SLEEP DISTURBANCE IN ADOLESCENTS WITH ADHD-LIKE BEHAVIORS:
SYMPTOMS, IDENTIFICATION AND TREATMENTS

A Project

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in
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by

Christina Saad

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A Project

by

Christina Saad

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Department of Graduate and Professional Studies in Education
Abstract

of

SLEEP DISTURBANCE IN ADOLESCENTS WITH ADHD-LIKE BEHAVIORS:
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This study will present research and data regarding the current sleep habits of adolescent students with diagnosed or suspected Attention-Deficit/Hyperactivity Disorder (ADHD). From the encompassing research collected, a workshop was created for the benefit of school based mental health professionals (SBMH). This workshop focuses on behaviors and symptomology of both ADHD and sleep disturbance among youth. Differential assessment and intervention examples are also included in the workshop order to identify and help adolescents with ADHD or ADHD-like behaviors and who also struggle with poor sleep hygiene. This may help mental health professionals in the school setting create better interventions and goals for individualized education plans or student study team meetings.

_______________________________, Committee Chair
Stephen E. Brock, Ph.D.

_____________________
Date

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CHAPTER 1

INTRODUCTION

Background

Students, whether they are in general education or in special education classes, face many difficulties that can hinder their success in schools. As school personnel, we should be aware of all the variables that can affect students in a negative way. Some of these variables include socioeconomic status, physical and mental health problems or educational deficits (Billows, Gradisar, Dohnt, Johnston, & McCappin, 2009). In recent years, Attention-deficit/Hyperactive Disorder or ADHD has been recognized as a common health problem in schools (Akinbami, Liu, Pastor & Reuben, 2011). According to the Diagnostic Manual of Mental Disorders (DSM IV-TR), ADHD is a neuropsychological disorder with an underlying genetic component. The main symptoms are hyperactivity, impulsivity and/or inattentiveness (2000). It largely affects about 9% of students and has its own special education eligibility category (Akinbami et al., 2011.) This disorder can become a major barrier to accessing education and performing at the same level as other peers (Brock, Jimerson, & Hanson, 2009). According to the American Pediatrics Association, School psychologists are now trained and well informed about the various methods for detecting possible ADHD and formulating interventions in the school setting to help students who possibly have this disorder (2013).
School psychologists should have an interest in all health related issues that can affect students as they are the professionals who many times end up assessing students for special education eligibility. In researching some of the more commonly undetected problems, lack of sleep among teenagers in recent years has been identified (Calamaro, Mason, & Ratcliffe, 2009). What are the common misconceptions regarding sleep deficit? How can school psychologists and other school personnel create guidelines for teens regarding sleep hygiene and sleep health? One major issue that has not been fully understood by school professionals is how sleep effects students with ADHD or ADHD-like behaviors. In the research that has been done, effects of sleep disturbance can look like ADHD symptoms (Cassoff, Wiebe, & Gruber 2012; Chiang et al., 2010 Rief, 2008).

Because ADHD has similar core symptoms as sleep deprivation, school mental health professionals need to be more aware and observant of how one can mask the other, and vice-a-versa. These and many more questions regarding sleep among teenagers with ADHD-like behaviors will be addressed in the following project.

Purpose

The purpose of this research project is to inform school psychologists as well as other school-based mental health professionals (e.g. school counselors, school social workers), about how sleep is an important issue among youth with ADHD-like behaviors (and diagnosed with ADHD), and can adversely affect their education. Students with ADHD face many difficulties, but one issue that may go undetected is sleep deprivation. This project will outline how the combination of sleep deprivation and ADHD bring forth
a whole new set of problems that school based mental health professionals need to be aware of. Lastly, presenting an intervention framework that can easily be applied to any student with seemingly ADHD behavioral problems and sleep related issues through a workshop presentation. It will guide school based mental health professionals on how to educate teenagers with ADHD-like symptoms on sleep hygiene and sleep health.

Limitations

This project has some limitations that need to be brought to the attention of those who use this information for the purposes of further research, training and professional development. ADHD and sleep were thoroughly researched; however, there is much more research that need to be done before we truly understand the relationship between the two learning challenges. Since this project focuses on adolescents, their buy-in to some of the interventions presented in the workshop is critical. If students are not interested in developing good sleep hygiene, then they will continue to have sleep problems.
CHAPTER 2
REVIEW OF LITERATURE

Attention-deficit/Hyperactive Disorder (ADHD) is a disorder that affects many school-aged children. With the increase of academic activities that require sustained attention (i.e. standardized testing) many professionals are seeing a rise in the number of referrals to doctors for possible diagnosis and to school psychologists for services to help them succeed socially and academically. According to Akinbami and colleagues data shows about 9% of children between the ages of 5 and 17 have been diagnosed with ADHD (Akinbami, Liu, Pastor & Reuben, 2011). Thus, the need for accurate assessment, diagnosis and treatment is imperative, as is the need to rule out other possible comorbid diagnoses. In addition to the core symptoms of ADHD, including inattentive, impulsive and hyperactive behaviors, sleep complications are prevalent in this population. Sleep deprivation and sleep disorders can be contributing factors to an adolescent student’s inattentive behavior and low achievement. With the significant rise of ADHD diagnoses within the school-aged (K-12) community, it would be judicious for professionals to also consider how sleep is impacted by ADHD. This review of the literature will focus on identifying key elements of both ADHD and sleep disorders and the relationship between these two.
I. ADHD

*Causes and Symptoms.* Attention-Deficit/Hyperactive Disorder or ADHD is a clinical diagnosis that is characterized by symptoms ranging from inattention, hyperactivity, and impulsivity (Brock, Jimerson & Hanson, 2009; Chiang et al., 2010; Rief, 2008). Specifically, problems with concentrating, disorganization, fidgeting, and impulse control are common with these children. In addition, ADHD contributes to poor academic performance that can lead to grade retention, placement in a special education program, or failure to graduate from high school (Brock et al., 2009; Gruber et al., 2008; Rief, 2008; Sung, Hiscock, Sciberras & Efron, 2008). According to Chandler (2010), ADHD is described as “a complex neurobehavioral problem with a genetic component,” wherein “the environment can exacerbate or ameliorate the symptoms” (p. 2).

Psychosocial factors that increase the likelihood of a child exhibiting ADHD symptoms include severe marital discord amongst parents/guardians, low socio-economic class, large family size, paternal criminality and maternal mental illness (Brock et al., 2009; Rief, 2008; Sung et al., 2008). ADHD may have long-term effects on a student’s academic achievement. Assessment, diagnosis and treatment are vital to attempting to promote more positive, pro-social outcomes (Brock et al., 2009).

*Diagnosis.* Due to the nature of the disorder, it important to use a multi method, multi setting, multi source assessment (i.e., different measures and observations from several individuals in various settings). To make an accurate diagnosis, observation of the
child in multiple settings, interviews of guardians or parents, the use of valid and reliable questionnaires, and review of medical and school records are all necessary (Chandler, 2010). Following this protocol will help to obtain vital information to either confirm or rule out ADHD. That information includes current behaviors across multiple settings, family background and medical history, academic and behavioral history, parental discipline approach, child’s quality of relationships, and the child’s developmental history (Brock et al., 2009; Rief, 2008). The assessor should use standard criteria once they have gathered all necessary information to make the diagnosis. The *Diagnostic and Statistical Manual of Mental Disorders* [American Psychiatric Association (APA), 2000] outlines these criteria and are offered in Table 1:

<table>
<thead>
<tr>
<th>DSM IV-TR Diagnostic Criteria for ADHD</th>
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<td><strong>I: A or B</strong></td>
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<tr>
<td><strong>1A: 6 or more of the following symptoms of inattentiveness have been present for at least 6 months to a point that is disruptive or inappropriate for developmental level</strong></td>
</tr>
<tr>
<td><strong>A:</strong></td>
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<tr>
<td>1. Often does not give close attention to details or makes careless mistakes in schoolwork, work or other activities.</td>
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<tr>
<td>2. Often has trouble keeping attention on tasks or play activities.</td>
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<tr>
<td>3. Often does not seem to listen when spoken to directly.</td>
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<tr>
<td>4. Often does not follow instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behavior or failure to understand instruction).</td>
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<tr>
<td>5. Often has trouble organizing activities.</td>
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<tr>
<td>6. Often avoids, dislikes, or doesn’t want to do things that take a lot of mental effort for a long period of time (such as schoolwork or homework).</td>
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<tr>
<td>7. Often loses things needed for tasks and activities (e.g., toys, school assignments, pencils, books, or tools).</td>
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<tr>
<td>8. Is often easily distracted.</td>
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<tr>
<td>9. Is often forgetful in daily activities.</td>
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<tr>
<td><strong>1B: Six or more of the following symptoms of hyperactivity-impulsivity have been present for at least 6 months to an extent that is disruptive and inappropriate for developmental level.</strong></td>
</tr>
<tr>
<td><strong>B:</strong></td>
</tr>
<tr>
<td>Hyperactivity:</td>
</tr>
<tr>
<td>1. Often fidgets with hands or feet or squirms in seat.</td>
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<tr>
<td>2. Often gets up from seat when remaining in seat is expected.</td>
</tr>
<tr>
<td>3. Often runs about or climbs when and where it is not appropriate (adolescents or adults may feel very restless).</td>
</tr>
<tr>
<td>4. Often has trouble playing or enjoying leisure activities quietly.</td>
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<tr>
<td>5. Is often “on the go” or often acts as if “driven by a motor.”</td>
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</table>
6. Often talks excessively.

**Impulsivity:**
1. Often blurts out answers before questions have been finished.
2. Often has trouble waiting one’s turn.
3. Often interrupts or intrudes on others (e.g., buts into conversations or games).

| II. | Some symptoms that cause impairment were present before age 7 years. |
| III. | Some impairment from the symptoms is present in two or more settings (e.g., at school/work and at home). |
| IV. | There must be clear evidence of significant impairment in social, school, or work functioning. |
| V. | The symptoms do not happen only during the course of a Pervasive Developmental Disorder, Schizophrenia, or other Psychotic Disorder. The symptoms are not better accounted for by another mental disorder (e.g., Mood Disorder, Anxiety Disorder, Dissociative Disorder, or a Personality Disorder). |

Based on these criteria, three types of ADHD are identified:

1. **ADHD, Combined Type:** if both criteria 1A and 1B are met for the past 6 months (ADHD-C)
2. **ADHD, Predominantly Inattentive Type:** if criterion 1A is met but criterion 1B is not met for the past six months (ADHD-I)
3. **ADHD, Predominantly Hyperactive-Impulsive Type:** if criterion 1B is met but Criterion 1A is not met for the past six months (ADHD-H).

Table from APA (2000).

**Treatment.** One of the most common treatments for ADHD includes the use of psychostimulant medications (Rief, 2008). Controversy continues to exist over the use of psychopharmaceuticals in the treatment of ADHD, and much of the current research effectively argues for both sides of the debate. The controversy lies in whether pharmaceuticals or behavioral training is the best way to treat ADHD. There is evidence that shows either or both can have positive outcomes in treating ADHD (Chandler, 2010).

Non-pharmacological treatment of ADHD typically includes behavioral intervention, namely parent training. These types of interventions include overviewing the ABC method (Antecedents, Behavior, Consequences), acknowledging and responding to adaptive behaviors, psychoeducation, the use of reinforcers or rewards (rewarding good behaviors and ignoring the bad behaviors), consistent behavioral rules,
problem solving, and giving specific and short commands (Chandler, 2010). Other forms of therapy, including Cognitive Behavior Therapy (CBT) or supportive therapies are considered to be beneficial in treating the secondary symptoms of ADHD (poor social interactions and low self esteem; Chandler, 2010; Sciberras, Fulton, Efron, Oberklaid & Hiscock, 2011). CBT is a treatment that targets certain types of behaviors, training the child to think about the behaviors, and replace them with healthier, more acceptable behaviors. The purpose of CBT is to help clients first, recognize the ADHD behaviors and then manage them. For example, the STOP-THINK-DO approach helps children problem solve and self-monitor to reduce impulsivity (Chandler, 2010). The key for these types of treatments to work effectively is to actively apply those behavioral interventions consistently and across several settings to provide continuity of the training (Sciberras et al., 2011). If the interventions are not used as on a daily basis, then students will not be able to consistently learn acceptable behaviors.

As a part of a thorough assessment protocol, professionals must rule out differential diagnoses when diagnosing ADHD, keeping in mind comorbid issues. Examples of comorbid symptoms or diagnoses can include depression, anxiety, school failure, and sleep disturbance. This paper will focus on sleep disturbance and its relationship to ADHD.

II. Sleep Disturbance in Adolescents

Today, children and adolescents are getting less sleep than needed to function and grow into healthy young adults (Amschler & McKenzie, 2005; Fredriksen, Rhodes,
Reddy, & Way, 2004; Wolfson, Spaulding, Dandrow, & Baroni, 2007). Calamaro, Mason, and Ratcliffe (2009) further explain that, on average, adolescents are getting less than 7 hours of sleep per night, when it is recommended they need about 8 to 9 hours of sleep. Problems with sleep are likely to contribute to teens developing other mental health or medical complications, such as mood disorders or asthma (Calamaro et al., 2009; Cortese et al., 2007; Fredriksen et al., 2004; Noland, Price, Drake, & Telljohann, 2009). Researchers have learned the important role that quality sleep has in terms of a young person’s growth, development, cognition, and school achievement (Billows et al., 2009; Bruni et al., 2006; Gruber et al., 2008; Meijer & Wittenboer, 2003; Noland et al., 2009).

**Risk Factors.** There are some risk factors to consider when looking at why adolescents do not get as much sleep as pre-adolescents. Some of these factors can be controlled whereas others cannot. For example, nutrition, exercise, and familial interactions can affect sleep and can be controlled to some extent. Other issues such as school start time and biological changes in the adolescent body cannot be controlled. Risk factors for daytime sleepiness, sleep disturbance and sleep disorders include, but are not limited to: high BMI (Body Mass Index), low SES (Socioeconomic Status), and shorter sleep duration due to distractions or demanding schedules (Anderson et al., 2009; Calamaro et al., 2009). Technology, increased homework load, social activities, and energy drinks may also be factors leading to sleep deprivation in adolescents (Amschler & McKenzie, 2005; Calamaro et al., 2009; Noland et al., 2009). As some of these
problems can be controlled or solved easily to increase sleep time for adolescents, some of them cannot be helped and therefore can present an array of issues that can have negative repercussions and consequences.

Behaviors that can negatively impact academic achievement and are often associated with poor sleep include lack of concentration, impairment in maintaining focused attention, and fatigue. These symptoms can cause a child to become over-aroused (i.e., hyper, fidgety and impulsive), and difficult (i.e., defiant, irritable, aggressive; Amschler & McKenzie, 2005; Bruni et al., 2006, University of Helsinki, 2009). Executive functioning, which is often defined as the “planning/decision making” part of the brain, is affected by the behaviors from lack of sleep. Problems with executive functioning can ultimately lead to low achievement in school (Anderson et al., 2009; Gruber et al., 2008). Chronic sleep deprivation not only causes problematic behaviors, such as moodiness and irritability in children, but also can adversely affect executive functioning (Karimzedeh, 2012; Sung et al., 2008). These behaviors can cause students to develop behavioral problems in school, be frequently tardy, have mental lapses, and have lowered motivation (Mitru, Millrood, & Mateika, 2002).

Sleep Time. Sleep disturbance and the decreasing amount of sleep time a student is getting can be attributed to school start times. Studies have suggested that a later start time at school (e.g., 9:00 vs. 7:30 AM) can help to increase the quantity of sleep (Brydolf, 2011; Jackson, 2011; Nolan et al., 2009; Wolfson et al., 2007). This also is related to the fact that when children grow and develop into adolescents, they tend to need more sleep.
This change is related to specific hormonal transformations within the body’s chemistry as children get older (Brydolf, 2011). This can pose a problem when children go through puberty and the student is still expected to get up for school at the same time as his/her younger counterparts. Adolescents and pre-adolescents tend to get the best quality sleep by going to bed late and sleeping in later (Mitru et al., 2002; Taras & Potts-Datema, 2005; Wolfson et al., 2007). Researchers Gruber et al. (2008) suggest that an increase of one hour per night of sleep time over the course of three days can cause significant cognitive and neurobehavioral improvements for pre-adolescents and adolescents.

Sleep Hygiene. Sleep hygiene consist of habits that promote sleep; for example, routine bedtime, no consumption of caffeine before bedtime, adjusted temperature and light in the room. Other examples of good sleep hygiene are no electronics and exercise right before bedtime, rising at the same time each morning, and self-relaxation techniques before sleep (Billows et al., 2009). Additionally, Ballas (2008) affirms that using the bed where a person sleeps for other activities can actually increase the time for sleep onset, which is one of the main sleep problems that can lead to sleep deprivation. Keeping a sleep diary wherein one tracks patterns of sleep and days of the week when sleep is more difficult, can help with identifying sleep issues. These sleep hygiene habits can help those get much better quality sleep and have less sleep disturbance. Sleep hygiene, when practiced, can help to deter sleep disturbance (Billows et al., 2009). Without the proper practice and good development of sleep hygiene, adolescents will start to experience the consequences of sleep problems. This can and usually develops into a sleep disorder.
Symptoms of Sleep Disturbance. It is important for parents and educators to be able to identify sleep disturbance and/or sleep disorder symptoms in children and adolescents. Some clues suggesting the possible presence of sleep deprivation or sleep disorders in a child may include: snoring, pauses in breathing while sleeping, spontaneous and frequent awakening at nighttime, and daytime sleepiness. Educators should look for students falling asleep in class as a possible sign of poor sleep hygiene or sleep-related disorder, and should consult with parents or guardians in this matter (Mitru et al., 2002). A common sleep disorder diagnosed in children is sleep-disordered breathing (i.e., sleep apnea). Sleep Apnea is by far the most reported and diagnosed sleep disorder among the pediatric population. Obstructive sleep apnea (OSA), a type of sleep apnea, is full or partial obstruction to the airway flow during sleep (Karimzedeh, 2012). Other pediatric sleep disorders include: periodic limb movement (PLM; characterized by the movement of one or more limbs during sleep) and restless leg syndrome (RLS; characterized by the irresistible urge to move the legs which is brought on by a tingling or crawling sensation). Of these disorders, sleep apnea and restless leg syndrome is the most prevalent in teenagers, although any person is certainly susceptible to any sleep related disorder. Children with OSA, for example, have trouble with executive functioning. The symptoms derived from poor executive functioning within the prefrontal cortex mimic the same deficit in ADHD (Gau & Chiang, 2009). OSA and ADHD both produce issues with impulse control and emotional liability (Silverstri & Arico, 2012). Further, OSA, PLM, and ADHD all have a dopamine deficiency
mechanism (Gau & Chiang, 2009; Gagliano et al., 2011.). This could mean an underlying and underdiagnosed common deficit among youth with ADHD and sleep problems.

III. ADHD and Sleep

Sleep hygiene, sleep disturbance and sleep disorders in the pediatric population have been thoroughly researched, and Mitru et al. (2002) discusses the topic of ADHD in relation to sleep deprivation as,

The relationship between sleep and daytime hyperactivity was initially accounted for by the Diagnostic and Statistical Manual of Mental Disorders, version III (DSM-III; American Psychiatric Association, 1980), in which excessive movement during sleep was used as one of five possible behavioral characteristics of daytime hyperactivity (p. 714).

Even though the current version of the DSM (DSM-IV-TR; APA, 2000) does not include sleep disturbance as one of the criterion symptoms/behaviors listed under ADHD, it is still considered to be a clinical concern among practitioners who work with those diagnosed with ADHD (Cassoff, Wiebe, & Gruber 2012; Chiang et al., 2010 Rief, 2008). As much as 50% of the ADHD population reported having some form of sleep deprivation or sleep related problems (Rief, 2008). Clinicians and educators alike must be aware of sleep and it’s affects on students with ADHD as the symptoms of sleep deprivation can result in greater complications and less responsiveness to treatments.

As noted in the previous section, ADHD and chronic sleep disturbance/sleep deprivation share common characteristics, such as inattention, impulsivity, and
restlessness. There are also specific symptoms of sleep disorders, including insomnia, night terrors, sleep talking, bruxism and snoring, that relate directly to ADHD behaviors (Corkum, Tannock, Moldofsky, Hogg-Johnson, & Humphries, 2001). These symptoms specifically relate to ADHD-H (Attention-Deficit/Hyperactive Disorder Predominantly Hyperactive-Impulsive Type; Amschler & McKenzie, 2005; Chiang et al., 2010; Corkum et al., 2001). Low quality sleep due to a sleep disorder can cause children to have daytime symptoms similar to that of children with ADHD, such as inattentiveness, hyperactivity and impulsivity. Children with ADHD also display an increase in behaviors associated with dyssomnias (a broad term for sleep disorders that have to do with maintaining sleep or sleep onset), which include a resistance to bedtime, later sleep onset, and problems awakening (Corkum et al., 2001; Nauert, 2009). This resistance to bedtime could be misinterpreted as oppositionality, which is known to be highly associated with ADHD (Weiss & Salpekar, 2010).

Chronic sleep-onset insomnia is the inability to fall asleep, happening frequently enough to become a health risk. According to some research, as many as 30% of medication-free children with ADHD have been shown to have chronic sleep-onset insomnia. Other research has also confirmed that excessive daytime sleepiness in students with ADHD can account for being less alert in class, therefore causing the ADHD symptoms to be much more pronounced (Weiss & Salpekar, 2010).

In a study conducted by the University of Helsinki (2009), sleep deprived children were found to exhibit more inattentive and hyperactive behaviors than controls, even
though they were not diagnosed with ADHD. Ruling out ADHD as the precipitating problem behind sleep deprivation is critical to treatment, though the similarities between the two makes differential diagnosis challenging. In *The Science of ADHD*, Chandler (2010) lists common disorders that may be mistaken for ADHD. Four of these disorders involve sleep or sleep disturbance, including: Narcolepsy, Sleep Deprivation, Sleep Apnea, and Klinefelter Syndrome. Some sleep disorders, specifically Sleep Disordered Breathing, has been linked to ADHD behaviors (Karimzadeh, 2012; Sung et al., 2008). Moreover, similar studies have shown that excessive daytime sleepiness (the primary symptom of Narcolepsy) can become a significant problem in obese adolescents with ADHD (Cortese et al., 2007). Other researchers have found that sleep disorders or sleep deprivation can exacerbate ADHD behaviors and symptoms (Silvestri & Arico, 2012). In some cases, sleep deprivation itself can mimic ADHD behaviors (Cassoff et al., 2012).

Additional investigation is needed to truly understand the nature of ADHD and sleep disorders. Since both disorders have similar symptomology misdiagnosis is likely. It would seem there is a bidirectional relationship between ADHD and sleep disorders/sleep deprivation, wherein one disorder can cause or exacerbate the other. In exploring the relationship between ADHD and sleep, it is essential to take into account all arguments posed. For example, Chandler (2010) stated,

Sleep disruption is a common side-effect to stimulant medication. This should not come as a surprise as one of the uses of methylphenidate is for Narcolepsy, which a sleep disorder characterized by excessive daytime sleepiness. (p. 168)
Many adolescents will experience sleep problems when on medication for ADHD. For this reason, pharmacological treatment is not black-or-white when treating ADHD; patients have to visit the doctor many times to try different combinations of medications and dosages in order to get the best treatment (Chandler 2010). Some medications are used to treat sleep problems when ADHD is present, such as Clonodine and Periactin (Chandler, 2010; Corkum et al., 2001; Noland et al., 2009; Taras & Potts-Datema, 2005).

Summary

It is of utmost importance for educators, school mental health professionals, medical professionals and parents to recognize the severity of sleep deprivation in children, especially those already diagnosed with ADHD. Thorough assessment is needed to confirm a student has ADHD as well as possible sleep disorders. With sleep disorders, there are symptoms that often times look like and/or mimic, symptoms or behaviors that are related to ADHD (Ballas, 2008). Gau et al., (2007) suggested that it is difficult to rule out ADHD when someone presents with sleep deprivation or a sleep disorder, unless the diagnosis was accomplished with highly comprehensive and established protocols. The same researchers also note that students with mild inattentiveness or hyperactivity should seek to be thoroughly assessed for a sleep disorder, as symptoms often get mistaken for ADHD. Researchers, doctors and educators must be well aware that sleep deprivation can have significant and long-term negative consequences for adolescents.

In sum, caution should be taken when assessing adolescents for ADHD and sleep
disorders. Much of the research presented in this literature review has identified the symptom overlap and issues surrounding misdiagnosing or misinterpreting the symptoms of both disorders. Since ADHD and sleep disruption cause students to have challenges at both school and home, it is prudent that more research be conducted and that a careful protocol is followed when making recommendations for either disorder. School nurses, teachers and school psychologists can act as advocates for parents in many cases. School staff can provide parents with additional information and resources necessary to make conscientious decisions and comprehensive treatment plans. This literature review and workshop is intended to educate those working in the schools on the identification, assessment and intervention for those students who have both ADHD and sleep disordered symptoms.
CHAPTER 3

METHODOLOGY

Research

Extensive research was done in order to better understand the connection between ADHD and sleep disturbance among youth. Key terms and phrases used in researching this topic include Attention-Deficit/Hyperactivity Disorder, ADHD in adolescents, sleep disturbance and ADHD as well as sleep disturbance among adolescents. The literature review includes articles from the Sacramento State University online library as well as use of government websites including the National Institute of Health. Other scholarly articles were provided by other websites of institutions of higher learning.

Development of Presentation

The presentation was largely created for school based mental health professionals (school counselors, school social workers, school based MFT’s and school psychologists). The intention behind the presentation/workshop is to inform on the research currently being conducted on ADHD and sleep disturbance among youth. The treatments and interventions included in the presentation were formatted for school based mental health professionals. They also keep in mind the length of time and setting with which school based mental health professionals work with students.

These treatments are for adolescents who are struggling in school and who have exhibited symptoms of ADHD or sleep disturbance or both. They should be used with
caution in that student and parent permission should always be acquired before attempting any psychological or behavioral counseling using these materials.

The presentation can be given in roughly 1 to 2 hours depending on the size of the audience. The presenter(s) should keep in mind, the more active participation from the audience, the longer the presentation will take. Further, all materials for the presenter and audience are located in the appendices of this paper.
CHAPTER 4

FINDINGS

Through extensive research, information was collected regarding sleep disturbance and ADHD and the following workshop for school based mental health professionals was developed. This workshop includes an overview of Attention-Deficit/Hyperactivity Disorder (ADHD), as well as sleep, and sleep disturbance among youth. Finally, some research presented on the similarities and differences between ADHD symptoms and sleep disturbance symptoms.

Workshop Objectives

This workshop is to educate and inform school based mental health professionals of the identification, symptoms and treatments of ADHD and sleep disturbance. The participants should come away with more knowledge regarding the similarities and differences between ADHD symptoms and the effects of sleep disturbance among youth. Further, they should also get more information regarding effective sleep hygiene tips for teens. Other suggestions for assessment methods, treatments and interventions that can be used with teens, are also included as part of this workshop. This information should be easily incorporated into school based counseling sessions or psychological assessment procedure for special education eligibility.
Discussion

This workshop is only one step towards better understanding the connection and development of ADHD and sleep disturbance. Moreover, sleep disturbance among youth in general is a developing concern in the education setting in the United States, with the advent of technology and more hours added to the school day each year. More research should be done on how to better implement sleep hygiene curriculum as a mandatory standard in K-12 education. Lastly, school based mental health professionals reach students on an individual level and many of the symptoms discussed in the workshop are easily detectable according to our specific job descriptions and in how we interact with students. It is our duty as mental health professionals in the school setting to communicate concerns and information to parents and guardians of students struggling with suspected ADHD, sleep disturbance or both.

Recommendations

It is recommended that this workshop should be used to help students who have behavioral problems that are either founded in ADHD or suspected ADHD or sleep disturbance. Moreover, the procedure of assessment and intervention can also help students who are also suspected of having a sleep disorder. The information obtained through assessment and gathering of the student’s background information can be useful for medical professionals who specialize in sleep medicine. Many times, we as school based mental health professionals can help inform doctors of student behaviors in schools which in turn help them diagnose a medical problem.
Conclusion

Many problems associated with ADHD and sleep disturbance are also problems associated with students’ low achievement, poor school attendance and behavioral problems. More education is needed for school based mental health professionals in this area, as sleep disturbance and ADHD are both prevalent and rising issues among the K-12 population. School start time is also a significant contributor to student problems associated with sleep disturbance, which in turn, exacerbates ADHD symptoms. Although there is some research to support late school start time for secondary schools as beneficial for students, more quantitative research needs to be done in this area. Finally, encouraging parents to help monitor their teens sleep hygiene and acknowledge family disturbance, will aid students in reaching their educational potential.
Appendix A

Presenter’s Manual

Introduction

The presenter’s manual will help those who are interested in presenting information on ADHD and sleep disturbance among adolescent youth. Further, the presentation also includes information on sleep rhythm; sleep hygiene, common causes of sleep disturbance, assessment, interventions and treatments. This information is beneficial for those professionals that work in the mental health field within public K-12 schools. Since this is focused on adolescent psychological health issues, the information presented should be within the context of secondary school setting. However, the information presented can be modified for the use of younger students and this is up to the mental health professionals who will use the materials and information presented in this workshop.

Nature of Presentation

The presentation is in three distinct parts. The first part is an overview of Attention-Deficit/Hyperactivity Disorder, which will go over symptoms and common diagnostic procedures that most school based mental health professionals are already aware of. The second part is focused on the nature of sleep and the effects of sleep disturbance among youth. The last section is dedicated to identification, assessment and possible treatments for sleep disturbance (for students with or without ADHD). All three
of these sections include well researched facts, statistics and visual depictions of ADHD and sleep disturbance as well as an analysis of these to help the audience better understand the information.

Guidance to Presenters

The presentation is in a Microsoft PowerPoint format, with slides that include information on ADHD and sleep disturbance among youth. Sources from which the information was obtained from are in APA format at the bottom, left hand corner of each slide. This presentation is likely to take approximately 1 to 2 hours to present. It is suggested that the potential presenter(s) look over the notes in the presenter’s manual in order to familiarize themselves with the content. The information within the workshop presentation is readily easy to understand as long as the audience has a basic foundation in psychological and behavioral issues prevalent among adolescents.
About the Author

Christina Saad is a student in the School Psychology graduate program at California State University, Sacramento. This workshop was developed to satisfy as part of the graduate requirements for the Education Specialist degree. Christina also has a Master’s of Science in School Counseling from California State University, Sacramento.
Hello! Here are presenter notes to use when conducting a workshop on ADHD and Sleep.

First…

- Writing that is in *italics* are directions, all other type font will be suggested commentary.

- Know your audience: This will work for most school-based mental health professionals (school counselors, school social workers and MFT’s that are school based as well as school psychologists).

- These are suggestions of what should be said with each slide. Make the comments and anecdotes your own, with your own style and vernacular. This will help with making the presentation as smooth and more conversation-like than stuffy or formal.
• When in doubt, ask the audience to share experiences, anecdotes or comments.

• Good luck!

*Introduce yourself and your background - For example…

• Credentials/education/experience with students

• If the audience is a small group (5-10), ask each to introduce him/herself

• Be sure to smile and let the group know they are encouraged to ask questions/make comments throughout the presentation

FYI: Throughout these notes, SBMH= School Based Mental Health
The reason for the brief overview of ADHD is that because we are all SBMH that we deal with ADHD a lot and know the symptoms/red flags. The suggested interventions are a key part of the presentation because we want to be proactive in determining if a student truly has sleep problems and if they’re having an impact on their education.
Here, you can read the bullet points and after each one, add the following:

- I am sure many of you have seen students asleep in class as you're observing them or hear teachers complain about kids putting their heads down on their desks during class time. Ask by a show of hands, how many of you have had to deal with kids showing up late to school because of sleep issues or falling asleep in class?
- *ASK:* What kinds of behaviors are often associated with poor sleep?
- ADHD is rampant in our field, we see it a lot, especially in schools where the underprivileged are being served.
These next 3 bullet points I’ll be discussing at length about throughout the presentation. In the DSM III, sleep disorders used to be a part of the symptomology of ADHD. This was taken out for the DSM IV as it does not affect all people with ADHD but there is research that suggests it is prevalent enough to be a problem.
You’ll want to discuss WHY this is an important topic. Read bullet points and explain:

As SBMH we have an obligation to our students to make sure they are reaching their educational potential.

Since sleep is such an important part of growing and learning, students with ADHD will have an even harder time because they are dealing with their symptoms.

For students who do not have ADHD but are still exhibiting those types of symptoms then sleep deprivation could be the next natural suspicion.
Briefly say,

Now we’ll be going over some important points about ADHD in order to try and differentiate between ADHD-like behaviors, sleep disturbance effects and ADHD.
After each corresponding bullet point...

- These are the 3 main behaviors corresponding to ADHD.
- We know often times ADHD runs in family history.
- As SBMH professionals we are aware of the comorbid psychological disorders that sometimes tag along with ADHD.
- The 3 predominant subtypes of ADHD- the first, H/I, we see in a lot of children; C is often times harder to distinguish and the I is the hardest to figure out because inattentiveness can be mistaken for other behaviors (depression, anxiety, etc.)
• The multimodal procedure to diagnose ADHD is considered best practices but often times we see MD’s take the easy way out.

• *ASK* Does anyone have an anecdote or story about local MD’s writing prescriptions for ADHD medication without any kind of diagnosis procedure?

• Research is solid in that skills training and along with medication is the best; however medication is not a necessity. Most professionals would agree that some kind of behavioral/skills training is necessary for all suffering from ADHD.
So since sleep is an important part of one's development and it does effect some students with ADHD, which many of those students we as SBMH work with, then it is essential to go over the basics of sleep.
This is how sleep is regulated. It makes sense that our bodies are in sync with the time of day. This is why it is more difficult to sleep at night with lights on in the room. It gives your brain the impression that it is still daytime.

Melatonin is essential for sleep- in this illustration it say it starts to secrete at 21:00 which is military time for 8:00pm. This doesn’t mean that students should go to sleep at 8pm but that they should be winding down, doing things that are calming (taking a warm bath, reading) and definitely not working out or playing video games as these activities will stimulate the brain too much.
This also helps us to understand why electronics play a huge part in why students cannot sleep. They become too stimulated and it takes the brain longer to realize that it’s time to sleep even when they are done with that particular activity.
Many of you are already familiar with the idea that once your body is used to a certain way of doing things, it’s hard to break out of that habit.

This is an example of a sleep cycle a teenager could fall into:

Cumulative sleep debt is an important part because it motivates our teens to sleep in on the weekend, therefore confusing the body once again into a different wake-sleep time. Then when Monday rolls around, the body wants to sleep in. During the whole week the body is once again trying to regulate itself but the student is overly tired, pays little attention in class, is irritable..etc. etc.
When a student has had weeks of accumulated sleep debt, this turns into sleep disturbance. Many students, especially those suspected of having ADHD, sometimes have the behaviors that lead to sleep disturbance (wanting to stay up and play video games, defiance when parents try to set a specific bedtime, etc.)

Unfortunately teenagers’ bodies are set up for the best quality sleep when school start time is later. This has to do with the stage of puberty and drastically changes their hormones.

Early start times for secondary schools is well researched fact that high schools that start later have less tardies and absences.
Explain what each of these disorders is...

OSA- partial or full obstruction of upper airway during sleep (causes you to stop breathing)

SM- sudden jerks or muscle twitching during sleep

PLM-display involuntary limb movements that occur at periodic intervals anywhere from 20–40 seconds apart

RLS- a disorder in which there is an urge or need to move the legs to stop unpleasant sensations. May be described as creeping, crawling, aching, pulling, searing, tingling, bubbling, or crawling.

ASK: Some research has shown that two of these sleep disorders are more prevalent with students with ADHD…which ones do you think they are and why?
Along with early school start time, some other factors that lead to poor sleep.

**ASK:** Why would you think family dysfunction could lead to sleep disturbance? Are there any other examples of this that you can think of? What about some of the others on here?
Many of the effects of sleep disturbance, we see on a day-to-day basis. The students who seem tired are not able to function, cannot complete classwork/homework and as a result, do worse in school.

We can often times think a student is having behavior problems because of family situations at home but the behaviors aren’t consistent enough. It is our job as SBMH to ask students about their day-to-day activities and if they are getting good quality sleep at night.
As we have already discussed, many of the behaviors seen in students who get poor sleep look like ADHD. Especially the inattentive, hyperactivity and impulsivity.

*Read slides and continue on...*
It would be best to use a laser pointer on this slide to point out each of the bullet points.

The main effect we witness in schools is irritability. We see it when teachers complain of a student “back talking” or “being incomppliant” or “defiant.”

Health issues are not as evident and we must take care to ask students specific questions regarding how they are feeling physically, as well as mentally and emotionally.

ASK: Any questions so far before we move on?
Read the bullet points and explain:

Now that we have a grasp of ADHD and sleep, we should take a look at how they are similar and different.

Students who are not diagnosed with ADHD but have sleep problems can come off looking like they do have ADHD. Differential assessment for special education eligibility is critical.

If a student is suspected of having ADHD then all areas of suspected disability need to be assessed. ADHD rating scales and student observations can help with this.

Students already diagnosed with ADHD may be on meds that can affect their sleep. Again, it is important to ask questions about medication when counseling/interviewing students.
If a student is diagnosed with ADHD and is not medicated then the next logical conclusion is looking at sleep and its effects.
Here are the similarities and differences of ADHD symptoms and effects of sleep disturbance. Many of the symptoms are similar.

Take care in completely assessing for both ADHD and sleep associated problems before coming to any conclusions.

Some of the effects are long term and some are immediate.

For both ADHD and sleep, the behaviors hyperactivity, impulsivity and inattentiveness are immediate. Weak social skills and obesity are symptoms that take longer or may not appear at all.
As SBMH it is part of our job to make sure our students are doing as best as they can in school. Whether a student is already diagnosed with ADHD or has ADHD like behaviors, they will most likely end up in our office one way or another.

These next slides are suggestions as to how to determine whether a student is having sleep problems. They are very simple and practical suggestions that can be integrated with a psychological assessment, behavioral assessment or counseling sessions.
Read the bullet points, then say:

Here are some of the methods that can be used when investigating sleep disturbance.

I will go into detail about each of these methods of assessment and intervention.

Some of these can be easily implemented and some are a little more time consuming. It all depends on your specific interaction with the student, whether you are a school counselor, school based MFT or school psychologist.
This is the easy part! Looking up records, whether online or in the school office, does not take much time at all. It provides us with a plethora of very vital information regarding the student.

Talking with attendance office staff is crucial! If the school is small (a middle school or junior high), many of the receptionists know the students pretty well. They are aware of who is coming to school late/tardy and whose parents they need to call regarding lateness.

Lateness in and of itself is not an indication of a sleep problem but sleep problems often times cause students to get to school late.

**ASK:** Can anyone tell me what SARB is? What does it mean?
Briefly read some of the bullet points or if good on time, all of them then say:

Here are some interview type questions that can be asked regarding sleep. These are only suggested questions.

ASK: Does anyone have any other questions that you think would be important to ask of the parents or student, which were not included on this slide?
Read example questions…

**ASK:** Does anyone have any other questions that you think would be important to ask of the parents or student, which were not included on this slide?
Standardized questionnaires go a long way in helping to inform us of what a student is experiencing. They in no way are a definite answer or diagnosis. We leave that up to the physicians.

However, more and more MD’s are starting to rely on SBMH professionals for insight on how a student is performing in school. Once it’s filled out, this questionnaire can be given to a parent to give to their child’s doctor.

This is an example of a questionnaire developed for teens to help determine sleep quality and sleep problems.

As you can see, the Likert scale is a very good way of getting more accurate answers. This one is available online but it would be best to get author permission.
Read example questions and possible answers.

ASK: Are there any questions about this particular assessment?
This sleep questionnaire is again, for teens but the questions have more to do with sleep hygiene than general sleep questions.

**ASK:** Could someone explain what sleep hygiene is? Do you think most teens have good sleep hygiene?

Sleep hygiene are things that one does that promotes good quality sleep, such as going to bed at the same time every night; no caffeinated drinks in the evening; etc.

Again, as with the CASQ, get author permission before reproducing and using with students. This is a good assessment to give before teaching a student about sleep hygiene to see how much their habits are getting in the way of a good night’s sleep.
Once again, read the questions and possible answers before moving on.
We want to teach students who are having a difficult time sleeping, how to get better sleep at night.

*Read each bullet point and after each one...*

- Sleep hygiene is a skill that needs practice in order for it to become second nature (like brushing your teeth twice a day).
- We want to inform students of how to get better sleep because it is possible nobody else is doing that.
- We want to give them good tips they can use daily that would be easy for them to implement (e.g. not move out of your sibling’s room because they are disturbing your sleep).
- Determine by asking students how much their parents set their bedtime. Every family is different and we must be aware of that.
• If parents play a vital role in setting bedtime, get them involved and inform them how much sleep is important to their child’s success in school.
• Empower students to make mature decisions when it comes to sleep and sleep hygiene.
• We as SBMH should take it upon ourselves to educate ourselves about sleep hygiene and the best ways to help students who need more guidance in this area.
A good way to start is to find already used sleep hygiene curriculum. Some health teachers spend some time going over this in class.

However, not every student takes health (some only take it in high school) and you may need to educate students themselves.

This can be used in the classroom with groups of students or on an individual basis. It is available for free online and promoted by the National Institute of Health.

One part of this is how to use a sleep diary.

In the upcoming slides, I will explain this in further detail.
For those of you Microsoft Word/Publisher savvy, this may appeal to you. These are very good for students you may not be seeing often (in counseling) and can be part of a behavioral support plan, which I will be explaining in a couple of slides.

An even better idea than this is to make small, wallet sized cards with some tips/tricks for better sleep. Students can keep these in their wallet or purse.

Check in so often with them to see if they are using the information to help get their sleep under control.
These are some suggested tips for good sleep hygiene. There are many more out there all you have to do is Google “sleep hygiene”.

There are books, journal articles, and magazine articles, about sleep hygiene. You can add these to a pamphlet like the one I showed you on the previous slide.

Discuss these with the student and encourage them to ask questions about each of the bullet points.

**ASK:** What are some other sleep hygiene tips that are not included in this slide? What do you do to help regulate your sleep?

**ASK:** Any other questions so far?
The NIH Sleep curriculum example also includes some handouts for students. This is a sleep diary chart. For each of these boxes, students put in how much sleep they got, each night.

They count up the hours and come up with an average. They will start to see a pattern on certain nights and this can be done for a couple of weeks in order to determine the real cause.

Most likely they will see the most sleep they get will be on the weekends. Students need to actually see that this is not healthy and that getting more sleep on the week days as well, would be better.

Once the chart is complete, you can sit with a student and come up with ways he/she can get more hours of sleep or better quality sleep.
This shows how to calculate the number of hours and come up with an average. It is best to review this chart after 2 or 3 weeks.
Read the bullet points to the audience. After the third bullet point, ASK: Could someone explain what a BSP or Behavior Support Plan is? Most SBMH should be aware of what these are.

Continue...

It’s important to figure out an effective reward otherwise, student won’t be motivated. After a while, the BSP should be phased out and the reward in and of itself would be better quality sleep. Checking in with the student is crucial for this to actually work.
Referring to medical professionals is really important if the student is exhibiting severe sleep related behaviors (falling asleep frequently in class and snoring, injuries during PE or sports, etc.) Here are some local resources for parents/students.

**ASK:** At what point should you suggest to a parent to seek out medical advice?
slide 34

Further Reading on Sleep Hygiene/ADHD:

- Sleep Foundation
  - http://www.sleepfoundation.org/article/sleep-topics/teens-and-sleep
- Mayo Clinic
- American Psychology Association (APA)
- National Institute of Mental Health (NIMH)
- Learning Disabilities Online
  - http://www.ldonline.org/adhdbasics/teens
- Center for Disease Control (CDC)
  - http://www.cdc.gov/ncbddd/adhd/
- Children and Adults with Attention Deficit/Hyperactivity Disorder (CHADD)
  - www.chadd.org

Further reading…
Any comments questions? Thank you for your time. Feel free to contact me (provide full name, email address) if you need any of the resources I used in this presentation.

Thanks again.
Appendix C

Handouts for Participants
Sleep hygiene Tips for Teens

1. Your bedroom should be dark, quiet, comfortable, and cool. Use comfortable mattress and pillows.

2. Use your BED ONLY FOR SLEEP—not studying, not texting, etc. That way, your body will instinctively know that when you are in bed, it’s time for sleep and nothing else.

3. YOUR SLEEP OBJECTIVE should be 8 or 9, or even 10 hours of sleep every night. Your health, your happiness, your weight control, and your life depend on it!

4. Avoid nicotine, caffeine and heavy exercise within two hours of bedtime as they may delay sleep onset.

5. Practice relaxation techniques before bedtime. Deep breathing and visualization techniques can help you relax and facilitate sleep.

6. Schedule 30 minutes of "quiet time" before getting into bed. During this period abstain from using the telephone, radio, television, or computer

7. Worry before going to bed rather than after you are in bed. Write down your worries or your next day's "to do" list onto a note pad that is kept in the bedroom

8. Lighting in bedroom: keep lights low, or off, at night

9. Sleep wake rhythm: Try to wake at or about the same time every day (even weekend days)

10. If you can’t get to sleep after about 20 minutes, don’t just lie there, and don’t keep looking at the clock. Get up out of bed and do something non-stimulating, such as reading (not TV!), and then go back to bed and see if your body will cooperate this time.

References:


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<th>TUES</th>
<th>WED</th>
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<th>FRI</th>
<th>SAT</th>
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**Sleep Diary**

- **Date Begun:**
- **Name:**

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**Note to students:** For the period FRI/SAT/ Москв, indicate your bedtime Friday night and your wake time on Saturday morning. These data line per...

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Do you believe that you often have difficulty sleeping? (Having deep, refreshing sleep during the night affects your performance)

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<th>No</th>
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Handout provided via public domain by NIH Office of Science Education and Biological Sciences Curriculum Study (BSCS).
# Recording Bedtimes and Wake Times

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<th>Record this number as your bedtime in your Sleep Diary</th>
<th>If you wake up at:</th>
<th>Record this number as your wake time in your Sleep Diary</th>
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Handout provided via public domain by NIH Office of Science Education, and Biological Sciences Curriculum Study (BSCS).
# Sleepiness Scale

Name ___________________________  Date ________________

Use the following scale to assess your sleepiness at the times indicated in the table below.

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<th>Score</th>
<th>Description</th>
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<tr>
<td>1</td>
<td>feeling active and vital, alert, wide awake</td>
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<td>2</td>
<td>functioning at high level, but not at peak; able to concentrate</td>
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<td>3</td>
<td>not at full alertness, but responsive and awake</td>
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<td>4</td>
<td>not at peak; let down; a little foggy</td>
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<td>5</td>
<td>beginning to lose interest in remaining awake; slowed down; foggy</td>
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<td>6</td>
<td>prefer to be lying down; fighting sleep; woozy</td>
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<td>7</td>
<td>losing struggle to remain awake; sleep onset soon; or asleep</td>
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<tr>
<td>2nd Monday</td>
<td></td>
</tr>
<tr>
<td>6:00–7:00 a.m.</td>
<td></td>
</tr>
<tr>
<td>10:00 a.m.</td>
<td></td>
</tr>
<tr>
<td>2:00 p.m.</td>
<td></td>
</tr>
<tr>
<td>4:00 p.m.</td>
<td></td>
</tr>
<tr>
<td>7:00 p.m.</td>
<td></td>
</tr>
<tr>
<td>10:00–11:00 p.m.</td>
<td></td>
</tr>
</tbody>
</table>

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# Calculating Average Bedtime and Wake Time

Name ___________________________  Date _______________________

To calculate an average bedtime, follow the steps below. Consider the following hypothetical data:

<table>
<thead>
<tr>
<th>Day of Week</th>
<th>Bedtime</th>
<th>Bedtime (as recorded in diary)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friday</td>
<td>11:45 p.m.</td>
<td>11:75</td>
</tr>
<tr>
<td>Saturday</td>
<td>1:00 a.m.</td>
<td>13:00</td>
</tr>
<tr>
<td>Sunday</td>
<td>11:00 p.m.</td>
<td>11:00</td>
</tr>
<tr>
<td>Monday</td>
<td>10:30 p.m.</td>
<td>10:50</td>
</tr>
<tr>
<td>Tuesday</td>
<td>10:45 p.m.</td>
<td>10:75</td>
</tr>
<tr>
<td>Wednesday</td>
<td>11:00 p.m.</td>
<td>11:00</td>
</tr>
<tr>
<td>Thursday</td>
<td>10:30 p.m.</td>
<td>10:50</td>
</tr>
<tr>
<td>Friday</td>
<td>11:45 p.m.</td>
<td>11:75</td>
</tr>
<tr>
<td>Saturday</td>
<td>12:15 a.m.</td>
<td>12:25</td>
</tr>
<tr>
<td>Sunday</td>
<td>11:00 p.m.</td>
<td>11:00</td>
</tr>
</tbody>
</table>

In this example, the average bedtime is calculated as the sum of the bedtimes (113.5) divided by the total number of bedtimes recorded (10). This gives an average of $113.5/10 = 11.35$. Rounding this number to the nearest quarter hour (the decimals would be 0.0 for the hour itself; 0.25 for 15 minutes after the hour; 0.5 for the half hour; 0.75 for 45 minutes after the hour) gives us 11.25, or 11:15 p.m., as the approximate average bedtime.

Calculating the approximate average time you woke up in the morning is done in a similar way.

For your data:

**Average bedtime**

1. Add all bedtimes recorded in sleep diary: ______
2. Number of bedtimes recorded: ______
3. Average bedtime (line 1 divided by line 2): ______
4. Round answer on line 3 to nearest quarter hour to get average bedtime: ______

**Average wake time**

1. Add all wake times recorded in sleep diary: ______
2. Number of wake times recorded: ______
3. Average wake time (line 1 divided by line 2): ______
4. Round answer on line 3 to nearest quarter hour to get average wake time: ______

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References


