



RESEARCH ARTICLE

Sleep-Related Issues in Children and Adolescents Presenting at Community Mental Health Clinics

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Abstract

Objective: To examine sleep-related issues in children and adolescents presenting at community clinics with diverse mental health concerns using a brief sleep questionnaire and to examine whether sleep issues would improve with mental health interventions. **Method:** Study 1: A questionnaire-based study that used a modified version of the Pittsburgh Sleep Quality Index to measure sleep-related issues in youth aged 4-18 years presenting at community mental health clinics. Study 2: A pre/post-treatment study that used the same questionnaire to measure changes in sleep-related issues in youth aged 4-19 years participating in a group mental health intervention. The main outcome measure for both studies was global sleep score. **Results:** Using the recommended cut-off score of 5, 31% of children aged 4-11 years and 71% of adolescents aged 12-18 years had problematic sleep. Sleep-related issues did not differ by presenting mental health concern. The group intervention was associated with improved sleep for parent-reported child sleep and self-reported adolescent sleep, but not for parent-reported adolescent sleep. **Conclusions:** Problematic sleep is very common in youth with mental health concerns. More research is needed to understand best practices for assessment and treatment of sleep issues that are comorbid with mental health issues in children and adolescents.

Key Words: *sleep problems, childhood, adolescence, mental health*

Résumé

Objectif: Examiner les difficultés liées au sommeil chez des enfants et des adolescents se présentant à des cliniques communautaires avec divers problèmes de santé mentale, à l'aide d'un bref questionnaire sur le sommeil, et examiner si ces difficultés de sommeil s'amélioreraient par des interventions de santé mentale. **Méthode:** Étude 1: Une étude basée sur un questionnaire qui utilisait une version modifiée de l'échelle de la qualité du sommeil de Pittsburgh pour mesurer les difficultés liées au sommeil chez des enfants et adolescents de 4 à 18 ans qui se présentent à des cliniques communautaires de santé mentale. Étude 2: Une étude pré/post traitement qui utilisait le même questionnaire pour mesurer les changements des difficultés liées au sommeil chez des enfants et adolescents de 4 à 19 ans qui participent à une intervention de groupe en santé mentale. La mesure principale du résultat pour les deux études était le score de sommeil total. **Résultats:** À l'aide du score d'inclusion recommandé de 5, 31 % des enfants de 4 à 11 ans et 71 % des adolescents de 12 à 18 ans avaient un sommeil problématique. Les difficultés liées au sommeil ne différaient pas par la présentation d'un problème de santé mentale. L'intervention de groupe était associée avec un sommeil amélioré pour le sommeil de l'enfant déclaré par le parent et celui auto-déclaré par l'adolescent, mais aucun parent n'a déclaré le sommeil de l'adolescent. **Conclusions:** Le sommeil problématique est très commun chez les jeunes ayant des problèmes de santé mentale. Il faut plus de pratique pour comprendre les pratiques exemplaires d'évaluation et de traitement des difficultés de sommeil qui sont comorbides avec des problèmes de santé mentale chez les enfants et les adolescents.

Mots clés: *problèmes de sommeil, enfance, adolescence, santé mentale*

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Introduction

Sleep disturbances have been found to affect 37% of children and adolescents (community sample; Owens, Spirito, McGuinn, & Nobile, 2000), and have been linked to a variety of issues, including school performance (Dewald, Meijer, Oort, Kerkof, & Bögels, 2010), emotion regulation (Baum et al., 2014), and attention and behaviour (Beebe, 2011). Higher frequency of sleep problems (sleep onset, nocturnal awakenings, daytime sleepiness) have been found in children with a psychiatric diagnosis compared to non-psychiatric controls (Ivanenko, Crabtree, O'Brien, & Gozal, 2006). Specifically, rates of sleep disturbances in youth with diagnosed depression, anxiety, and ADHD have been found to be between 70-90% (Alfano, Ginsburg, & Kingery, 2007; Lui et al., 2007; O'Brien et al., 2003). The types of sleep disturbance seem to vary by mental health disorder. Nocturnal awakenings and nightmares have been found to be closely associated with symptoms of mood disturbances and anxiety, while bedtime struggles have been shown to be closely associated with ADHD (Ivanenko et al., 2006). Further, developmental stage may moderate the relationships between sleep and mental health symptoms. In a community sample, anxiety symptoms were more strongly associated with sleep disturbance in children while depression symptoms were more strongly associated with sleep problems in adolescents (Alfano, Zakem, Costa, Taylor, & Weems, 2009).

Disturbed sleep is often seen as a secondary symptom to psychiatric disorders (Lichstein, 2006), which may lead to the false conclusion that sleep will automatically improve with improvements in psychiatric symptoms (Chorney, Dettweiler, Morris, & Kuhm, 2008). However, a recent meta-analysis suggests that although sleep disturbance acts as a precursor to depression, there is little support for a predictive role of depression for sleep problems (Lovato & Gradisar, 2014). Similarly, a review of the literature found preliminary support for the role of sleep disturbance as a precursor to anxiety, with less evidence for a relationship in the opposite direction (Leahy & Gradisar, 2012).

If sleep problems are more likely to be precursors to mental health problems, rather than symptoms of them, then interventions designed to treat mental health disorders should not be expected to resolve sleep-related issues, unless sleep issues are explicitly targeted within the intervention. However, mental health interventions could have secondary effects on sleep through transfer of skills (e.g., relaxation) to sleep problems or resolution of underlying issues that previously facilitated sleep issues (e.g. parenting issues; Peterman et al., 2016). Peterman and colleagues (2016) examined whether cognitive-behavioural therapy (CBT) for anxiety, without specific sleep intervention, would be associated with changes in sleep-related problems in youth aged 7-17 years. They found that parent-reported sleep problems, but not child-reported sleep problems, improved following

CBT for anxiety. Specifically, sleep issues around bedtime, rather than quantitative sleep variables (e.g., sleep latency, sleep duration), showed improvement with CBT.

The aim of the current research was to examine sleep disturbances in children and adolescents who presented at community mental health clinics with diverse mental health concerns using a brief sleep questionnaire (Study 1). We hypothesized that sleep issues would be common in this population, and that sleep problems would vary by developmental stage (children vs. adolescents) and mental health concern. Further, we aimed to examine whether sleep disturbances would improve with mental health interventions (Study 2). We hypothesized that mental health interventions would be associated with small improvements in sleep, but that significant sleep disturbance would remain following mental health interventions.

General Method

Materials and Procedure

Following informed written consent, youth and/or their parents completed a modified version of the *Pittsburgh Sleep Quality Index (PSQI)* (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989). The modified version simplified the language for young participants, and eliminated some questions to reduce the completion time. As with the original PSQI, seven component scores (sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbances, medication use, and daytime sleepiness) and a global score were calculated. For sleep duration, the scores were adjusted according to current recommendations for children and adolescents. Five additional items were added; two rated the perception of current sleep quality/habits, two rated the desire to get help for current sleep quality/habits, and one asked participants to identify their primary mental health concern. For children under the age of 12, parents completed a parent-report version of the PSQI on behalf of their child. For children 12 years and older, both youth and their parents were invited to complete the questionnaire. The study received approval from the Research Ethics Board of the IWK Health Centre.

Data Analysis

Global scores were calculated by summing the seven component scores. In cases of missing component scores, the mean component score was calculated and applied in order to calculate an imputed global score. A minimum of four component scores was required to compute a mean component score; cases with less than four valid component scores were not included.

Study 1

Participants

One hundred and eighty-five participants were recruited from an outpatient mental health clinic during an eight month period from September 2015 to April 2016. Participants were recruited at their first visit to the clinic, prior to their mental health appointment with a clinician. Sixty-nine children (aged 4-11 years; $M=8.32$ years; 62% male) and 116 adolescents (aged 12-18 years; $M=14.82$ years; 36% male) participated in the study.

Both parent and adolescent completed the questionnaire for 76.7% of cases, just the adolescent completed the questionnaire in 13.8% of cases, and just a parent completed the questionnaire in 9.5% of cases.

Data Analysis

Imputed data were used to calculate global scores for 31 parents and 14 adolescents (24.3% of sample). Descriptive statistics were derived for component scores, global scores, perception of sleep problems, readiness to engage in sleep interventions, and mental health concerns. Correlations between adolescent and parent reports were calculated. Finally, multiple regressions were run to examine the association of covariates including age, gender, and mental health concern with global sleep score.

Results

For adolescents with both self- and parent-report data available, we calculated correlations between adolescent- and parent-reported component scores and global scores. Correlations between adolescent and parent reports were all significant at $p<.01$, and Pearson r 's were as follows: sleep quality, $r=.61$; sleep latency, $r=.54$; sleep duration $r=.47$; sleep efficiency, $r=.44$, sleep disturbances, $r=.49$; sleep medication, $r=.85$; daytime sleepiness, $r=.41$; global score, $r=.63$. There was more missing data for parent reports, especially for sleep latency, sleep efficiency, and sleep disturbance. Thus, we elected to report only on adolescent-reported data for this age group for parsimony. Table 1 provides the descriptive statistics for the PSQI component scores and global scores, stratified by age group. Results indicated that adolescents had significantly higher mean global scores than children ($M_{ado} = 7.20$ vs. $M_{child} = 4.26$; $t=5.65$, $p<.001$). Using the recommended cut-off score of 5, results showed that significantly more adolescents had problematic sleep quality compared to children (71.2% vs. 31.3%; $\chi^2 = 26.2$, $p<.001$). Table 2 provides the descriptive statistics for the additional items on the questionnaire. While only 22% of parents perceived that their children had moderate/major problems with sleep quality (compared to 31% who showed problematic sleep quality on the PSQI), 52% of parents were interested in getting help to improve their child's sleep

quality. In adolescents, only 42% perceived moderate/major problems with their sleep quality and 41% were interested in getting help to improve their sleep quality, compared to 71% who showed problematic sleep quality on the PSQI. As a post-hoc analysis, we examined how many youth displayed at least one sleep-related problem. Results indicated that 88% of children and 97% of adolescents had a problem in at least one of the seven sleep domains.

We also ran multiple regressions to examine associations of age, gender, and mental health issue (ADHD, disruptive behaviour, mood issues, anxiety) with global sleep score. For children, the multiple regression indicated no significant effects for age ($\beta=.21$; $p=.11$), gender ($\beta=.23$; $p=.09$), and mental health issues ($\beta s=-.03-.14$; p 's $=.29-.85$). For adolescents, the multiple regression indicated no significant effects for age ($\beta=.17$; $p=.12$), gender ($\beta=.14$; $p=.19$), and mental health issues ($\beta s=-.08-.04$; p 's $=.45-.82$). We ran post-hoc analyses to look for associations between mental health issue and problematic sleep (above cut-off score), and found no significant associations. Finally, we examined whether mental health issue was associated with PSQI component scores, and found no significant associations, except that children with anxiety showed more sleep disruptions than children without anxiety.

Discussion

Sleep problems were common in children and adolescents with mental health concerns who presented at an outpatient clinic for an initial intake/assessment, with adolescents displaying higher rates of problematic sleep than children. Over half of the adolescents and close to one-fifth of the children surveyed were not getting the minimum recommended hours of sleep per night (Hirshkowitz et al., 2015), suggesting that many adolescents with mental health concerns are chronically sleep deprived. This is consistent with findings in the general adolescent population (Carskadon, Wolfson, Acebo, Tzischinsky, & Seifer, 1998), in part due delayed sleep onset in adolescence.

We did not observe differences in severity or type of sleep problems across presenting mental health concern. These findings are in contrast to previous research (Ivanenko et al., 2006) that showed that sleep disturbances were more closely associated with depression and anxiety, while bedtime issues were closely associated with ADHD. The PSQI does not explicitly measure issues related to the bedtime routine, which may have contributed to the lack of differentiation in sleep issues across mental health concerns in the current study. Moreover, mental health concerns were self- or parent-reported in this study, rather than confirmed with a psychiatric diagnosis.

Table 1. Study 1 descriptive statistics for PSQI, stratified by age group		
	Children	Adolescents
Sleep quality		
Very good	32.8%	7.7%
Good	49.3%	44.2%
Bad	13.4%	43.3%
Very bad	4.5%	4.8%
Sleep latency		
	M=34.15 mins (SD=26.87)	M=41.52 mins (SD=30.59)
Less than 15 mins	27.9%	20.0%
16-30 mins	35.3%	36.8%
31-60 mins	27.9%	28.4%
More than 1 hour	8.8%	14.7%
Sleep duration		
	M=9.84 hours (SD=1.27)	M=7.57 hours (SD=1.48)
More than 9 hours*	83.6%	44.6%
8-9 hours*	13.3%	25.0%
7-8 hours*	0.0%	18.5%
Less than 7 hours*	3.0%	12.0%
Sleep efficiency		
	M=94.2 (SD=6.13)	M= 91.56 (SD=6.16)
Greater than 85%	97.1%	87.2%
75-84%	1.5%	9.6%
65-75%	0.0%	3.2%
Less than 65%	1.5%	0.0%
Sleep disturbance		
Less than once per month	16.1%	9.0%
Less than once per week	41.9%	48.0%
Once or twice per week	37.1%	33.0%
Three or more times per week	4.8%	10.0%
Medication use		
Less than once per month	75.4%	72.5%
Less than once per week	6.2%	6.9%
Once or twice per week	0.0%	5.9%
Three of more times per week	18.5%	14.7%
Daytime sleepiness		
Less than once per month	82.1%	25.2%
Less than once per week	11.9%	19.4%
Once or twice per week	6.0%	29.1%
Three of more times per week	0.0%	26.3%
Global score		
	M=4.26 (SD=3.16)	M=7.20 (SD=3.55)
Less than 5	68.7%	28.8%
5 or greater	31.3%	71.2%

*For adolescents, sleep duration categories were as follows: 8 hours, 7-8 hours, 6-7 hours, less than 6 hours

Table 2. Study 1 descriptive statistics for additional questionnaire items, stratified by age group

	Children	Adolescents
Perception of sleep quality problems		
Not a problem	43.9%	22.1%
Minor problem	33.3%	35.6%
Moderate problem	18.2%	34.6%
Major problem	4.5%	7.7%
Perception of sleep habit problems		
Not a problem	43.3%	23.1%
Minor problem	34.3%	30.8%
Moderate problem	13.4%	32.7%
Major problem	9.0%	13.5%
Interest in improving sleep quality		
Not interested	32.8%	24.0%
Somewhat interested	14.9%	34.6%
Interested	23.9%	21.2%
Very interested	28.4%	20.2%
Interest in improving sleep habits		
Not interested	35.8%	25.0%
Somewhat interested	14.9%	39.4%
Interested	19.4%	19.2%
Very interested	29.9%	16.3%
Mental health concern		
ADHD	27.3%	9.4%
Anxiety	37.8%	41.7%
Disruptive behaviour	37.8%	5.2%
Depression	27.3%	55.2%
Autism Spectrum Disorder	10.6%	9%
Other	19.7%	15.6%

Table 3. Study 2 Global PSQI scores before and after intervention

	Children - Parent-report		Adolescents - Self-report		Adolescents - Parent-report	
	Pre	Post	Pre	Post	Pre	Post
Mean global score (SD)	4.41 (3.16)	3.14 (2.47)	9.64 (4.02)	7.96 (4.81)	6.13 (3.92)	5.63 (3.34)
Proportion with global score 5 or greater	38.7%	16.1%	92.3%	65.4%	57.9%	55.5%

Study 2

Participants

One hundred and thirty-seven participants were recruited from an outpatient mental health clinic during a four-month period from December 2016 to April 2016. Participants were recruited at the first session of their group mental

health intervention. Forty-one children (aged 4-11 years; $M=9.00$ years; 58% male) and 84 adolescents (aged 12-19 years; $M=15.48$ years; 30% male) participated in the study, and completed the questionnaire at the first session (pre-treatment). Both parent and adolescent completed the questionnaire for 29.8% of cases, just the adolescent completed the questionnaire in 24.5% of cases, and just a parent completed the questionnaire in 45.7% of cases. Thirty-one

parents of children and 51 parents of adolescents or adolescents completed the questionnaire at the last session of the group (post-treatment); lower numbers were primarily due to drop-out from the mental health interventions.

Data Analysis

Imputed data were used to calculate global scores for 29 parents and two adolescents (22.6% of total sample). Paired t-tests were run to examine the change in sleep score from pre- to post-treatment. One-way ANOVAs were run to examine the sleep scores in relation to group completion.

Results

Because some of the groups were designed for parents of adolescents, we had a large amount of data that was parent-report only or adolescent-report only. We elected to report on parent-reported information for children, and self-reported and parent-reported information for adolescents in order to retain as much data as possible. We compared the pre-group sleep scores for those who completed the group and those who did not. Results indicated that for adolescent parent-reported sleep, those parents who did not complete the group intervention had rated their adolescents' sleep as more problematic compared to parents who completed the group intervention ($M=8.45$ vs. $M=6.15$; $F=4.17$, $p=.04$). No differences were observed for children ($M=4.41$ vs. $M=5.43$; $F=0.86$, $p=.36$) or for adolescent self-reports ($M=9.29$ vs. $M=8.20$; $F=0.80$, $p=.38$).

Table 3 provides a summary of the pre- and post-intervention global sleep scores. Using paired t-tests, we compared pre- and post-group sleep scores for those youth/parents who completed the group intervention. Results indicated that children's sleep scores decreased from the first to last session of the intervention ($t=3.23$, $p=.003$), as did adolescents' self-reported sleep scores ($t=2.65$, $p=.01$). There was no change for adolescent parent-reported sleep scores ($t=1.00$, $p=.32$).

We ran post-hoc analyses across group intervention type. We found that children's sleep improved within both groups studied: a CBT anxiety intervention ($M=4.09$ vs. $M=2.92$; $t=2.10$, $p=.04$), and an emotional regulation skills group ($M=5.40$ vs. $M=3.60$; $t=2.84$, $p=.01$). We also ran analyses by sleep domain, and found that sleep quality improved for children in the anxiety group, while sleep latency and sleep disturbance improved for children in the emotion regulation group.

For adolescents' sleep, we found that sleep improved within the CBT anxiety intervention ($M=8.89$ vs. $M=5.77$; $t=4.35$, $p=.001$), and not within emotion regulation ($M=13.60$ vs. $M=15.20$; $t=-1.02$, $p=.37$) or ACT groups ($M=10.25$ vs. $M=9.50$; $t=0.52$, $p=.64$). For the anxiety intervention, adolescents reported improvements in sleep quality, sleep latency, and sleep disturbance. Parents did not report significant

improvements in their teens' sleep within the CBT anxiety group ($M=7.38$ vs. $M=6.52$; $t=1.34$, $p=.21$), within a group targeting parenting during adolescence ($M=5.03$ vs. $M=4.51$; $t=0.66$, $p=.52$), or within a group for parents of adolescents with substance abuse concerns ($M=6.44$ vs. $M=8.80$; $t=-1.73$, $p=.16$).

Discussion

We found that more problematic adolescent sleep was predictive of parent-dropout from group interventions. It may be that adolescents with more sleep problems also have greater mental health and behavioural issues, which may contribute to parents being unable to complete the interventions. For those who completed the interventions, sleep problems improved for children participating in anxiety or emotional regulation treatment groups and for adolescents participating in anxiety treatment groups (self-reported sleep, but not parent-reported sleep). Specifically, improvements were noted in the domains of sleep quality, sleep latency, and sleep disturbance. These findings are in contrast to Peterman and colleagues (2016) who found that CBT for anxiety was associated with improvements in parent-reported, but not child-reported sleep problems. Moreover, these improvements were limited to bedtime issues, rather than to other sleep domains. Of note, the adolescent anxiety intervention in the current study included a short segment on sleep hygiene, which may help to explain the observed results in this age group.

General Discussion

We aimed to examine sleep disturbances in children and adolescents who presented at community mental health clinics with diverse mental health concerns. We expected that sleep issues would be common in this population, and that sleep problems would vary by developmental stage and mental health concern. We found that 88% of children and 97% of adolescents in our sample had sleep disturbance in at least one domain; these rates are comparable to those reported in previous studies using clinical samples (e.g., Alphano et al., 2007), even though youth in the current study were not required to have a psychiatric diagnosis. Sleep problems varied by developmental stage, with more adolescents showing problematic sleep using the recommended PSQI cut-off score and greater severity of sleep problems in adolescents using the global sleep score. Compared to PSQI scores, fewer parents and adolescents perceived problems with sleep when explicitly asked, suggesting that problems with sleep may be perceived as typical in young people. Sleep problems were not found to vary by mental health concern in this study, perhaps related to the measurement of sleep (self-report, focused on sleep rather than bedtime domains) or the assessment of mental health concerns (self-report, diverse sample) in the current study. It is also possible that sleep issues are prevalent across mental health

disorders, possibly linked by common symptoms, such as psychological distress or emotional dysregulation.

We also aimed to examine whether sleep disturbances would improve with mental health interventions. We hypothesized that mental health interventions would be associated with small improvements in sleep, but that significant sleep disturbance would remain following mental health intervention. We observed improved sleep in children and adolescents (self-report only) following mental health interventions, although close to one-fifth of children and over half of adolescents still had problematic sleep. The current study demonstrated that sleep quality, sleep latency, and sleep disturbances may improve in children and adolescents following anxiety or emotion regulation treatment. It may be that some of the skills and techniques taught during these interventions (e.g., relaxation, awareness of arousal) also help to improve sleep difficulties. It is also possible that amelioration of symptoms of anxiety and emotional dysregulation help to facilitate sleep in youth.

The current study had a number of limitations that should be considered. The study was based on subjective self- and parent-report data rather than objectively measured sleep variables, which are the gold standard in sleep measurement. However, the PSQI is a well-validated questionnaire, and we observed robust correlations between self- and parent-reported sleep problems in the current study. As previously noted, the PSQI was focused on sleep quality-related dimensions, rather than bedtime-related issues, and thus may not be able to paint a full picture of the sleep-related issues faced at home. This study lacked a control group who did not complete the group mental health intervention; thus, we are not able to attribute changes in sleep to the mental health intervention alone. The study also did not assess mental health symptoms from pre- to post-treatment. Furthermore, significant drop-out from the group intervention limits our ability to draw firm conclusions.

Further study is warranted to understand how sleep-related problems change during psychological interventions, and also how sleep-related problems may have an impact on the effectiveness of these interventions. Given the high proportion of children and adolescents with sleep-related problems in clinical samples, it is critical to increase our understanding of sleep-related difficulties, and ensure that these are adequately assessed and treated.

Acknowledgments / Conflicts of Interest

The authors have no conflict of interest to declare.

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