning to Crawl Impacts Spatial Aspects of Movement During Sleep

Introduction
The acquisition of new motor skills in infancy changes sleep characteristics (e.g., more fragmentation) and gross motor activity during sleep (DeMasi et al., 2022). However, little is known about the nature of sleep-dependent movement because measurement is typically limited to activity monitors that record amount, but not kind, of movement from only one limb. To better understand the functional relationship between motor skill acquisition and nocturnal locomotor activity, we examined infants' total wake episodes and range of movement around the crib during night sleep before and after the onset of crawling.

Materials and Methods
27 full-term infants (13 female) participated from before they could crawl to first crawling steps (Mage=8.88 months; SD=1.49) to skill mastery (Mage=9.14; SD=1.31). Night sleep was measured with Nanit, a home video baby monitoring system that uses computer vision technology to calculate summary sleep metrics based on activity levels in each pixel of the total crib area over the course of the night. Parents kept a daily checklist of infants' motor milestones for the duration of the study (Mduration=208 days; SD=97) Adolph et al., 2008; Berger & Moore, 2021). Here we report on Wake Episodes (number of times the infant woke >5 minutes continuously) and Total Area (total pixel area where infants spent 1/3 or less of the night; captures the greatest physical extent of movements around the crib). We defined the onset period of both milestones as the 28 days surrounding skill onset (2 weeks on either side). We tracked change across 7 total 28-day periods (3 before, 3 after onset). We hypothesized there would be an increase in wake episodes around skill acquisition, consistent with past research, and an increase in total movement, which has not been previously assessed.

Results
Generalized additive models revealed a steep decrease in Wake Episodes from three periods before until crawling acquisition, which was then followed by a period of stability (edf=3.073, F=6.998, p<.001). Wake episodes then peaked at the onset of mastery (edf=3.799, F=2.116,

p=.049). Total Area increased the month before skill acquisition (edf=4.312, F=13.389, p<.001) and increased linearly through mastery (edf=1.100, F=15.449, p<.001).

Conclusions

The temporal relation between skill onset and changes to infants' sleep may hold clues as to the functional relation between these behaviors. The fact that wake episodes decreased leading up to first crawling steps, but total area increased suggests that infants were moving more in their sleep as they learned to crawl. It was not until crawling mastery that infants' sleep was fragmented. Previous work has shown that upon taking their first crawling steps, infants' REM sleep increased (Horger, 2021). Before consistently performing a skill, infants may be more aroused as skill-related cortical activity is reactivated during sleep (Berger & Moore, 2021; Maquet et al., 2000). Increased activity suggests that new skills are consolidated via sensorimotor integration when learning the skill is most difficult (Cao et al., 2020; Peters et al., 2007). Thus, the relationship between movement during sleep and sleep fragmentation is more complex than previously thought. Future research should determine whether there is a threshold of activity that awakens infants.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P57

Title
Impact of the Onset of Pre-Linguistic and Linguistic Milestones on Infants' Sleep

Introduction
Sleep generally becomes increasingly consolidated over the course of infancy, but is temporarily disrupted around the onset of gross locomotor milestones like crawling, pulling-to-stand, or walking (Berger & Moore, 2021; Scher, 1996; Scher, 2005; Atun-Einy & Scher 2016). Pre-linguistic and linguistic milestones have a motor component, but whether the onsets of these milestones similarly disrupt infants' sleep has not been investigated. For example, motor development is an organizer for communicative and language development (Iverson, 2010) and the onset of new motor skills can launch a developmental cascade providing access to opportunities for languauge learning (Libertus & Violi, 2016).

The aim of this study is to better understand the functional relationship between sleep and motor development by examining whether the onsets of pre-linguistic and linguistic milestones disrupt sleep in a similar manner to the onset of locomotor milestones.

Materials and Methods
Participants were 103 families who used Nanit, a commercial video baby monitor mounted over infants' cribs. A computer vision algorithm generated sleep metrics (sleep duration and night wakings) based on activity level in each pixel of the video streamed from the Nanit camera over the night. Parents were asked about their infants' age-appropriate language and locomotor skills by responding to daily prompts within the Nanit app about infant babbling (n=38), cooing (n=19), expressive jargon (n=21), new word utterance (n=37), and labeling an object (n=22). Parents of rolling infants were asked about babble and coo, parents of crawling infants about babble and expressive jargon, and parents of walking infants about new word and labeling an object.

Results
A changepoint analysis was conducted to determine whether sleep characteristics changed significantly around the onset of skills. We calculated within-subject means of each sleep statistic for nights excluding the onset night of the skill. Then, we determined the average

deviation from the within-subjects mean for each night (nights were identified by their distance from the onset night). The changepoint analysis tested for abrupt changes in these deviations. Changepoints in deviations were found around the onset of babbling and expressive jargon. Infants woke up significantly more often than average between 8 nights before and 2 days after babbling onset and between 4 nights before to 5 nights after expressive jargon onset compared to other nights. Infants' sleep duration was significantly lower than average 8 nights and 4 nights before onset of babbling compared to other nights.

Conclusions

Infants' sleep was disrupted around the onsets of babbling and expressive jargon but not around the onsets of cooing, new word use, or labeling an object. Our results provide some of the first evidence that linguistic and pre-linguistic milestones disrupt infant sleep in a similar manner to locomotor milestones. However, it is unclear why some milestones and not others disrupted sleep. Perhaps babbling and expressive jargon are particularly embodied language skills which stem from changes to the motor system (Iverson, 2010), which in turn disrupt sleep. Future research will need to tease apart whether these findings reflect the motor component underlying language skills or a broader relationship between sleep and information consolidation during learning.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P58

Title
Rock-a-bye Baby: Interruptions to infants' night sleep relate to decreased postural control during problem solving the next-day

Introduction
Findings on the relation between night sleep and infants' readiness to learn have been mixed. For example, 6-month-olds' sleep quality was positively associated with success at encoding and reproducing novel behaviors the next day (Konrad, et al., 2016), but 12-month-olds' sleep quality in the same study was not related to next day's learning. Whereas the number of nightly wake episodes predicted 13-month-old newly walking infants' success at learning a novel motor problem the next morning (Horger, et al., 2021), parent reports of 10-month-olds' typical night sleep did not predict how well they learned an action sequence (Lukowski & Milojevich, 2013). Clearly more research is necessary to clarify when night sleep is (and is not) related to infants' readiness to learn. Thus, we examined the relation between newly sitting infants' nighttime sleep and problem-solving behaviors the next day.

Materials and Methods
22 pre-crawling 6- to 8-month-old infants (Mage=7.39 mos) who could sit independently participated. Families used Nanit, a commercial baby monitoring camera mounted over infants' cribs. Nanit uses a computer vision algorithm based on the same criteria as actigraphy to translate movement into sleep metrics: number of wake episodes and parent visits, sleep efficiency, and sleep duration. The problem-solving task required infants to reach for a toy at two locations on a reaching board. To make the task challenging, infants sat on a pliant surface to destabilize their balance as they reached. Primary outcomes were latency to reach (time to start reaching), trial duration (time to complete task), loss of balance, visual scanning, and postural adjustments A subset of infants (n=17) also received a Focused Attention (FA) task, in which they explored 3 toys for 90 s each (Berger, et al., 2019). Primary outcomes were global FA (a qualitative measure of engagement); sum total FA duration; mean FA bout duration; number of bouts of FA; longest bout of FA.

Results

Pearson correlations revealed significant relationships between sleep metrics and problem-solving behaviors. Number of wake episodes were positively related to visual scanning and postural adjustments ($r=.54$, $p<.01$; $r=.43$, $p<.05$, respectively). Number of parent visits was positively related to visual scanning ($r=.57$, $p<.01$). Sleep efficiency was negatively related to latency ($r=-.47$, $p<.03$). Sleep duration was negatively related to loss of balance ($r=-.42$, $p=.05$). No sleep metric was related to trial duration or any FA variable.

Conclusions

The more disrupted infants' night sleep, the more difficulties emerged with problem solving the next day. However, sleep was related to specific aspects of problem solving, namely motor planning and balance control strategies. Sleep did not seem to be predictive of attention or information-processing, perhaps because we explicitly made the motor demands of the problem-solving task challenging, leaving the skills that were most taxed most vulnerable. Moreover, despite differences in context (napping vs night sleep, consolidation of information vs readiness to learn), these findings converge with previous work showing that sleep fosters domain-specific, rather than domain-general skills in infancy (Horger, et al, 2023). Implications for the long-term effects of fragmented sleep and chronic sleep problems on learning in infancy will be discussed.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P59

Title
Comparison of 2 pulse oximetry measuring devices during sleep investigations in paediatric populations

Introduction
Pulse oximetry is a non-invasive measurement which is commonly applied in the clinical setting to provide a measure of peripheral oxygen saturation (SpO2). Many centres use pulse oximetry as a screening tool for obstructive sleep apnoea (OSA) or as part of a cardiorespiratory sleep study (CRSS) to identify sleep disordered breathing (SDB). Therefore, accuracy of SpO2 measurement is essential. In our centre, 2 SpO2 devices are used during an inpatient CRSS. Our aim was to look at inter-device variation and assess for any significant differences.

Materials and Methods
Devices from 2 manufacturers were compared (SomnoscreenTM using Nonin technology, Teveik disposable sensors, SOMNOmedics and Radical-7, RD Set® Neo disposable sensors, Masimo) within a paediatric cohort. Average sampling time of every 4 beats (SomnoscreenTM) and 2-4 seconds (Radical-7) were used. Both devices are used routinely in our clinical practice to measure SpO2 as part of inpatient CRSS's. Patients who had been referred for a CRSS were studied over one night. The reason for test was varied but most commonly, referrals originated from respiratory and ear, nose & throat (ENT). Retrospectively, we analysed equal timeframes from both devices. Bland-Altman analysis was used to evaluate the agreement between devices with respect to the mean SpO2 and the oxygen desaturation index (ODI) of ≥3%.

Results
Data from 84 subjects was analysed. Mean age was 3.7 ± 3.1 years. The mean bias of the 2 devices for mean SpO2 was -1.26% (Masimo – Nonin). The upper and lower limits of agreement (LOA) were 0.7 and -3.2% respectively. Mean SpO2 was higher in the SomnoscreenTM in 76 subjects when compared to the Radical-7. The mean bias of the 2 devices for the ODI was 10.3 (Masimo – Nonin). The upper and lower LOA were 26.7 and -6.1

respectively. The ODI was higher in the Masimo for 79 subjects when compared to the SomnoscreenTM.

Conclusions

In a paediatric cohort, the mean bias of SpO2 from 2 pulse oximeters is clinically within acceptable limits, with only 3 subjects displaying a mean SpO2 of >3% between devices. The device manufacturers state an accuracy of 2-3%, therefore the results are reassuring. However, the ODI mean bias is large with wide LOA and is of more clinical concern. Severity gradings have been proposed 1 and a mean bias of this size could result in patients being under or over diagnosed. The difference in the ODI results highlights that care should be taken when making clinical decisions based on a single monitor and shows the limitation of using pulse oximetry on its own as a screening tool for diagnosing SDB in children.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P60

Title
Sleep Trajectories and Frequency of Non-suicidal Self-injury in Adolescents: A Person-Oriented Perspective over Two Years

Introduction
Adolescent sleep quality and quantity is commonly linked to worse emotion regulation. One maladaptive emotion regulation strategy that is on the rise is non-suicidal self-injury (NSSI), which includes burning, hitting, or scratching one's own body tissue without suicidal intent. The aim of this study was to explore the frequency of NSSI among different longitudinal trajectories of insomnia symptoms and short sleep duration to identify at-risk adolescents.

Materials and Methods
We used questionnaire data collected annually (3 time points over 2 years) from a sample of Swedish adolescents (N = 1,294; Mage = 13.2 [range: 12-15 years], SD = 0.4; 46.8% girls). Adolescents answered questions about their sleep duration, symptoms of insomnia, NSSI, depressive symptoms, and demographics.

Results
Adolescents who reported persistent or increasing sleep problems over time also reported more NSSI. A notable pattern was that adolescents whose insomnia symptoms were high and increasing reported the highest frequency of NSSI, also compared to adolescents who started at the same high level of insomnia symptoms but improved over time.

Conclusions
Measuring NSSI may help identify a risk-group for persistent sleep problems and self-injury. Because sleep disturbances, especially insomnia, and NSSI go hand-in-hand for most adolescents, sleep interventions would benefit the treatment and prevention of self-injury.
Keywords: Self harm, sleep disturbance, teenagers, person-oriented analyses.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P61

Title
Evaluation of Sleep spindles activity and its relationship with daytime functioning in Iranian children with neuromuscular disorders.

Introduction
The children with neuromuscular disorders (NMD) suffer from various type of sleep disorders for example: sleep fragmentation, insomnia, parasomnias, Sleep Disordered Breathing (SDB), hyper somnolence and respiratory failure. SDB is found in more than 40% of children with NMD. All type of SDB including primary snoring, upper airway resistance syndrome, hypoventilation and obstructive sleep apnea are associated with adverse effects on behavioral variables such as daytime function, daytime sleepiness, school performance, attention and memory concentration.

Polysomnography (PSG) is a standard method to find effect of repetitive hypoxia, obstructive sleep apnea syndrome (OSAS) and sleep disruption in NMD patients on macroarchitecture and microarchitecture of sleep. One of the micro architectures on EEG is sleep spindles that protect the sleeping brain from external sensory stimuli and can serve as markers of sleep integrity.

The aim of this study was to evaluation sleep spindle activity and its relationship with daytime functioning in children with NMD.

Materials and Methods
This retrospective, cross-sectional, descriptive study was conducted on all children with NMD, aged from birth to 18 years who were referred to the sleep ward between 2015 and 2023 due to sleep problems. Data collection involved the completion of the Iranian children and adolescence sleep habits questionnaire (CSHQ), Epworth Sleepiness Scale (ESS) and with manual scoring of PSG data was done according to the American Academy of Sleep Medicine .(AASM 2023)

Each child with NMD was matched to a normal child by age and sex, and with the same OSAS severity based on the apnea-hypopnea index (AHI): mild OSAS (AHI of >1–≤5 events/h), moderate OSAS (AHI of >5–≤ 10 events/h) or severe OSAS (>10 events/h).

Sleep spindles were identified manually using Compumedics PSG system from the C4-A1 and F4-A1 EEG channels during N2 and N3 sleep stages. Spindle density was calculated as the number of spindles per minute of N2 or N3 sleep; spindle intensity was calculated as the product of spindle density and average spindle duration. Data analysis was performed using SPSS version 24 statistical software, with a significance level of 0.05.

Results

The study included 43 children with NMD, with 62.8% being boys. The average age of the participants was 7.06±3.45 years. The most common clinical symptoms in children were restless sleep (63.9%), nighttime pain, moaning (56.6%) hypersomnolence (30 %) and daily moodiness (26%).

The PSG result revealed low sleep efficiency, with 59.5% of children having an abnormal arousal index (AI). There was a higher proportion of lighter sleep stages (N1, N2), reduced deep sleep stage (N3), delayed onset of rapid eye movement (REM) sleep, and an extremely low percentage of REM sleep compare to control group with same OSAS severity. 55% of children exhibited severe OSAS. Children with higher AHI showed a greater drop in oxygen saturation index (SpO2), particularly during REM sleep compare to control group (<0.001).

Evaluation of spindle activity showed shorter duration, less number of spindle, lower density and decrease intensity than control group. A correlation was found between increased OSA severity and decreased spindle numbers. Children with less spindle had higher Epworth Sleepiness Scale compared to the control group with equal AHI severity.

Conclusions

Sleep structure disruption and OSAS are prevalent among children with NMD. This study showed that children with NMD had fewer, shorter and slower spindles on frontal and central EEG compared to healthy children with OSAS.

Reduction in sleep spindles increases sleep disruption and perhaps has the negative effects on patients quality of life. Further studies in this field are suggested.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P62

Title
Mind and skin: Exploring the links between sleep disturbance, neurocognitive function and inflammation in patients with atopic dermatitis

Introduction
Atopic dermatitis (AD) is a chronic, pruritic and inflammatory, dry skin condition with many known comorbidities. These include airway disease, food allergies, atopic eye disease and autoimmune conditions. Furthermore, there is often significant sleep disturbance as well as increased psychological distress and mental health problems. The links and associations between these comorbidities are poorly understood.

Clinical guidelines often state a holistic approach is required in patients with AD. However, evidence-based guidance for the assessment and management of sleep disturbance in eczema is lacking and without clear guidelines, there likely remains uncertainty amongst clinicians and unwarranted variation in assessment, onward referral and treatment of sleep disturbance in eczema. No national data exists on prescription treatments for sleep disturbance in eczema, including antihistamines or melatonin. Behaviour and cognitive interventions have been shown to improve sleep latency but research has been done in eczema. Sleep disturbance caused by eczema is complex and not well understood.

Materials and Methods
A review of recent findings on the putative links between AD, its association with itch, sleep disturbance and neuropsychiatric morbidity, including the role of inflammation in these conditions was performed. Following this, a mixed methods study was designed and conducted exploring the current approach of healthcare professionals in assessing and managing children and young people with AD related sleep disturbance.

This was conducted alongside an ongoing prospective cohort study evaluating whether children with severe AD have abnormal cognitive function associated with systemic inflammation and impaired sleep.

Results

The healthcare professional survey was completed by 101 participants. Quantitative analysis showed 73% of respondents specialised in Dermatology and amongst the respondents, there was low levels of confidence in assessment and managing sleep disturbance. 59% did not have access to behavioural interventions for sleep disturbance. The most common intervention was sedating antihistamines which was prescribed by 98% of respondents however only 8% prescribed melatonin.

Analysis of four focus groups identified four themes that represented healthcare professionals perceived causes of AD related sleep disturbance, perceived impact, experiences of assessment and experiences of management. Subthemes included AD sleep related disturbance reduces quality of life, is detrimental to education, and is complex and poorly understood. Other subthemes represented the view that AD leads to changes in behaviour that drive sleep disturbance however in dermatology clinics this is difficult to assess and treat.

Conclusions

Findings suggest that healthcare professionals In the United Kingdom, recognise that sleep disturbance in children with eczema significantly reduces the child and families quality of life however feel as though they lack the expertise or ability to refer to services to effectively treat this problem. This highlights a significant need for better evidence and guidelines on how to improve sleep disturbance in children with AD especially in healthcare settings where sleep service resources are limited.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P63

Title
Diagnosis and treatment of later onset congenital central hypoventilation syndrome in children

Introduction
To explore the diagnosis and treatment of patients with late onset congenital central hypoventilation syndrome (LO-CCHS).

Materials and Methods
The clinical datas of 2 patients with LO-CCHS admitted in our department in 2020 were retrospectively analyzed, and the experience was summarized and the relevant literature was reviewed.

Results
Two patients with LO-CCHS were diagnosed. Patient 1, male, 3 years and 9months old, and the patient had no obvious inducement to cough and cyanosis at 1 year and 6 months old. The lowest oxygen saturation was only 40%. The initial diagnosis was severe pneumonia. Later, the gene test showed that the class I pathogenic mutation of PHOX2B gene, a It is consistent with the diagnosis of congenital central hypoventilation syndrome (CCHS). The children were given oxygen inhalation and non-invasive ventilation after admission,however, CO2 retention cannot be corrected, so endotracheal intubation is used to assist respiration, attempt several times to extubate in 1 month were failed, so tracheotomy was performed.When sleeping, the patient use a two-level ventilator to connect with the endotracheal tube to assist breathing, and when awake, do not need a non-invasive ventilator. One year and six months later, endoscopic examination found that the granulation hyperplasia in the trachea blocked 90% of the trachea, hypothermia plasma tracheal granulation resection was performed under general anesthesia.After discharge, the patient was followed up for 2 years. The patient was assisted by breathing with a two-level ventilator connected with a tracheal cannula during sleep,and when awake, do not need a non-invasive ventilator. During the day, the activity was normal, the blood gas analysis index was normal, the heart color Doppler ultrasound was normal, and all growth and development indicators were normal.

Patient 2, female, 2 years and 7 months old, at the age of 11 months, the child developed severe hypoxemia and hypercapnia due to upper respiratory tract infection, and the minimum blood oxygen was only 46%. Emergency intubation was needed for rescue,Cardiac color Doppler ultrasound showed pulmonary hypertension and right ventricular insufficiency after admission.It was initially diagnosed as congenital heart disease with pneumonia, and then the gene test showed the class I pathogenic mutation of PHOX2B gene, and CCHS was diagnosed.After treatment, the pneumonia of the child was cured, and the pulmonary hypertension disappeared. After the tracheal intubation was removed, the child slept with a two-level non-invasive respirator through the nasal mask. Follow-up for 2 years showed that the child's daytime activity was normal, the pronunciation was normal, the blood gas analysis index was normal, and the growth and development index was generally normal.

Conclusions

The treatment goal of CCHS patients is to ensure adequate ventilation during wakefulness and sleep. During treatment, can choose tracheotomy or non-invasive ventilation according to patients condition. Choosing the most appropriate treatment plan for different patients will help improve the quality of life of patients with LO-CCHS.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P64

Title
Sleep disturbances in children and adolescents with juvenile idiopathic arthritis - a cross-sectional and analytical study

Introduction
: Juvenile idiopathic arthritis (JIA) is one of the most common pediatric rheumatic diseases, comprising a group of chronic inflammatory childhood diseases of unknown etiology, with onset before the age of 16. Several studies found that children and adolescents with JIA had significantly more sleep disturbances when compared to healthy controls, mostly related to pain/disease control. The primary objective of this study was to analyze sleep duration in patients with JIA and compare it with recommendations (from Portuguese Sleep Association and Pediatric Portuguese Society) and secondary objective was to perceive their sleep quality using questionnaires and actigraphy. The final goal is determining the necessary diagnostic and subsequent therapeutic approaches that need to be implemented for better sleep in these patients.

Materials and Methods
A cross-sectional and analytical study of the quality and quantity of sleep was carried out in children aged 2 to 17 years with juvenile idiopathic arthritis, who attended outpatient pediatric rheumatology appointment from June 2022 to March 2023. Were excluded patients with other chronic disease, under medication which could interfere with sleep and with severe neurodevelopment problems. The following scales/questionnaires were used in the study: JADAS-27 (Juvenile Arthritis Disease Activity Score) to assess disease activity; for qualitative assessment of sleep CSHQ-PT (Children´s Sleep Health Questionnaire) and Pittsburgh Sleep Quality Index both adapted for Portuguese population, the last one the older patients. The patients underwent an objective sleep assessment - actigraphy - for 7 days, and these variables were evaluated: sleep latency, total duration of sleep, WASO, arousals. Statistical analysis was performed using IBM SPSS statistics v27.o, using Spearman's correlation coefficient, Wilcoxon test and Kruskall-Wallis test.

Results

We evaluated data from 22 patients aged between 2 and 17 years, median age 9,5 +/- 4,5years, 73% girls (16/22), 27% boys (8/22). About 60% (13/22) had positive questionnaires for sleep problems (18% with bedtime resistance, 27% with sleep anxiety, 22% with daytime sleepiness). In the analysis of the primary outcome, 8 patients were included (the ones who performed actigraphy), and it was found that median total sleep time (Med=491minutes) differed in a statistically significant manner from the median of the midpoint (Med=630 minutes) recommended for each age group. Sleep latency were normal in all except in one patient.

The association of disease activity (translated by JADAS-27) with total sleep time and WASO (wake after sleep onset -marker of sleep fragmentation) proved to be positive and moderate (rs= 0.552 and rs=0.561 respectively), but without statistical significance. No differences were identified between disease activity and sleep latency or arousals.

Conclusions

JIA patients had significant less duration of sleep than recommended for age. Most of them identified sleep disturbances in questionnaires. No significant relation was found between disease control and actigraphy parameters, namely sleep latency or sleep fragmentation, but this study had the limitation of having a small sample.

Inconsistent findings in the various evaluated parameters highlight a complex relationship between JIA and sleep, which deserves to be addressed in future longitudinal studies with a broader sample.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P74

Title
Sleep Quality: Potential Target to Better Understand Obesity and Cardiovascular Risk in Children?

Introduction
Obesity is a risk factor for developing atherosclerosis and cardiovascular disease (CVD)1 and short sleep duration has been associated with childhood adiposity.2 Sleep is a multidimensional construct and likely that other sleep-metrics, like sleep quality may in addition to sleep duration contribute to the relationship between sleep and obesity.

The aim of this analysis was to evaluate if healthy-weight and overweight children differ in sleep-quality by utilizing a simple method cardiopulmonary coupling (CPC) to calculate an FDA-cleared sleep quality index (SQI).

Materials and Methods
Post hoc CPC-analysis of polysomnography-data from two large prospective studies, the Childhood Adenotonsillectomy Trial (CHAT, n=960) and Cleveland Children's Sleep and Health Study (CCSH, n=491). Overweight was defined as Body Mass Index (BMI) >25.0.

Results
SQI is significanly higher in healthy-healthy weight (n=551,76.4%) compared to overweight (170, 23.6%) girls, 76.1 CI95% [75.0,77.0] vs. 70.5 CI95% [68.1, 72.8], p<0.001 and in healthy weight (n=592, 81.1%) compared to overweight (n=138, 18.9%) boys, 75.6 CI95% [74.5,76.7] vs. 65.9 CI95% [63.4, 68.4], p<0.001.

In subroup analysis based on age:

1) In children 5-10-years of age, SQI was higher in healthy-weight (n=395, 81.9%) compared to overweight (n=87, 18.1%) girls, SQI 77.4 CI95% [76.2,78.6] vs., 70.2 CI95% [66.6, 73.7] p<0.001 and in healthy-weight (n=434, 90.8%) compared to overweight (n=44, 9.2%) boys, 79.1 [77.9, 80.2] vs. 71.1 [66.6, 75.6]; p<0.001.

2) In adolescents 16-19-years of age, SQI did not differ significantly in healthy-weight (n=153, 64.0%) compared to overweight girls (n=86, 36.0%), 72.8 CI95% [70.9,74.5] vs., 70.5 CI95% [67.3, 73.7] p=0.202 or in healthy-weight (n=158, 62.7%) compared to overweight boys (n=94,37.7%), SQI 66.0 CI95% [63.9,68.0] vs., 63.5 CI95% [60.5, 66.5], p=0.162.

3) In adolescents, SQI is significantly lower in healthy-weight (-6.7, $p<0.001$) and overweight (-7.0, p=0.002) boys when compared to girls.

Regression analysis ($R2=0.14$, $F(3,1455)= 75.36$, $p<0.0001$) shows that for a unit increase BMI significantly affects SQI (beta=-0.44, $p<0.0001$).

Conclusions

Overweight was more prevalent during childhood in girls than boys and SQI significantly lower in overweight compared to healthy weight children. Prevalence of overweight increases into adulthood but the difference in SQI based on weight observed during childhood is not maintained. Adolescent boys have significantly lower SQI when compared to girls. The analysis does not address if compromised SQI increases risk of weight gain or if being overweight may compromise SQI.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P65

Title
A Prospective Study Evaluating Night-to-Night Variability in Sleep Apnea Severity in Young Children.

Introduction
Diagnosis of obstructive sleep apnea (OSA) is routinely based on single night sleep evaluation. However, data on whether one night of monitoring is sufficiently accurate to diagnose OSA in children is limited. This analysis was performed to evaluate night-to-night variability and possible misclassification in disease severity in a pediatric population comparing utilizing a single- and mult-night protocol.

Materials and Methods
Post-hoc analysis of prospective cross-sectional study evaluating prevalence of sleep apnea in healthy, population-based children aged 4-8-years (NCT05479201) residing in geographically defined area in Northern Europe (Akureyri, Iceland). After parental consent, participating children recorded their sleep for up to five-nights. A minimum of two-nights with duration of 4-hours was required for OSA diagnosis. Sleep was recorded with FDA-cleared K182618/CE-marked 2862 home sleep test, SleepImage®. Classification of OSA-severity was defined based on the apnea-hypopnea-index-3% (AHI3%)/hour of sleep as; no-OSA (AHI3% <2.0), mild-OSA (AHI3% 2.0-5.0), moderate-OSA (AHI3% 5.0-10.0) and severe-OSA (AHI3% >=10). The night with the highest AHI-number calculated was utilized for disease classification. Data was collected from August 2022 through June 15th, 2023. Participation was not compensated for.

Results
Included in the analysis is data from children with high-quality data of > 4-hours of continuous recordings of sleep over 2-nights (Group2Nights n=343) and 3-nights (Group3Nights n=200, 58.3%). In Group2Nights on night-1 167 out of 208 OSA cases identified on AHI on night-2 (80.3%), with 51 out of 73 in the moderate-severe category

identified on AHI on night-2 (69.9%). In Group3Nights on night-1 91 out of 130 OSA cases identified on AHI night-3 (70.0%) and 32 out of 43 (74.4%) in the moderate-severe category.

Conclusions

This study indicates that there is a clinically relevant night-to-night variabililty in AHI in young children which needs to be taken into accont when evaluating children suspected of pediatric OSA. As adding the third-night identified additional children with OSA indicates that recording more than two nights might add to accuracy of clinical decision on severity and appropriate therapy.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P66

Title
Volume-assured ventilation in children with Congenital Central Hypoventilation Syndrome

Introduction
Congenital central hypoventilation syndrome (CCHS) is a rare genetic condition affecting respiratory drive and needing assisted ventilation at least during sleep, most commonly with tracheostomy or mask ventilation. Ventilation requirements are higher during Quiet Sleep (QS or NREM) compared to Active Sleep (AS). This presents a challenge when ventilating with pressure-targeted modes, as it can result in hypoventilation during QS and over-ventilation in AS. Newer, volume-assured modes of ventilation can reduce this. We aimed to assess the effects on gas exchange in CCHS patients of changing from pressure-targeted to volume-assured ventilation.

Materials and Methods
We reviewed the records of all patients with CCHS managed in our unit in the last 5 years. Patients who had changed from pressure-targeted to volume-assured ventilation were identified for further analysis. Data were collected from the last sleep study prior to changing and the first sleep study after changing ventilation mode. Primary outcomes included peak carbon dioxide (CO2), CO2 nadir, percentage of total sleep time (%TST) CO2 >50mmHg, %TST CO2 <35mmHg, oxygen desaturation index 3% (ODI3%, d/hr) and oxygen saturation (SpO2) nadir. Differences between groups were analysed using a two-sided Wilcoxon Signed-Rank Test using R software. Subgroup analysis was performed for mask- and tracheostomy- ventilated patients.

Results
Of 20 patients with CCHS, 14 changed from pressure-targeted to volume-assured ventilation. Thirteen patients were included in analysis: 6 female, median age 9 years (range 2-18); one was excluded as sleep study data were unavailable. Ten of 13 patients had polyalanine repeat mutations.

Six of 13 changed from mask ventilation with ST or SIMV modes to intelligent volume assured pressure support via ResMed Stellar 150 ventilator. Seven of 13 changed from tracheostomy ventilation in ST mode to ST with safety VT via ResMed Astral 150 ventilator.

There was a significant reduction in peak CO2 when changing from pressure targeted mode (median (IQR) peak CO2 55.9 (53, 63.9) mmHg) to volume assured mode (median (IQR) peak CO2 47.6 (41.6,53.8) mmHg), p=0.02. ODI3% improved from 1.4 d/h (0.6, 2.7) to 0.3 d/h (0.2, 1.3); median difference 1.00 (0.50, 3.00), p<0.01). There was significant reduction in %TST CO2 >50mmHg in children using NIV although not in the overall cohort. %TST CO2 <35mmg was higher after changing to volume-assured ventilation. There was no difference in CO2 nadir in any analysis.

Conclusions

Use of volume-assured ventilation in children with CCHS has been reported in small numbers of children with severe genotypes. In our cohort, we have seen significant improvements in peak CO2 and ODI in children with CCHS ventilated with volume-assured modes. Volume-assured ventilation is a safe alternative to pressure-targeted ventilation for children with CCHS to help improve their gas exchange.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P67

Title
Adapting an insomnia intervention for adolescents with co-morbid mental health problems: A Delphi study

Introduction
Insomnia is highly prevalent in adolescents with poor mental health. Specifically, insomnia predicts onset of depression, limits treatment effectiveness, and predicts relapse. Despite this, insomnia is rarely assessed or treated in mental health services due to limited insomnia expertise and poor access to interventions. Developing a tailored, manualised approach to insomnia intervention, that could be delivered by healthcare staff working in mental health services, would increase access to insomnia treatment. Cognitive Behavioural Therapy is the recommended treatment for insomnia in adults (CBTi). However, in the absence of clear guidelines for adolescent insomnia intervention protocols, our aim was to inform the development of a CBTi protocol for adolescents with co-morbid mental health conditions.

Materials and Methods
This study utilised a modified Delphi technique to examine the appropriateness of an existing insomnia intervention (SIESTA), developed in a previous study as a school-based insomnia education programme for adolescents. The Delphi study explored intervention delivery and content to inform adaptations required for our target population. 18 international experts in adolescent mental health and/or behavioural sleep medicine were identified from literature searches and professional networks and invited to participate. Three iterative rounds of online questionnaires were conducted. Round 1 (R1) adopted an exploratory approach to gain qualitative feedback on the appropriateness of SIESTA for our target population. Round 2 (R2) was designed to follow-up on key issues that emerged from R1, combining both open and closed questions. The final round (R3) involved an evaluation of the amended materials, based on feedback from R1 and R2. Qualitative data was analysed using Thematic Analysis.

Results

In total, 7 experts completed R1, 5 completed R2 and 1 completed R3. In R1, four main themes emerged; (1) SIESTA is appropriate for younger adolescents with insomnia and anxiety/depression, although not appropriate for delayed sleep wake phase disorder, (2) content and design of SIESTA materials is appropriate but requires some adaptation, (3) proposed method of delivery is appropriate (i.e., in-person, by trained practitioner), and (4) parent/caregiver involvement is necessary for successful implementation. A questionnaire for R2 was disseminated to follow-up from R1, which confirmed that Sleep Restriction Therapy and Stimulus Control Therapy should be included in the intervention. In R3, the adapted intervention materials were disseminated and approved for delivery to adolescents with co-morbid mental health problems. The final protocol and materials include 4 sessions featuring all CBTi components, a manualised training package and intervention delivery materials (PowerPoints, workbook, delivery manual, parent/carer videos).

Conclusions

To our knowledge, this is the first study to utilise a Delphi technique to develop a CBTi intervention for adolescents with co-morbid mental health difficulties for delivery within mental health services.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P68

Title
Later ("Evening") Circadian Preference is Associated with Poorer Executive, Academic, and Attentional Functioning in Adolescents with and without ADHD

Introduction
Adolescents vary considerably in their circadian phase preference; those with greater "eveningness" (also known as "night owls") have later bedtimes, wake times, and peak arousal compared to those with greater "morningness." Prior research suggests that (a) greater eveningness is associated with worse academic, executive, and attentional functioning; and (b) adolescents with ADHD tend to be high in eveningness and to have deficits in these school-related constructs. However, few studies have examined circadian preference alongside two potential confounds – sleep duration and sleep quality – as predictors of daytime functioning, or whether the strength of associations differs across adolescents with and without ADHD.

Materials and Methods
Participants were 302 adolescents (Mage=13.17 years; 44.7% female; 81.8% White); approximately half (52%) had ADHD. A multi-method, multi-informant design was used. Specifically, adolescents reported on their circadian preference, school night sleep duration, and sleep quality. Adolescents provided ratings of their academic motivation (intrinsic, extrinsic, and amotivation) and were administered standardized achievement tests in reading and math. Adolescents and parents completed ratings of daily life executive functioning (behavioral, emotion, and cognitive regulation), and they and teachers also provided ratings of ADHD inattentive symptoms.

Results
Above and beyond sleep duration, sleep quality, and covariates (sex, family income, pubertal development, medication use), greater eveningness was uniquely associated with poorer academic, executive, and attentional functioning across most measures. Sleep quality was uniquely associated with a handful of outcomes, and sleep duration was not significantly

uniquely associated with any outcome in the regression analyses. ADHD status did not moderate effects.

Conclusions

This study provides compelling evidence that poorer academic, executive, and attentional functioning are more closely associated with greater eveningness than with sleep duration or quality in adolescents. Findings suggest that targeting circadian preference may be important to reduce these problems in adolescents, especially in clinical samples such as ADHD for whom academic, executive, and attentional difficulties are exceptionally common.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P69

Title
An Exploratory Study of Sleep and Behavior Problems Based on Sleep Arrangement in a Country with High Co-sleeping Rates

Introduction
Previous studies have shown that co-sleeping in young children is associated with sleep disturbance, but the findings regarding sleep arrangement and behavioral problems have been inconclusive. This study examines the prevalence of co-sleeping among Korean children and its association with sleep and behavior problems.

Materials and Methods
This study used a subsample from the Kids Cohort for Understanding of Internet Addiction Risk Factors in Early Childhood (K-CURE) Study, a larger prospective cohort study in South Korea. Participants were one of the children's parents (Mage=35.34 years, SD=3.64, female=99.35%). We used the second wave data as baseline, in addition to five consecutive follow-up assessment points measured one year apart. The mean age of the children (n=307) was 3.38 years (SD=.87) at baseline, and 50.51% were boys. Sleep problems were assessed using the Children's Sleep Habits Questionnaire (CSHQ) and behavioral problems were assessed using the Child Behavior Checklist (CBCL). Sleep arrangement was collected by one item of CSHQ (child sleeps with parents or siblings on the same bed) based on a 3-point Likert scale. Participants who responded 2 (sometimes; 2–4 times per week) or 3 (usually; 5–7 times per week) on this item were categorized as "co-sleeping". Children were divided into three groups based on their sleep arrangement over 6 time points: Continuous co-sleeping group (co-sleeping at all 6 time points), past co-sleeping group (those who had co-slept continuously and had stopped co-sleeping before the sixth time point), the intermittent co-sleeping group (those who co-slept intermittently at all time points). Those who never co-slept at any time points were excluded because of the small sample (n=2). One-way ANOVA was used to compare sleep and behavior problems among the three co-sleeping groups.

Results

During baseline, 95.77% (n=294) of children reported co-sleeping with their parents or siblings. There were 56.03% (n=172) in the continuous co-sleeping group, 19.22% (n=59) in the past co-sleeping group, and 24.76% (n=76) in the intermittent co-sleeping group. Based on a one-way ANOVA, total CSHQ score ($F(2, 304)=27.70$, $p=.000$), sleep anxiety subscale of CSHQ ($F(2, 160.26)=23.18$, $p=.000$), and total CBCL ($F(2, 304)=4.14$, $p=.017$) were significantly different among co-sleeping groups at the sixth time point. Duncan or Dunnett T3 post-hoc test results showed that children in the continuous co-sleeping group had more sleep and behavior problems than the other groups.

Conclusions

We investigated the prevalence of co-sleeping in Korean children from infancy to preschool age using longitudinal cohort data. Our results showed that continuous co-sleeping children had more sleep and behavior problems than past or intermittent co-sleeping children. While sleeping arrangements may differ by culture, it will be important to understand the implications of how it affects the child's sleep and behaviors.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P70

Title
The development of an online Māori-led sleep intervention on sleep, wellbeing and connection in Aotearoa New Zealand families: the Moemoeā MOST trial

Introduction
The creation of culturally relevant interventions is essential to improving access and outcomes for Māori (indigenous people of New Zealand). Moemoeā is a Māori-led, tikaka ritual-based, Multiphase Optimisation Strategy (MOST) sleep intervention. This presentation will outline the creation of three pou (components) which aimed to increase connection to Māori language, culture, and well-being as well as sleep.

Materials and Methods
Māori members of our team co-designed with whānau (families) and experts in mātauraka Māori (knowledge) using kaupapa Māori methods. The team undertook semi-structured interviews with experts and structured interviews with whānau using kaupapa Māori principles of: taonga tuku (passed down knowledge), ako (learning), utu (reciprocity) and aroha ki te takata (respect).

Results
Three pou (Rongo time, Uru time, Whanau support) were created and tested in a MOST factorial trial in 503 whānau across Aotearoa. Qualitative feedback to date shows that use of ritual rather than routine works in varied whānau contexts, and that our pou create a better sense of connection to living as Māori. This connection is a significant driver of good outcomes and removes the shame that whānau often experience as research participants in Western projects.

Conclusions
Whānau who have a strong sense of (honoka) connection felt validated in their use of ritual and mātauraka, while those who were less connected appreciated being able to grow their connection to the Māori world. Use of the western MOST trial design posed challenges as

everything is interconnected in Māori culture, but our decolonizing tools and measures were able to overcome much of this.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P71

Title
Exploring sleep disordered breathing in patients with SMA and DMD: A cohort retrospective study

Introduction
Sleep-disordered breathing (SDB) is prevalent among pediatric patients with neuromuscular disorders (NMD), like spinal muscular atrophy (SMA) and Duchenne muscular dystrophy (DMD), due to respiratory muscle weakness. Despite guidelines recommending polysomnography for assessing the need for noninvasive ventilation (NIV) in symptomatic NMD patients, evidence supporting this is limited, necessitating individualized patient evaluations. The study examines the efficacy of spirometry and polygraphy with transcutaneous capnography (PG+trCO2) in detecting SDB in these patients, highlighting the limitations of spirometry.

Materials and Methods
Retrospective cohort study conducted at the Children's Clinical University Hospital in Riga, Latvia. The study included patients treated between 2016 and 2023, who were diagnosed with either DMD or SMA. Demographic details and clinical data was obtained from medical records. This included age, gender, diagnosis, treatment history, and the presence of comorbid conditions. Analysis was conducted using IBM SPSS Statistics software, version 25.0.

Results
The study included 31 SMA and 41 DMD patients. PG+trCO2 was used in 36% of cases, identifying mild sleep-related respiratory disturbances in 42% of SMA and 38% of DMD patients. Severe obstructive sleep apnea was observed in 21% of SMA and 29% of DMD patients, with hypoventilation present in 16% of SMA and 19% of DMD patients.
Spirometry, used in 63% of the participants, showed normal pulmonary function in 38%, a restrictive breathing pattern in 47%, while 15% encountered challenges in understanding the spirometry procedure, which compromised the validity of their test results.
In 2 cases, PG+trCO2 detected respiratory complications where spirometry did not, leading to the initiation of NIV. The study also found a strong and statistically significant correlation

between motor function and all spirometry measures, but not with any of the PG+trCO2 measures.

Conclusions

Our study underscores the necessity of comprehensive respiratory assessments in NMD patients and advocates for integrating PG+trCO2 into routine diagnostics for early SDB detection. Implementing a "PG+trCO2 for All" policy could facilitate annual screenings, emphasizing the need for further research to optimize monitoring strategies.

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Presentation Day and Board Number
Saturday, April 27, 2024 | P75

Title
The impact of sleep on sensory processing and integration in autism

Introduction
Sensory processing and integration anomalies are considered one of the core symptoms of autism spectrum disorders. Similarly, sleep problems are also more present and significant in children with autism than in the general population. Moreover, both sensory profiles and sleep profiles are very different from each other within the same spectrum. In fact, sensory anomalies may take the form of both hypo- and hypersensitivities and may include different sensory modalities, while sleep problems can vary from difficulty falling asleep, frequent night-wakings, shorter sleep duration, restlessness during sleep, and so on. Both sensory and sleep problems may have a significant impact on the severity of the neurodevelopmental condition and the quality of life of the patient and his/her family. Moreover, a two-way correlation has been seen between sleep and sensory profiles in children with autism. Therefore, it is important to assess how different sleep problems can have an impact on sensory disorders, and therefore on the severity of these core symptoms, in children with autism.

The primary purpose of our work is to evaluate the different sleep and sensory profiles in preschool children with a diagnosis of autism spectrum disorder. The second aim is to correlate sleep problems with their different sensory profiles in order to understand how sleep affect them.

Materials and Methods
The study has been conducted on a sample of preschool children with a diagnosis of autism afferent to the UOC of Child Neuropsychiatry, Policlinico Umberto I (Rome, Italy).

We have collected data on sensory and sleep profiles from parent self-report, using respectively the SPM-P (Sensory Processing Measure-Preschool) and the SDSC (Sleep Disturbance Scale For Children), along with demographic features and data on their cognitive and linguistic level.

Results

The results suggest a preponderance of different sensory abnormalities and sleep problems in children with autism. In addition, the correlations between patterns of sleep disturbances and sensory problems were also significant.

Conclusions

The detection of a worsening of the core symptoms, in particular of sensory processing and integration problems, in children with autism who have concomitant sleep problems is especially important for its treatment implications. In fact, it is crucial to set a targeted treatment also on the sleep problems, because this could improve their sensory symptoms and therefore reduce the burden of the disease and make the child more receptive to other therapies underway.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P72

Title
Ventilator reported Apnoea Hypopnoea Index in predicting titration of CPAP pressure

Introduction
Modern ventilators provide information about respiratory indices during sleep, such as apnoea and hypopnoea index (AHI) using complex algorithms based on measurement of patient's airflow. These have previously been shown to correlate poorly with respiratory indices from a concurrent single night's sleep study. No studies have examined the value of ventilator-reported AHI over a longer period of usage at home. We aimed to review the correlation between ventilator-reported AHI and the need for up-titration of pressure during a subsequent sleep study, in patients using CPAP for obstructive sleep apnoea (OSA).

Materials and Methods
We identified patients who were using non-invasive CPAP for OSA in our current cohort. Patients using CPAP for reasons other than OSA and patients using Auto-CPAP were excluded. Only patients with good compliance (defined as median daily usage of ≥ 6 hours) were included. The results of their most recent cardiorespiratory sleep study on CPAP were analysed/reviewed specifically noting if the patient required up-titration of pressure overnight or not. Titration of pressure is done live by physiologists in our unit based on AASM criteria, independent of the ventilator download indices. Ventilator download with usage and AHI values were collated at the same time.

Results
Thirty-nine eligible patients were identified (9 females, median age = 10 years [IQR 7-14.5years]) and their data were analysed. Ventilator downloads spanned a median period of 234 days throughout the cohort (IQR=165,364 days). We compared the ventilator reported AHI values between the patients who required up-titration of pressures during the sleep study and the patients who did not (ie either stayed on the same pressure or pressure was reduced) using the Mann-Whitney U test. The patients requiring up-titration had higher ventilator-reported AHI (9.1ev/h vs 1.7ev/h, $p<0.01$). An AHI of >=5 ev/h had a sensitivity of 69%, specificity of 70%, positive predictive value of 61% and negative predictive value of 76%

for up-titration during the sleep study. An AHI of <2 ev/h had a negative predictive value of 93%.

Conclusions

This is the first study examining the relationship between ventilator-reported AHI over a long period of usage and the subsequent need for ventilation titration during a sleep study. AHI is significantly higher for patients who required increase in pressure during the sleep study to control their OSA. Ventilator-reported AHI alone is not specific enough to be used for clinical decision making in CPAP titration. However, it can be a useful adjunct to history and clinical examination when reviewing patients on CPAP for OSA in an outpatient setting, to decide about timing of their next titration sleep study. Combining ventilator reported AHI with Oxygen Desaturation Index from an overnight oximetry may further improve specificity in predicting up-titration during the study.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P73

Title
DRIFT-OFF Diabetes Related Insomnia in Families and Teenagers - Optimising control and Facing Fears

Introduction
Type 1 diabetes mellitus (T1D) is a chronic condition that occurs when the pancreas makes little to no insulin, thereby causing raised levels of blood glucose. It is the third most prevalent severe chronic disease among youth. Sleep disturbances are common in people with T1D due to symptoms of high or low blood glucose levels, anxiety around glucose levels and monitoring throughout the night. Sleep and glycaemic control demonstrate a bidirectional relationship, with poor sleep leading to worse glycaemic control, and worse glycaemic control adversely affecting sleep. Anxiety around diabetes control is exacerbated by the dead-in-bed syndrome where sudden death occurs in young diabetic patients thought to be related to nocturnal hypoglycaemia, and the catalogue of adverse health consequences associated with hyperglycaemia. The aims of this study were to explore the nature and frequency of sleep difficulties in children/adolescents with T1D and their parents/caregivers, and the relationship between disordered sleep and metabolic outcomes, to guide optimal sleep advice for individuals and families affected by T1D.

Materials and Methods
This mixed methods, exploratory study, used baseline sleep questionnaires, hypoglycemia fear surveys, parental stress survey, 7-day sleep diaries and the three most recent glycated hemoglobin levels (HbA1C). HbA1C is an indicator of average blood sugar levels for the previous three months. Sleep diaries were chosen to capture reasons for bed times and waking overnight, including recording blood glucose levels at those times. Children/adolescents attending a tertiary diabetes clinic aged 5 years, 0 months to 17 years 11 months and a co-resident parent, were invited to participate in the study. Inclusion criteria were having a diagnosis of T1D for at least one year and sufficient English proficiency to provide consent and complete questionnaires. Exclusion criteria included children/adolescents with nocturnal seizures (> 1 per month) and children/adolescents with a

history of a severe hypoglycaemic episode (a glucose less than 3.9mmol that required external assistance to treat) within the past 6 months.

Results

Eighteen dyads (36 participants) consented to be in the study and completed all questionnaires and at least one diary night. Participants were 9 boys and 9 girls ranging in age from 7 to 17 years (mean 11.8, median 12 years) and the majority were white and used an insulin pump (14 and 15 respectively). Two parents were fathers. Sleep quantity and quality were compromised with duration being at the lower end or below recommended levels, and frequent night awakenings. Later sleep onset was associated with low blood sugar at bedtime. An inverse U-relationship was seen with tight glycaemic control and least good glycaemic control both associated with shorter total sleep times. Parents often sacrificed their own sleep to try and optimise their child's sleep and experienced high levels of stress.

Conclusions

Promoting healthy sleep is an important public health measure, especially in children/adolescents with diabetes who are already at increased risk of adverse physical and mental health outcomes. Optimising parents' sleep may help them cope with the increased stresses and demands of supporting their child with a chronic health condition. Balancing glycaemic control with quality sleep is likely to yield the most positive health outcomes for both child and parent.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P74

Title
Novel Subtypes of Infantile Prader-Willi Syndrome using Brain Connectivity on Overnight Polysomnography

Introduction
Prader-Willi syndrome (PWS) is a complex genetic disorder characterized by hypotonia and feeding difficulties in infancy, growth hormone deficiency, hypogonadism, behavioral problems, cognitive impairment, hyperphagia leading to obesity, and a high prevalence of obstructive sleep apnea syndrome (OSAS) in early childhood. Although there had been many studies on genetic subtyping of PWS, there is still no subtyping study in terms of sleep disorders. The authors conducted this preliminary study to identify new subtypes based on the brain connectivity shown in overnight polysomnography (PSG) in infantile PWS before growth hormone therapy.

Materials and Methods
The 6-channel sleep electroencephalography (EEG) and PSG parameters of infantile PWS patients who were evaluated for OSAS was collected. Imaginary coherence between each channel is calculated for each frequency band (delta [0.5-4.0 Hz], theta [4.0-8.0 Hz], alpha [8.0-12.0 Hz], sigma [12.0-16.0 Hz], beta [16.0-30.0 Hz], gamma [30.0-50.0 Hz]). Average clustering coefficient of EEG data was calculated through graph theory analysis after principal component analysis (PCA), and then k-means clustering was performed.

Results
Total of 7 patients were included for the analysis. Median age was 5 months old (3-9 months). Median body mass index 14.8 (12.4 – 16.7). All patients had hypotonia and global developmental delay. Median obstructive apnea hypopnea index (AHI) was 0 (range 0 – 0.9) and median central AHI was 1.5 (range 0-7.4). K-means clustering was conducted using 2 principal components from 6 variables. The 2 clusters model showed the best average silhouette index (0.24). There was no difference in PSG parameters between the two groups.

Conclusions

In this preliminary study, we found two subtypes in infantile PWS population through graph theory analysis of 6-channel sleep EEG. Follow up of PSG parameters and neurodevelopmental outcome is warranted for further study.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P75

Title
Sleep Habits of Patients with Congenital Cardiac Problems : Preconception Care Interview

Introduction
Patients with congenital cardiac problems may need to consider their risk of pregnancy in adolescence. Preconception care plays an important role in assisting the patients to think about the partnership and future pregnancy under their medical condition. Having a healthy lifestyle is also beneficial among these patients, but importance of good sleep habits has not been emphasized in this context. The aim of the study was to elucidate sleep habit of young patients with congenital cardiac problems.

Materials and Methods
Ninety patients who consult pediatric outpatient clinic at Ehime University Hospital were invited for preconception care interview. Patients were interviewed by expert midwives about their daily life under their health condition and concern about partnership or having a baby in the future. Sleep habit was analyzed for bedtime and waketime on weekdays and weekends, and subjective feelings about their sleep. Fifty seven patients (mean age 20.4 SD 7.4, 55 females) who answered full for the sleep habit parameters were included in the analysis.

Results
Bedtime was earlier on weekdays (23:12 SD 1:23) than on weekends (23:29 SD 1:31). Waketime was earlier on weekdays (6:47 SD 1:02) than on weekends (8:30 SD 1:36). Estimated sleep duration was longer on weekends (9:01 SD 1:55 hours) than on weekdays (7:34 SD 1:12 hours) . Difference of sleep duration between weekend and weekday was 1:26 SD 1:45 hours. Patients complained of difficulty initiating sleep in 17%, nocturnal awakenings in 40% and unrefreshed sleep in 9%. Restriction of exercise due to the cardiac problems was indicated in 33% of the patients. Concerns about future partnership and pregnancy was expressed in 16% of patients, but they were not related to sleep problems.

Conclusions

Sleep problems among patients with congenital cardiac problems were identified. Additional survey with large number of patients is needed to elucidate the relationship among sleep problems, anxiety to their disease condition and future pregnancy.

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Presentation Day and Board Number
Sunday, April 28, 2024 | P76

Title
Differentiating Primary Snoring from mild Obstructive Sleep Apnea: How useful is overnight oximetry?

Introduction
Background
Though oximetry has been suggested as a useful investigation in evaluating children with suspected Obstructive Sleep Apnea (OSA), the optimal cut-off values of oximetry indices for differentiating Primary Snoring (PS) from OSA, in particular mild OSA, remains unclear.

Aim
The aim was to determine the diagnostic test accuracy of overnight oximetry indices in differentiating PS from mild OSA compared to the gold standard polysomnography (PSG), in children with habitual snoring.

Materials and Methods
In this retrospective study, we collected clinical, polysomnographic and overnight oximetry data of children aged 1-18 years with habitual snoring who underwent PSG between January 2014 to October 2017, at KK Women's and Children's Hospital, Singapore. Children with a PSG confirmed diagnosis of PS and mild OSA were included. Patients with Down syndrome, craniofacial anomalies, known genetic syndromes, neuromuscular conditions, central apnea index ≥5 and moderate-severe OSA were excluded. Oximetry indices extracted from the overnight PSG included oxygen desaturation index (ODI3, defined as the number of ≥3% desaturation episodes per hour of sleep), SpO2 nadir (lowest value of SpO2 recorded during sleep) and the proportion of sleep time spent with SpO2 85-94% and SpO2 <85%. The optimal cut-off values were determined using ROC curves.

Results
Of 652 children (mean [SD] age = 9.14 ± 3.81 years, 64.9% males), 530 (81.3%) had mild OSA and 122 (18.7%) had PS. Among the oximetry indices, ROC analysis showed ODI3 to have the

largest area under curve of 0.763. ODI3 cut-off of >2.0 achieved 71.5% sensitivity, 70.5% specificity, 90.6% PPV and 38.2% NPV in differentiating PS from mild OSA. There was a significant positive correlation between ODI3 and both Obstructive Apnea Hypopnea Index ($r = 0.682$; $p < 0.05$) and Respiratory Arousal Index ($r = 0.408$, $p < 0.05$).

Conclusions

This study provides optimal cut-off values for ODI3 in differentiating PS from mild OSA in children with habitual snoring and suspected OSA. As ODI3 can be derived easily from overnight oximetry study; which is cheaper and widely available; it has the potential to be incorporated into cost-effective clinical decision making algorithms.