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A brief parent-based intervention to improve sleep for children with attention deficit hyperactivity disorder

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Final Report HCPS (Project No.: 30160604) Contents

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We would like to dedicate this report to all the participants. The project could not have succeeded without their cooperation and participation. We also would like to thank the Health and Medical Research Fund (Health Care & Promotion Scheme) for providing the grant support.

Summary

Project title: A brief parent-based intervention to improve sleep for children with attention deficit hyperactivity disorder

Aim and Objectives: 1) To improve sleep problems, and daytime symptoms and functioning in children with ADHD through a brief parent-based intervention; 2) To evaluate whether this programme is helpful for parents of ADHD children to learn ways of managing their child's sleep problems and whether it is effective in improving parental distress.

Project Plan: The programme involved two one-to-one consultation sessions and one telephone follow-up with the trained clinicians, during which parents were provided with sleep education and behavioural strategies of managing their child's sleep problems. All the study participants were assessed at baseline, 2-week post intervention, and 3-month post intervention.

Target Group: Children aged 5-12 years with ADHD and parent-reported sleep problems

Expected and Actual Outcome/Response: Sixty eligible families were recruited and 43 (72%) completed the intervention. There was a significant improvement in the child's sleep after the intervention. In addition, the programme resulted in a significant improvement in the child's daytime behaviours, particularly attention problems and externalizing symptoms at 3-month follow-up. There was no significant change in parental stress after intervention. Families participated in this programme provided high satisfaction ratings after intervention.

Benefits Derived: Participating ADHD children benefited from this programme with improved sleep and daytime behaviours (externalizing symptoms and attention problems).

Extent of Objectives Achieved: This project achieved both objective 1 and 2 by providing an efficacious parent-based sleep-focused intervention to children with ADHD and comorbid sleep problems.

Conclusions/Implications: This brief parent-based behavioural sleep intervention is effective in ADHD children with sleep problems, resulting in a significant improvement in clinical outcomes and high parental satisfaction. Our findings supported the feasibility, acceptability and efficacy of a parent-based behavioural sleep intervention for children with ADHD and comorbid sleep problems.

Introduction

Attention deficit hyperactivity disorder (ADHD) is the most common neuropsychiatric disorder with childhood onset, ¹ affecting approximately 5% of children and adolescents worldwide,² and 3.9% in Hong Kong.³ It is characterized by the impairments associated with inattention, impulsivity, and/or hyperactivity. At least one comorbid psychiatric disorder is present in 87% of children with ADHD.⁴ Among the array of comorbidities, sleep problems and the associated impairments have long been recognized as one of the most common issues. Sleep problems have been reported in 25-73% of children with ADHD.⁵⁻⁷ In the studies based on the subjective report, up to 50% of the parents have noted sleep difficulties in their child with ADHD. Local data also indicated that non-medicated ADHD children experienced significantly more sleep difficulties than normally developing children.⁶ Despite the high prevalence of sleep problems found in children with ADHD, there is no specific guideline for the management of insomnia in this population.⁸ Hence, there is an imperative need to explore effective sleep intervention in the context of the routine clinical management of ADHD.

Impacts of sleep problems in ADHD children

The impacts of sleep problems on ADHD children can be far-reaching. Presence of sleep problems ranging from mild to severe predicts lower psychosocial functioning even after controlling for other potential confounders, including demographic characteristics, comorbidities, and severity of ADHD symptoms.⁹ Moderate-to-severe sleep problems are strongly associated with the severity of ADHD symptoms and impaired physical wellbeing of the child.⁷ Furthermore, due to the high prevalence of comorbidity in ADHD, sleep problems in ADHD may also be associated with comorbid externalizing or internalizing problems.

Moreover, parents with an ADHD child with comorbid sleep problems are 2.7 times more likely to be clinically depressed, stressed, or anxious.⁶

Sleep-focused treatments for sleep problems in ADHD

Several factors may underlie the complex and multidirectional relationship between sleep and ADHD, in which poor sleep hygiene has been found to be a significant contributor. A previous study has shown that sleep problems in ADHD are generally behavioural in nature, primarily occurring at or around sleep onset.⁷ Behavioural interventions have been found to be effective in managing sleep problems in children in the general population,¹⁰ as well as in children with special needs (e.g. those with neurodevelopmental disorders).¹¹⁻¹³ A few studies conducted in the Caucasian populations reported positive results following sleep-focused intervention in ADHD children experiencing sleep problems.¹⁴ However, there were some limitations in these studies, including small sample size,¹⁵ and use of relatively brief measures for assessing the changes of behavioural and emotional symptoms.¹⁶ In addition, it remained inclusive whether the treatment effect could sustain over time. Hence, there are both theoretical and pragmatic needs to evaluate the efficacy of parent-based behavioural sleep intervention in the local context.

In this proposal, we aimed to conduct an intervention programme for the families with a child (aged 5-12) with ADHD and comorbid sleep problem. Eligible families were recruited from the local community and child psychiatric service. The changes of the child's sleep and daytime behaviours were considered as the performance indicators of this programme. We expected that this parent-based behavioural sleep intervention would improve sleep in children with ADHD, which in turn could improve the child's daytime behaviours.

Aim and Objectives

The aim of this project was to support and provide parents with the necessary knowledge and skills in dealing with specific sleep problems encountered by children with ADHD through a brief parent-based intervention. The project objectives included: 1) to improve sleep problems, and daytime symptoms and functioning in children with ADHD through a brief parent-based intervention; 2) to evaluate whether this brief parent-based intervention programme was helpful for parents of ADHD children to learn ways of managing their child's sleep problems and whether it was effective in improving parental distress.

Project Plan

Study participants & procedure

Participants were recruited from three channels. 1) Families with an ADHD child attending the local child and adolescent psychiatric service clinic of Alice Ho Miu Ling Nethersole Hospital who met the inclusion criteria were invited to take part in the study by the attending psychiatrists. Community samples were recruited 2) by sending invitation letters to the teachers in charge of coordinating services to cater students with special educational needs in the local schools, and 3) by approaching the parental self-help groups and non-governmental organizations (see the example of advertising poster in Appendix 1). Ethical approval was obtained from the Human Research Ethics Committee (Reference no: EA1903023) at the University of Hong Kong and Joint Chinese University of Hong Kong-New Territories East Cluster Clinical Research Ethics Committee (Reference no: 2016.549).

As this study aimed at targeting sleep problems despite adequate pharmacotherapy to control ADHD symptoms, the usual prescribed medications such as Ritalin, Strattera and Concerta were allowed during the study period.

- The potential interested parents were contacted via phone to undergo a brief assessment to ascertain the presence and severity of sleep problems of their child. Taking reference from the study conducted by Sung, Hiscock & Sciberras,⁷ parents were asked in the phone screening interview whether their child had experienced sleep problems, such as difficulty initiating and/or maintaining sleep, waking earlier than desired, and bedtime resistance, in the past four weeks. If affirmative, they were asked to rate the severity of the problem as mild, moderate, or severe. Families that reported their child had moderate to severe sleep problems were subsequently invited to a face-to-face clinical interview.
- Further face-to-face semi-structured clinical interview was conducted with the parent(s):
 (1) to ascertain the diagnosis of ADHD and to screen for any comorbidities presented in their child using the Diagnostic Interview Schedule for Children Version-IV (DISC-IV), and (2) to introduce the programme to the parents. For those eligible families, they were asked to complete a battery of questionnaires on their child's sleep, ADHD symptoms and functioning as well as parental stress.
- All the participating families provided informed consents for taking part in this study.
- Throughout the study, the families continued their regular clinical follow-ups for the prescription of medication for ADHD. The parents were advised not to cease the medication or change the types and doses of their children's medication unless it was upon their psychiatrists' advice.
- All the study participants were assessed at baseline, at 2-week post intervention, and at 3-month follow-up.

Interventions

Trial interventions were provided by the trained clinicians at the child psychiatric clinic of Alice Ho Miu Ling Nethersole Hospital and the Sleep Research Clinic and Laboratory of the University of Hong Kong. Both intervention locations were available upon the participants' preference. The intervention involved two fortnightly face-to-face individual consultation sessions and one telephone follow-up.

The first session (1.5 hours) provided to the parents involved: (1) a thorough assessment of the nature of the child's sleep problem, followed by (2) the provision of sleep-related psycho-education about normal sleep based on the child's developmental level, sleep hygiene, specific strategies to tackle the problematic sleep-related behaviours in children, and (3) collaborative goal setting and the development of management plan tailored to the child's sleep problem for the next two weeks. The goals of the intervention were to address parent's primary concerns about their child's sleep and might include the components such as reducing bedtime resistance, co-sleeping, sleep latency, duration of night-time wakings, difficulties in waking up, as well as optimising sleep duration, depending on the child's presentation of the sleep problems.¹⁷ Examples of the strategies used in the programme included *bedtime fading* for managing delayed sleep onset, which consisted of temporarily setting the child's bedtime later and then gradually bringing it forward whilst keeping a fixed rise time. Parents were also asked to complete a sleep diary to monitor their child's sleep patterns in the subsequent two weeks. The second session (45 mins) involved a review of the sleep diary and a reinforcement of learned strategies, and focused on problem-solving to tackle any issues that have emerged from implementing the behavioural strategies at home. Written materials were also distributed to the parents who participated in this intervention programme. The materials included the psychoeducation about normal sleep in children, and the tips about healthy sleep hygiene

practices and a summary of specific strategies for managing sleep problems in children with ADHD (see Appendix 1 for the example of the educational booklet distributed to the parents). Each face-to-face session was video-taped with the consent of the families to ensure that the consultations delivered have adhered to the protocol and information provided was accurate and clear. A follow-up phone call was made two weeks after the second consultation session to provide the parents with an opportunity to ask any further questions and to consolidate learned strategies and further troubleshoot.

Measurements

Children's Sleep Habits Questionnaire (CSHQ) – Parent-report ¹⁸

CSHQ is a validated 50-item parent-report measure of difficulties initiating and maintaining sleep over past week in children of age 4-12 (Cronbach's Alpha = 0.79). The CSHQ yields both a total score and eight subscale scores, including bedtime behavior, sleep onset, sleep duration, anxiety around sleep, night wakings, parasomnias, sleep-disordered breathing, and daytime sleepiness. Items are rated on a three-point scale from "rarely" to "usually," and scores range from 33 to 99 for the total score. The validated Chinese version of this scale was used in this project.¹⁹ A total sleep disturbance score on CSHQ greater than 41 was adopted as the cut off for identifying children with clinical sleep problems according to the previous research.

Strengths and Weaknesses of ADHD Symptoms (SWAN) – Parent-report

The Chinese version of SWAN rating scale is an 18-item questionnaire for the assessment of ADHD symptoms, validated locally for the Chinese children in Hong Kong.²⁰ Parents are asked to compare the child's inattention and hyperactivity behaviours with the children of the same age using a 7-point scale. Scores range from -3 (far better than peers) to +3 (far worse

than peers), with 0 denoting average behaviours. The scale has been shown to have excellent internal consistency (Cronbach's Alpha = 0.90), good test-retest reliability, and good discriminant validity in differentiating ADHD clinic sample from the community sample.

Children Behaviour Checklist (CBCL) – Parent-report

CBCL is a validated 118-item measure assessing children's emotional and behavioural problems including eight syndromes (i.e., aggressive behaviour, anxious/depressed, attention problems, rule-breaking behaviour, social problems, somatic complaints, thought problems, and withdrawn/depressed) and two factors (i.e., internalizing and externalizing problems).²¹ The validated Chinese version of CBCL was used.²²

Parental Stress Index – Short Form (PSI-SF)

PSI-SF is a validated 36-item measure designed to assess parental distress, parent-child dysfunctional interaction, and difficult child (Cronbach's Alpha = 0.81).²³ The Chinese version of PSI-SF was used in this project.²⁴

Other measures

A brief questionnaire was used to collect socio-demographic information about the child and his/her family, such as parental educational level and occupational status, and monthly family income. An evaluation survey designed specifically for this project was used to collect qualitative feedback from the parents on their perceived usefulness of the intervention (see Appendix 3).

Target Group

Families with a child who met the following study criteria were recruited into this study:

Inclusion criteria:

- 1. Aged 5-12 years old;
- With a diagnosis of ADHD (any subtype) as ascertained by Diagnostic Interview Schedule for Children Version IV (DISC-IV);
- 3. With parent-reported sleep problems.

Exclusion criteria:

- 1. Children with a serious medical condition (e.g. severe cerebral palsy) or intellectual disability (IQ<70);
- Children with a neurological and/or medical condition that may lead to disordered sleep;
- 3. Children who are already receiving specialized help for their sleep from a psychologist or at a specialized sleep clinic;
- Suspected clinical sleep disorders (e.g. obstructive sleep apnea, OSA) that may potentially contribute to a disruption in sleep continuity and quality, as assessed by the Children's Sleep Habits Questionnaire (CSHQ).

Statistical Analysis

Sample size calculation

The primary outcome in this project was the parental report of the child's sleep (e.g. as measured by CSHQ). A previous study on the parent-based sleep intervention has reported an effect size of 0.6 based on the measure of CSHQ at 6-month follow-up.²⁵ This would require 39 families in order to achieve 95% power at the two-sided 5% level of significance. To allow for 35% loss to follow-up, our planned sample size was 60 families.

The primary outcomes were CSHQ (the severity of child's sleep symptoms based on parental report, as a measure of intervention efficacy), SWAN and CBCL. Secondary outcomes included PSI-SF and the parents' qualitative feedback about the programme. Chi-square analysis and independent t-test were used to compare baseline characteristics between the families who completed the intervention and those dropouts. Treatment effect on the outcome variables were analysed using repeated-measures analysis of variance (ANOVA). Post hoc Bonferroni analyses were performed for all the measures when significant within-group differences were found. Cohen's *d* was used to calculate the effect size. A Cohen's *d* of 0.2 indicates a small effect, d = 0.5 indicates a medium effect, and d = 0.8 indicates a large effect size. All the tests were based on a 0.05 level of significance. All the statistical analyses were performed using Statistical Package System Software (SPSS) Version 24.0.

Outcome/Response

A total of 75 families that met the study criteria were recruited into this study. Figure 1 shows the flowchart of the study. Fifteen participants dropped out after baseline assessment due to various reasons (e.g. too busy to attend the treatment sessions due to other commitments, changed mind/no longer interested in the programme). A total of 60 families received the intervention, in which 43 (72%) completed the whole intervention programme (two face-to-face consultation sessions + one telephone follow-up consultation). Of 43 families who completed the intervention, 38 completed the post-treatment 2-week follow-up assessment and 27 completed the 3-month follow-up assessment. Baseline characteristics of the sample are detailed in Table 1. There were no significant differences in age, gender, baseline CSHQ total disturbance score between child participants who completed the intervention and those who did not (Table 2).

Child's sleep and psychopathology outcome measures and parental stress measure are shown in Table 3. Pairwise comparisons of child's sleep and daytime behaviours and parental stress between baseline, post-intervention and follow-up are presented in Table 4. The results of repeated-measures ANOVA showed that there was a significant change in CSHQ total disturbance score (p<0.001), where CSHQ total disturbance score was significantly reduced from baseline to post-intervention assessment (Cohen's d = 0.74), whilst there was no significant difference between post-intervention and 3-month follow-up. In terms of CSHQ subscales, sleep onset delay, sleep duration and parasomnias all showed significant reduction after intervention (p<0.001, p=0.02, and p<0.001 respectively), and the improvements of sleep onset delay and sleep duration were maintained at the 3-month follow-up as compared to baseline (p=0.01 and p=0.02, respectively).

Whilst there was no significant difference in the CBCL total score between baseline and post-intervention (p=0.228), the CBCL total score decreased significantly at 3-month follow-up (mean \pm SD: 60 \pm 11.62) compared to baseline (64.73 \pm 8.8), p=0.008, Cohen's d = 0.41. The scores for attention problem and externalizing symptoms as measured by CBCL also decreased significantly at 3-month follow-up compared to baseline (p=0.02 and p=0.022. respectively). Whilst there was a trend improvement in PSI score, the differences between the three assessment timepoints did not reach a statistical significance.

In the current study, treatment completion rate was 72%, as compared to the typically reported completion rate (<66%) for face-to-face interventions for children with mental health problems.²⁶ Families were asked for feedback at the post-intervention assessment by responding to thirteen questions specifically designed to evaluate the programme. Items 1 to 4 on sleep-specific outcomes were rated on a scale from 1 (strongly agree) to 5 (strongly disagree). Items 5 to 7 on intervention design were rated on a scale from 1 to 5, with 1

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representing "too much/long", 3 representing "just right", and 5 representing "too little/short". Items 8 to 13 on intervention content, their own participation level, and their general satisfaction were rated on a scale from 1 (strongly agree) to 5 (strongly disagree). Descriptive statistics presented in Table 5 indicated that families generally provided high satisfaction ratings towards the programme. Parents also responded to three open-ended questions; representative responses are included in Table 5.

Discussion

This study examined the effects of a brief parent-based sleep intervention on ADHD children's sleep, daytime symptoms and daily functioning, as well as parental stress. The intervention resulted in an improvement in sleep symptoms, such as sleep onset delay as well as sleep duration in children with ADHD. These improvements were noted at post-intervention and were maintained at follow-up (3 months after intervention). In terms of child psychopathology, externalizing symptoms (i.e., behaviours) and attention problems were found to be significantly improved three months after intervention. As for parents, their stress symptoms were not significantly reduced, albeit a trend for improvement following intervention.

Our study showed that a parent-based behavioural intervention is effective in improving sleep problems in children with ADHD, which were in line with the previous research. For instance, Keshavarzi et al.¹⁶ delivered a 12-week sleep-training program to ADHD children aged 8–13 years, and found that such an intervention led to a significant improvement in parent-reported sleep, psychological functioning, and social relationship with family and peers in children with ADHD. Our results showed that the effect sizes for the improvements of sleep were medium to large, and were comparable to those from previous studies on the behavioural intervention for insomnia in school-aged children with ADHD (e.g. Corkum et al.¹⁵). In particular, our

results showed that the intervention improved parent-reported sleep onset latency and sleep duration in ADHD children, and the treatment effects were durable at 3-month follow-up. These findings suggested that this brief parent-based behavioral sleep intervention could be a promising approach to improve sleep with sustained effects over time in children with ADHD.

Beyond the sleep outcomes, the intervention also led to a significant improvement in the child's daytime symptoms, particularly externalizing behaviours and attention problems, both with small-to-medium effect size. In a previous randomized controlled trial of a sleep intervention programme delivered using a distance delivery model (via written manual with weekly telephone support) for parents of school-aged children with and without ADHD, not only sleep problems but also psychosocial functioning in terms of both internalizing and externalizing were found to improve after the intervention and at 6-month follow-up.¹⁵ Taken together, the current findings provided some evidence to support the hypothesis that daytime symptoms and behavioural problems could be ameliorated in ADHD children via improving their sleep. Nonetheless, a longer-term follow-up may be needed to further investigate the effect on the changes of psychopathological symptoms in relation to sleep in ADHD children.

Our study also supported the feasibility and acceptability of a brief parent-based intervention for sleep problems in ADHD children. For the sleep-specific outcomes, parents generally agreed that the programme improved their sleep knowledge, increased their understanding about how to handle their child's sleep problems, and improved their child's sleep as well as their own sleep. Parents also agreed that the length, frequency and content of the intervention sessions were acceptable, with a high rate of overall satisfaction. Most of the parents were willing to recommend this intervention programme to others and were willing to participate in the similar studies in future. The feasibility of this intervention was also supported by the

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satisfactory completion rate, with 72% participants completing the overall intervention programme.

Nonetheless, the response rate at 3-month follow-up assessment was modest (45%), which was consistent with the figures reported in the previous studies of similar kind (e.g. face-to-face psychosocial interventions in children). For example, the response rate in some studies was as low as 30%.²⁷⁻³⁰ As such, the findings on the sleep problems and daytime problems in ADHD children at 3-month follow-up should be interpreted with cautions as it is possible that those parents who were more engaged with the project were more likely to return for the 3-month follow-up assessment. There may be some reasons for the low response rate at 3-month follow-up. All the assessments at baseline, at post-intervention, and at 3-month follow-up were administered face-to-face in this project. It is possible that some participants who have completed the intervention might consider completing additional face-to-face assessment at 3-month follow-up as redundant. It is recommended that future similar projects consider conducting the project evaluation by non-face-to-face means so as to facilitate families' participation and increase response rate (e.g. through phone calls, online questionnaires, or mobile phone APP). In addition, the psychosocial problems among ADHD children and the parents' concurrent commitments for their child (e.g. taking their child for other appointments) may have affected the adherence for the parents to complete the follow-up of the project. Some proactive strategies to enhance participant adherence are recommended for the future studies, including between-session communication via different means (e.g. telephone calls, email and text reminders), motivational enhancement therapies (e.g. pre-treatment motivational interviewing), and ongoing therapeutic support (e.g. timely problem solving and encouragement). Further research with modified project plan may be needed to investigate the effects of this brief parent-based intervention on the changes of psychopathological symptoms in the long-term.

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The strengths of this study included the generalizability of the results in the clinical settings, because ADHD children were recruited into this study regardless of their comorbidities and concurrent prescription of the ADHD medication. The sample characteristics of this study reflected the range of children presented to the child psychiatric clinic as well as in the local community. In addition, the ADHD diagnosis was stringently assessed and confirmed by a validated structured interview. Moreover, validated measures were used for child and parental outcomes.

To summarise, this brief parent-based intervention enhanced parents' and child's awareness of healthy sleep and lifestyles, by providing psychoeducation about sleep science, including the information about the basic physiology of sleep and normal development of sleep across the lifespan, especially in children, as well as the information about healthy sleep habits. Moreover, this project provided the participating families with the knowledge of good sleep hygiene practices (e.g. regular sleep schedule, consistent bedtime routine), and empowered the parents and equipped them with different strategies to manage their child's sleep problems (e.g. bedtime fading, stimulus control), with the aims to help them to change maladaptive sleep behaviours, and adopt healthy sleep practices and lifestyle. To this end, the participating families were generally found to have benefited from this project with increased sleep knowledge in parents and improvement in sleep as well as daytime behaviours and functioning in their child.

Implications for future research

Different formats of intervention may be considered in the future studies to improve treatment uptake and the efficiency of treatment delivery. As Corkum¹⁵ has argued, traditional approaches to service delivery are time-consuming for both health professionals and parents. Parents in this study have also suggested that scheduling conflicts and travel distance from home are important factors that influenced their overall satisfaction with an intervention, especially given their children's tight schedules with heavy academic workload, multiple appointments and extra-curricular activities. In such cases, a web- or phone-based intervention could be considered. Additionally, if this intervention was to be implemented on a larger scale, the efficacy of a group-based intervention format could be tested as a way to shorten waiting lists and reduce costs.

Another area to be considered for future research is the family dynamics and relationships in ADHD children. Family dynamics and relationships are important factors that could have an impact on one's sleep and mental health throughout the lifespan, particularly during childhood and adolescence.³¹ Troubled family relationships may result in significant distress in children and have been linked to a variety of difficulties including impaired social and cognitive functioning that could further influence the child's sleep.³² A possible area of future research work is to explore the association of sleep and mental health with environmental and family factors in ADHD children.

Limitations

Several limitations should be considered when interpreting the findings. First, although 72% of the participants (43/60) completed the intervention, the follow-up rate at the post-treatment 3-month was modest (45%). Lost to follow-up could potentially bias the outcome evaluation in this study, making it difficult to have an unbiased estimate of the long-term treatment effects. As mentioned above, there is a need to consider various strategies to improve follow-up rate in

future studies. Second, the sample size was moderate, which limited our power to run sub-group analyses. For example, whether certain sub-group of participants with particular characteristics (e.g. younger, more severe insomnia) were more likely to respond to this treatment remained untested. Third, there was a lack of a control group for comparison, which limited our current analysis to within-group comparison. Also, the outcome ratings were completed by parents themselves, who might be biased by the expectation effects. Parental ratings could be potentially influenced by their own feelings and expectations towards the intervention. In the present project, nonetheless, we used well-established and validated questionnaires and tools to assess the essential aspect of sleep and daytime functioning in ADHD children. Furthermore, objective sleep measures, such as actigraphy and polysomnography, were not included in this study. Whilst we used CSHQ, a well-validated and the most commonly used tool in the paediatric sleep research, as one of the main outcome measures in this project, retrospective self-report of sleep problems in this project could be potentially subject to reporting bias.

Implications of the Activities

Given the significant negative impacts of sleep problems on child's development, the current study showed that a brief parent-based behavioural intervention could be a promising approach in managing sleep problems in ADHD children in the local context, with good clinical outcomes and high parental satisfaction.

Dissemination of Project Information

Conference talk:

Li SX, Behavioural Intervention for Paediatric Insomnia – A Focus on Special Populations. Invited talk in the Neurodevelopmental Conference - Sleep Problems in Children with Neurodevelopmental Problems, organized by The Hong Kong Society of Child Neurology and Developmental Paediatrics, Hong Kong, February 2018

Publications

Li SX, Lau LF, Chiu WV, Wing YK, Li AM, Lai YCK, Shea KSC. Effects of a brief parent-based sleep intervention on sleep and clinical symptoms in children with attention deficit hyperactivity disorder and parental sleep and mental health. Sleep 2019; 42(supplement 1), A301. <u>https://doi.org/10.1093/sleep/zsz067.748</u>

Patents and other Intellectual Property Rights that have resulted directly from the

project

NONE

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Appendix 1:

Example of the Advertising Poster

Cover Page of the Educational Booklet



Inside Educational Booklet:





[關於睡眠的迷思]

睡眠是...

n

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一直以來,很多人都誤解睡眠是一個被動、靜止的過程,甚至認 為睡眠是浪費時間和懶惰的表現。事實上,睡眠在我們生活中是 一項基本和必要的生理需求。

當我們睡著的時候,身體處於放鬆狀態,但是我們的大腦仍然保 持活躍。經過科學家長時間的研究,證實了很多重要的生理過程 都在睡眠時發生,例如,細胞修復、記憶鞏固、成長和調節新陳 代謝等等。因此,睡眠對我們的身心健康,尤其是兒童及青少年 的成長有著極重要的意義。



人的睡眠是由"非快速動眼睡眠"(NREM sleep, Non Rapid Eye Movement Sleep)和"快速動眼睡眠"(REM sleep, Non Rapid Eye Movement Sleep)兩個階段循環交替組成。

非快速動眼睡眠(NREM)由速至深可分為第一期、第二期和第三期睡眠 (深層睡眠)。在深層睡眠的時候,心率、血壓、體溫及呼吸頻率會逐 漸下降。快速眼動睡眠伴有快速的眼球活動,大部份的肌肉處於僵直 的狀態,而心率、血壓和體溫則會升高,呼吸頻率亦會變得不規則, 夢也常在這個階段發生。

當我們入睡後,我們的睡眠會首先進入NREM階段,大約在入睡後的60至90分 鐘,會出現第一個REM睡眠,之後再重覆NREM睡眠。整個晚上,我們的睡眠大 約有4至6個週期,期間深層睡眠會減短,而REM睡眠則會越來越長。 [我的孩子睡幾多才足夠?]

睡眠的需求

睡眠不足會影響孩童日間表現,增加情緒與行為等問題。因此,確保 孩子得到足夠的睡眠對其健康發展非常重要。睡眠的需求與年齡相 關,亦存在個體的差異。家長需瞭解孩子在不同成長階段對睡眠的需 求並確保孩子得到充足的睡眠時間。



孩子到4-4.5歲時,便不再需要午睡。如孩子需午睡,可把睡眠時 間安排於下午12-1點,午睡時間應盡量不晚於下午4時。合理睡眠長 度為約5至15分鐘,或不多於30分鐘上限。過長的午睡會影響夜間的 睡眠,因此,家長應協助孩子將午睡職入晚間睡眠。

6







[睡眠衛生建議]

若在孩子並不感到困倦時強行要他入睡將會導致更多的睡眠問題和 壓力。因此,家長需首先瞭解孩子不能提早睡覺的原因,需分辨孩 子是不習慣早睡還是睡不著,兩者的處理方法各有所不同。

當孩子不習慣早睡時,採用漸進的方式推前孩子的睡眠時間

如孩子不習慣早睡,家長可以先將上床的時間設定為孩子自然入眠的時間, 然後逐步推前規定的上床時間,每晚推前15分鐘,直至最後達到理想的上床 睡眠時間。

- hundred for the data bard of the large -8pm 8:15 8:30 8:45 9pm 9:15 9:30 9:45 10pm 10:15 10:30 RERE

- 適時將孩子安置於床上。家長安置孩子於床上後便離開臥室,不要在 孩子房間裡逗留過長的時間,且謹記在孩子依然未入睡時離開房間好 讓孩子學習自行入睡。
- 當孩子哭鬧時,適當地忽略孩子的吵鬧,冷靜地讓孩子知道約定的睡 覺時間已到。
- 若孩子依然在床上哭鬧不停,再次提醒他約定的睡覺時間已到。
- 若孩子依然感到難過不滿,家長可按自己的意願到孩子的房間逗留約 一分鐘的時間,停留時間不宜過長,因這會讓孩子產生依賴。
- 家長此時應避免與孩子交談,冷靜地再次勸諭孩子睡覺。到房間內檢 視孩子的目的在於讓家長安心以及確保孩子依然在臥室內。
- 若孩子離開睡床,應將他,她重新送回床上。



家長不應強逼孩子在床上等待入睡,這樣反而會令孩子對睡眠產生壓 力。如果孩子在20-30分鐘都無法入睡,可讓孩子離開睡床,讓他進行一 些輕鬆的活動(可參考睡前習慣部份)。當他有睡意時,才讓他上床睡覺。 家長要留意不要讓孩子在客廳或者父母的寢室入睡。 家長亦可嘗試將上床時間推遲到孩子實際能夠睡著的時間,如果連續三 天孩子很快可入睡,則以15分鐘逐漸推前孩子的上床時間。

[睡眠衛生建議]







將電子器材 (尤其是電視機和電腦)安裝在孩子房間以外

促進睡眠規律性的建議

營造舒適的睡眠環境

- 裝上遮光布,阻擋光線

- 為孩子穿上舒適的睡衣

· 較重的被子Weighted blanket

- White sound (風扇、冷氣的聲音)

光線:

覺郵徵

聲音:

觸覺:

的地方

日間的活動對孩子的作息時間都會有影響,例如進食的時間。因此,家長應 該確保孩子的飲食規律。

此外,光線會抑制睡眠激素(褪黑素)的分泌,所以,家長應在睡前避免孩子 接觸強光,例如電子產品所發出的光線,這些都會抑制褪黑素的分泌。相 反,在孩子起床時,應讓他/她多接觸光線(如太陽光)。每天早上可將孩子睡 房的窗簾拉開,讓陽光進入房間內。如沒有陽光,可開啟房間內的日光燈。 這可幫助孩子感覺抖擻精神,開始新的一天。



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閱讀本手冊後,家長可試試回答以下問題:						
A.日常習慣			\sim			~
1.孩子每天有規律一致的作息習慣嗎?	是 / 否			—		
2.如孩子已經4-5歲以上,孩子日間有避免午睡嗎?	是/否	4		<u>家</u>	長筆記	
3.如有午睡,午睡長度是否不超過30分蓮?	是/ 否			適合我的孩-	子的睡前常規活動	
4.孩子平时有建勤的首调啊: 5.孩子平時有定時進食嗎?	是/否			時間	活動	
			_	0-104		_
B.睡前規律				1.		
1.孩子每晚睡前有進行規律一致的活動嗎?	是/否			2.		
2.孩子睡前15至30分鐘有進行輕鬆的活動嗎?	是/否			2		
3.找丁曄則有避免使用電丁產品嗎? 4.孩子睡前有避免進行劇刻運動嗎?	定 / 召 是 / 否		_	3.		
5.孩子睡前4至6小時有避免喝含咖啡因的飲料嗎?	是/否			4.		
6.孩子睡覺的時候飽度適中嗎?	是/否		_	F		
7.	是 / 否			5.		
C.睡房環境				6.		
1. 孩子睡床的大小合滴嗎?	是 / 否			7		
2. 孩子枕頭和床褥的軟硬度適中嗎?	是/否					
3.孩子的睡衣狗舒適、鬆身嗎?	是/否			8.		
4. ლ厉垠児童孫順(5. 孩子睡覺時, 他(她)的睡房環境安靜嗎?	定/召 是/否	2	-	9.		
6.孩子睡覺時,他(她)的睡房夠黑暗嗎?	是/否					/
7.孩子睡覺時,他(她)的睡房的溫度適中嗎?	是/否				1	
如果以上皆是,這代表家長和孩子已經領略什麼是良好的睡眠習慣!				2		5

[家長	自助手冊]				然 民 日 切	נחויבו	
孩子睡眠好幫手:睡眠日記				家長可幫孩子持續記錄一至兩周的睡眠日記可幫助家長和醫生了解孩子睡眠問題的!以及了解有什麼方法行得通行不通。				
	SAMPLE 様本	SUNDAY 星期日	MONDAY 星期一	TUESDAY 星期二	WEDNESDAY 星期三	THURSDAY 星期四	FRIDAY 星期五	SATURDAY 星期六
1.昨晚孩子蔑點上床?	[0:(5рм							
2.昨晚孩子幾點開始嘗試睡覺?	(0:55pm							
3.昨晚用了多少時間入睡?	55分鐘							
4.在睡眠當中,孩子總共醒來 幾多次(不計算最終起床)?	3							
5.孩子在昨晚總共醒來 幾長的時間?	(小崎 (0分鐘							
6. 孩子今日機點醒來?	6:35am							
7.孩子最終幾點起床?	7:20am							
8.孩子認為孩子的睡眠 質素如何?	□柞帚差 □差 逼 □好帚酚 □栫帚酚	□ ** ** □ * * □ * * 通 □ ** ** □ ** **	□惟帝差 □差通 □好栗昭	□ 帷帚差 □ 参 递 □ 好 帚 好 □ 栉 帚 好	 ● 幣幣差 ● 巻 適 ● 砂 帯 砕 ● 砂 帯 砕 	□ ** * □ * * □ * * □ * * □ * * □ * *	 ● 幣幣差 ● 幣券 ● 砂 幣 幣 ● 幣 幣 ● 幣 幣 	□ 帷帚差 □ 差 逼 □ 吩 幣 嘢
9.孩子今日是否有小睡? (時間/多久)	(:00pm/ ৬০ জ আছ							
10. 備註	泰星							
1. 睡眠時間長短:孩子是否得]]足夠睡眠?		3. 睡前常規:孩子	每天睡前是否有一致的	的、平靜放鬆的睡前活	5重0 ?



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Children and Adults with Attention Deficit / Hyperactivity Disorder (CHADD)	http://www. chadd.org
Attention Deficit Disorder Association (ADDA)	http://www.add.org
National Sleep Foundation	https://sleepfoundation.org/sleep- disorders-problems/adhd-and-sleep
學習行為輔導計劃 — 學校、 家庭與社區約協作活動	http://www.ha.org.hk/kch/adhd
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Appendix 2: Figure 1 & Table 1-5

Figure 1. Flowchart of the study



(N =60)							
45 (75)							
9.4±1.5							
58.24±8.32							
36 (71)							
30 (58.8)							
3 (5.9)							
3 (5.9)							
40±5.8							
25 (41.7)							
29 (48.3)							
44.7±6.3							
25 (41.7)							
45 (75)							
22 (36.7)							
55 (91.7)							

Table 1. Socio-demographic characteristics of the families received intervention

Notes. Abbreviations: CSHQ, The Children's Sleep Habits Questionnaire

	Completers	Dropouts	1	
Characteristics	(N =43)	(N=17)	t or X ²	p-value
Children				
Male sex, n (%)	31 (72.1)	14 (82.4)	0.684	0.408
Age, years (mean±SD)	9.35±1.56	9.53±1.47	-0.412	0.682
CSHQ Total Sleep Disturbance Score	57.76±8.48	59.92±7.86	0.057	0.434
Taking medication for ADHD, n (%)	26 (72.2)	10 (66.7)	0.157	0.692
Methyphenidate	22 (61.1)	8 (53.3)	0.264	0.607
Atomoxetine	2 (3.03)	1 (6.7)	0.024	0.878
Combination	2 (3.03)	1 (6.7)	0.024	0.878
Family Characteristics				
Maternal age, years (mean±SD)	40.14±5.87	39.64±5.54	0.250	0.803
Maternal education level				
Secondary school or below, n (%)	20(52.6)	5(55.6)	0.025	0.874
Maternal employed, n (%)	19(48.7)	2(18.2)	3.284	0.07
Paternal age, years (mean±SD)	44.94±5.99	43.91±7.48	0.470	0.640
Paternal education level				
Secondary school or below, n (%)	18(50)	7(77.8)	2.25	0.134
Paternal employed, n (%)	34(97.1)	11(100)	0.321	0.571
Household monthly income HKD30,000	19(50)	4/26 4)	0.620	0 400
or below, n (%)	16(50)	4(30.4)	0.629	0.420
Family member who attended the				
treatment session				
Mother, n (%)	40(93)	15(88.2)	0.366	0.545

Table 2. Comparisons of the families who completed the intervention and those dropouts

Notes. Abbreviations: CSHQ, The Children's Sleep Habits Questionnaire

		Pacalina	Dect intervention	Post-3month	F	n-value	
		Daseine	Post-intervention	follow-up	Г	p-value	
Sle	ер						
CS	HQ Total Sleep Disturbance				11.19	≤ 0.001***	
Sco	ore	59.08±7.27	53.92±6.87	53.56±7.56			
	CSHQ Bedtime Resistance	9.76±2.95	9.4±2.33	9.32±3	0.479	0.624	
	CSHQ Sleep onset delay	2.2±0.65	1.8±0.71	1.8±0.71	5.053	0.010**	
	CSHQ Sleep duration	7.28±1.72	6.24±1.69	6.2±2	5.277	0.008**	
	CSHQ Sleep Anxiety	6.96±2.39	6.64±1.98	6.24±2.03	2.144	0.128	
	CSHQ Night wakings	4.04±1.17	4.04±1.21	3.8±1.38	0.390	0.679	
	CSHQ Parasomnias	9.64±1.89	8.6±1.5	8.88±2.17	6.185	0.004**	
	CSHQ Sleep disordered				1.857	0.167	
bre	athing	3.56±0.65	3.44±0.58	3.84±1.14			
	CSHQ Daytime sleepiness	11.16±3.09	9.76±1.88	9.92±1.82	3.399	0.062	
Psy	ychopathology						
SW	AN Total score	1.82±0.99	1.78±0.81	1.66±0.81	0.461	0.633	
	SWAN Inattentive score	1.96±1.02	1.88±0.71	1.79±0.79	0.324	0.725	
	SWAN hyperactivity score	1.68±1.14	1.68±1.12	1.52±1.06	0.428	0.654	
СВ	CL Total score	64.73±8.8	61.96±8.84	60±11.62	5.147	0.009**	
	Withdrawn	60.35±8.47	59.85±7.24	60.12±8.48	0.053	0.949	
	Somatic complaints	57.69±8.98	55.19±6.89	55.54±8.68	1.499	0.233	
	Anxious/depressed	62.35±9.08	60.35±9.13	59.69±9	1.857	0.167	
	Social problems	63.88±10.2	61.5±9.87	62.35±9.2	1.152	0.324	
	Thought problems	60.5±8.95	59.46±8.62	60.12±9.64	0.143	0.868	
	Attention problems	69.19±11.58	65.23±11.24	64.42±9.93	4.031	0.024*	
	Delinquent behaviour	63±7.9	60±7.35	60.38±8.03	3.014	0.058	
	Aggressive behaviour	63.35±9.57	61.46±8.18	60.38±8.98	2.392	0.102	
СВ	CL Internalizing symptoms	60.35±11.25	58.77±9.65	56.77±13.07	1.680	0.197	
СВ	CL Externalizing symptoms	63.62±8.75	61.31±8.55	59.73±10.25	4.284	0.019*	
Par	ental Stress Level						
	PSI total score	124.62±25	118.35±18.06	119.73±14.64	1.269	0.218	

Table 3. Changes of child's sleep and daytime behaviours and parental stress

Notes. Date are presented as mean \pm S.D. Two participants were excluded from this analysis due to their CSHQ total sleep disturbance scores below clinical cut-off (CSHQ >=41) at baseline.

Abbreviations: CSHQ, The Children's Sleep Habits Questionnaire; SWAN, The Strengths and Weaknesses of ADHD symptoms and Normal behavior rating scale; CBCL, Child Behavior Checklist; PSI, Parental Stress Index. * $p \le 0.05$; ** $p \le 0.01$; *** $p \le 0.001$

	-	Mean	Std.	0.1	95% Confidence	O al amba d
Measures		Difference	Error	Sig.	Interval for Difference	Cohen's d
CSHQ Total Sleep	Baseline vs. Post	5.16	1.25	<0.001***	1.93-8.39	0.74
Disturbance Score	Baseline vs. Follow-up	5.52	1.13	<0.001***	2.62-8.43	0.76
	Post vs. Follow-up	0.36	1.51	1.00	-3.51-4.23	0.05
CSHQ Sleep onset	Baseline vs. Post	0.40	0.14	0.03*	0.04-0.76	0.60
delay	Baseline vs. Follow-up	0.40	0.12	0.01**	0.1-0.7	0.60
	Post vs. Follow-up	0.00	0.17	1.00	-0.45-0.45	0
CSHQ Sleep	Baseline vs. Post	1.04	0.35	0.02*	0.14-1.94	0.62
duration	Baseline vs. Follow-up	1.08	0.36	0.02*	0.17-2	0.59
	Post vs. Follow-up	0.04	0.42	1.00	-1.05-1.13	0.02
CSHQ Parasomnias	Baseline vs. Post	1.04	0.23	<0.001***	0.44-1.64	0.62
	Baseline vs. Follow-up	0.76	0.40	0.20	-0.26-1.78	0.38
	Post vs. Follow-up	-0.28	0.26	0.89	-0.95-0.39	-0.15
CBCL Total score	Baseline vs. Post	2.77	1.50	0.228	-1.07-6.61	0.24
	Baseline vs. Follow-up	4.73	1.42	0.008**	1.09-8.37	0.41
	Post vs. Follow-up	1.96	1.53	0.634	-1.96-5.88	0.17
CBCL Attention	Baseline vs. Post	3.96	2.30	0.292	-1.94-9.86	0.34
problems	Baseline vs. Follow-up	4.77	1.61	0.02*	0.63-8.91	0.41
	Post vs. Follow-up	0.81	1.35	1	-2.65-4.27	0.07
CBCL Externalizing	Baseline vs. Post	2.31	1.40	0.334	-1.28-5.9	0.20
symptoms	Baseline vs. Follow-up	3.89	1.33	0.022*	0.47-7.3	0.34
	Post vs. Follow-up	1.58	1.27	0.68	-1.69-4.84	0.14

Table 4. Pairwise comparisons of child's sleep and daytime behaviours between baseline, post-intervention and 3-month follow-up

Notes. Abbreviations: CSHQ, The Children's Sleep Habits Questionnaire; SWAN, The Strengths and Weaknesses of ADHD symptoms and Normal behavior rating scale; CBCL, Child Behavior Checklist; PSI, Parental Stress Index.

* $p \le 0.05$; ** $p \le 0.01$; *** $p \le 0.001$

ltem		Mean	Standard Deviation	
1.	Improved sleep knowledge	4.03	0.66	1 = Strongly agree,
2.	Increased understanding of how to handle sleep problems	4.06	0.68	5 = Strongly disagree
3.	Improved sleep (child)	3.91	0.66	
4.	Improved sleep (parent)	3.57	0.61	
5.	Suitable session length	3.00	0.00	1 = too much/long, 3 = just right,
6.	Suitable number of sessions	3.00	0.00	5 = too little/short
7.	Suitable session content	3.00	0.00	
8.	Clear suggestions on sleep improvement	4.06	0.59	1 = Strongly agree,
9.	Targeted suggestions on sleep improvement	4.00	0.69	5 = Strongly disagree
10	. Effort paid in trying suggestions	4.17	0.66	
11	. Overall satisfaction	4.00	0.69	
12	. Willingness to recommend to others	3.97	0.71	
13	. Willingness to participate in similar studies	4.03	0.71	

Table 5. Satisfaction ratings raw scores (standard deviations) and comments from programme evaluation survey completed by parents

Open-ended questions (bold) and representative quotes

What did you find most helpful about the program?

Improved understanding of impact of sleep problems in ADHD children on their emotional functioning and how to improve their sleep quality.

My child's sleep was improved, resulting in a more peaceful and happy home environment at night.

One-on-one consultations allow problems specific to each individual to be addressed easily.

I was satisfied that the doctor gave us a detailed interview, they are very attentive and patient to help us, and the phone follow-up was very good.

The doctor offered some advice to help my child fall asleep easily and taught me how to train him to have a consistent sleep schedule.

The doctor will listen carefully to the situation of my child and provide various opinions for parents' reference.

The therapist and staff are well organised, cordial and willing to answer my questions not only about children's sleep but also other questions.

What was least helpful about the program?

The hospital was far from home.

Too often and tight schedule

Other suggestions or comments?

The sessions could be shortened to 30-45 minutes.

It would be helpful to have one or two sessions that provide sleep education to the child, because children are more likely to follow the advice if directly given by the professionals.

Appendix 3:

治療計畫家長反饋表

親愛的家長:

感謝閣下參與是次針對專注不足/過度活躍症兒童的睡眠問題的治療研究。閣下對是次 治療計畫的意見對我們來說是非常重要的 懇請閣下根據自己的看法和感受圈出最合適

的答案:

參與是次治療計畫···	非常同意 非常不同	意			
1. 有助我認識更多有關睡眠的知識	1	2	3	4	5
2. 讓我更多了解孩子的睡眠問題及學會如何處理	1	2	3	4	5
3. 我的孩子睡眠得以改善	1	2	3	4	5
4. 我的(家長)睡眠得以改善	1	2	3	4	5
治療內容	太長/太爹	2	合適	太	短/太少
5. 每一節的時間長度	1	2	3	4	5
6. 治療節數(2節面談+1節電話跟進)	1	2	3	4	5
7. 每一節與心理學家探討的內容	1	2	3	4	5
整體來 說	非常同意			非常	不同意
8. 改善睡眠的建議容易理解	1	2	3	4	5
9. 改善睡眠的建議能針對我孩子的睡眠問題	1	2	3	4	5
10. 我嘗試了這些改善睡眠的建議	1	2	3	4	5
11. 我對是次治療計畫感到滿意	1	2	3	4	5
12. 我會推薦是次治療計畫給其他有需要的家長	1	2	3	4	5
13. 如果以後有類似的治療計畫,我會願意參加	1	2	3	4	5

1. 我對是次治療計畫最**喜歡/满意的**是:

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2. 我對是次治療計畫最不喜歡/最不滿意的是:

3. 其他意見:
