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Recommended Citation

Fontanarosa, Mia. "Sleep-Wake Disorders and a Look at Insomnia through Biological and Behavioral Perspectives." *The Review: A Journal of Undergraduate Student Research* 18 (2017): -. Web. [date of access]. <<http://fisherpub.sjfc.edu/ur/vol18/iss1/3>>.

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Abstract

Insomnia is defined by difficulties in falling asleep, maintaining sleep, and problems with early morning awakenings. Unfortunately, due to these symptoms daytime fatigue often follows. Daytime fatigue may have a severe impact on an individual's day. Insomnia symptoms may not exist alone, however. Individuals who are diagnosed with insomnia have another disorder present as well. Often insomnia is paired with anxiety and mood disorders. Therefore, insomnia can be viewed through the biological and behavioral perspectives. Insomnia is a disorder that can be treated. The most common treatment would be cognitive behavioral therapy for insomnia, but treatment is not limited to just that.

Keywords

insomnia, biological perspective, behavioral perspective

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ABSTRACT

Insomnia is defined by difficulties in falling asleep, maintaining sleep, and problems with early morning awakenings. Unfortunately, due to these symptoms daytime fatigue often follows. Daytime fatigue may have a severe impact on an individual's day. Insomnia symptoms may not exist alone, however. Individuals who are diagnosed with insomnia have another disorder present as well. Often insomnia is paired with anxiety and mood disorders. Therefore, insomnia can be viewed through the biological and behavioral perspectives. Insomnia is a disorder that can be treated. The most common treatment would be cognitive behavioral therapy for insomnia, but treatment is not limited to just that.

Sleep-Wake Disorders: An Overview

Normal sleep is what many hope to get when falling asleep. Getting what is referred to as “normal sleep” is important to one's health. Blythe, Doghramji, Jungquist, Landau, and Valerio (2009) address the features that constitute normal sleep in their article “Screening & Treating Patients with Sleep/Wake Disorders.” Those who engage in regular sleep tend to fall asleep within 15-20 minutes, have very brief awakenings in the middle of the night, and on average get between 7-9 hours of sleep, leaving the individual feeling refreshed in the morning and ready to start their day. Many though do not get this kind of sleep. Often individuals have trouble falling asleep, staying asleep, and just overall having what would be considered good quality sleep.

Are you one of the many million Americans who suffer from a sleep-wake disorder? Unfortunately, there are nearly 50 to 70 million people who have some type of sleep-wake disorder (Blythe et al, 2009). In “A Review of Changes in DSM-5 Sleep-Wake Disorders,” Khurshid (2015)

acknowledges that sleep-wake disorders consist of 11 diagnostic groups: insomnia disorder, hypersomnolence disorder, narcolepsy, obstructive sleep apnea hypopnea (OSA), central sleep apnea, sleep-related hypoventilation, circadian rhythm sleep-wake disorders, non-rapid eye movement (NREM), sleep arousal disorders, nightmare disorder, and rapid eye movement (REM) sleep behavior disorder. For as many people who are already diagnosed with a sleep-wake disorder, there is evidence that suggests sleep-wake disorders regularly go undiagnosed (Blythe et al., 2009). Those who suffer from sleep-wake disorders tend to have a poor night's sleep continually. This poor quality of sleep may begin to affect an individual's daily life, whether that be at home, work, or in a social context. Having excessive grogginess during the day may also impair driving or operation of heavy machinery. A few hours of sleep deprivation, alone, can be hindering to an individual. Can you imagine what it would be like to constantly be sleep deprived? You develop a loss of energy, possible mood swings, and can have a hard time

concentrating or being fully alert. Notably, these things can occur with just a few hours of sleep deprivation but having continuous sleep deprivation may really begin to take its course.

Many who suffer from a sleep-wake disorder have complaints about amount, quality, or timing of sleep. This is known as dyssomnia. Those who are prone to abnormal behavior during sleep or the night would be classified as having a parasomnia. (Barlow & Durand, 2015). It is important that sleep disturbances or problems are discussed with your doctor so a proper diagnosis can be made or so help can be provided. If your doctor does not first address if you have any problems sleeping initiate the conversation. Your doctor may then end up having additional questions. It is important to keep track of your nighttime and daytime symptoms. In regard to nighttime symptoms, be aware if you have trouble falling asleep, if your mind starts thinking about anything and everything, how much you wake up in the middle of the night, and how long you believe this has been going on for. During the daytime pay attention to how drowsy you feel, how often you have a headache when waking up, and if your memory seems to be impaired.

If sleeping habits become a constant concern, then a sleep study may be conducted. Accordingly, Barlow and Durand (2015) propose that a polysomnographic (PSG) evaluation provides the most accurate picture of an individual's sleep patterns. If individuals choose to participate in a sleep study they may spend a night or two in a sleep laboratory so their sleep can be monitored. Some things that are measured during this time are airflow, leg movements, brain wave activity, heart activity, etcetera. Regular day time activities are taken into consideration as well. Substance abuse,

psychological disorders, and anxiety all may affect sleeping habits (Barlow & Durand, 2015). When conducting a sleep study, researchers find it helpful to know an individual's sleep efficiency (SE). This is defined as the percentage of time you spent sleeping rather than just lying awake in bed (Barlow & Durand, 2015). This information can be useful because it may determine how well and how much an individual sleeps.

Sleep-wake disorders can also influence an individual's health. Blythe et al. (2009), suggest that excessive tiredness has been linked to an increased risk of death and psychiatric or other medical conditions. Although sleep-wake disorders may cause the above, the reverse can be true as well. Sleep-wake disorders may exist due to some other condition an individual may have. For instance, Chasens and Luyster (2016) write the "Effect of Sleep Disturbances on Quality of Life, Diabetes Self-Care Behavior, and Patient-Reported Outcomes" to show the relationship between type 2 diabetes and sleep-wake disorders. Statistics show that individuals with type 2 diabetes have an 8-17% rate pertaining to difficulty falling asleep. Another 23-40% report difficulty in staying asleep. There is evidence that suggests comorbidity of diabetes and sleep related problems are associated with a decline in an individual's quality of life and self-care behaviors needed for diabetes. (Chasens & Luyster, 2016). Reportedly, patients with type 2 diabetes, coronary artery disease, and stroke also have a higher prevalence of OSA (Blythe et al., 2009).

Generally, this section provides a glimpse at what sleep-wake disorders consist of. With as many as there are, knowing the general criteria is important. Each sleep-wake disorder has specific diagnostic criteria, however. It is important to be aware of your own sleep patterns and habits during the

day. Although there are many sleep-wake disorders, insomnia is the most prevalent today.

Insomnia: The Most Pertinent Sleep-Wake Disorder

Among the many subcategories of sleep-wake disorders insomnia would be the most common. According to Riemann, Nissen, Palagini, Otte, Perlis, and Spiegelhalder (2015), “chronic insomnia is defined by difficulties in falling asleep, maintaining sleep, and early morning awakening, and is coupled with daytime consequences such as fatigue, attention deficits, and mood instability.” In other words, insomnia would be classified as a dyssomnia. Per the DSM-5 diagnostic criteria for insomnia, an individual tends to have a constant complaint of dissatisfaction in regards to sleep quantity and/or quality. Like sleep-wake disorders in general, the complaints may be around difficulty in initiating or maintaining sleep. There also may be complaints of wakening in the early morning and not being able to fall back to sleep (American Psychiatric Association, 2013). To be diagnosed with insomnia the sleep problem must cause an impairment to the individual’s life, both with sleeping and daytime fatigue. Riemann et al. (2015), suggests that insomnia may be diagnosed, per the DSM-5 and ICSD-3, by an individual reporting a sleep complaint. This problem must occur three times each week over a 3-month period. Other diagnostic criteria include that insomnia cannot be explained by some other sleep disorder such as narcolepsy. It also is important to acknowledge whether or not the problem can be attributed to some kind of substance abuse (American Psychiatric Association, 2013). Having these diagnostic criteria is useful when trying to diagnose someone

who believes they are an insomniac.

Sleep diaries may be crucial in distinguishing if someone has insomnia. A sleep diary may help to keep track of the times that the individual finds themselves getting up in the middle of the night. It’s a good tool to use because the individual has a place to record the problems they want to discuss with their doctor. Accordingly, Blythe et al. (2009) suggest that many patients cannot recall sleep and wake times accurately. Perlis, Giles, Mendelson, Bootzin, and Wyatt (1997) acknowledge that patients may have the tendency to overestimate their symptoms. For instance, an individual may “overestimate how long it takes them to fall asleep” (Perlis et al., 1997). Investing in a sleep diary may be useful in accurately explaining symptoms. Having a sleep diary “may reveal issues that did not surface during questioning” between doctor and patient (Blythe et al., 2009). The types of things that are typically recorded in a sleep diary are bedtime, wake time, total hours that were slept, when an individual believes they fell asleep, how many times they woke up during the night, daytime alertness, naps during the day, and medication use (Blythe et al., 2009, Laar et al., 2014). Individuals may even record their amount of caffeine or nicotine use, stressful events, or amount of exercise (Blythe et al., 2009). All of these elements are important and can have an impact on an individual’s quality of sleep. Keeping track of these different features will allow for more clarity as to where an individual may be experiencing sleep problems.

Insomnia used to be looked at through two different perspectives, that being primary and secondary insomnia. Pullen, Mayes, and Horton (2013), define primary insomnia as having no other attributed problems. These may include medical, psychiatric, or

environmental influences. Chauvin, Thibault-Stoll, Chassagnon, Biry, Petiau and Tassi (2015), add that primary insomnia affects nearly 15% of the general population. Secondary insomnia is the exact opposite of primary insomnia. This occurs in relation to other disorders that may already be existent. Individuals may already be abusing substances or may already be diagnosed with psychiatric or mental illness(es) (Pullen et al., 2013). However, upon the DSM-5, secondary insomnia is no longer used when diagnosing insomnia. The reasoning for this is due to the comorbid nature that exists within insomnia. Many times, insomnia is co-occurring with some other disorder and both need to be treated (Khurshid, 2015).

Comorbidity

How often is insomnia diagnosed without being comorbid with some other psychiatric disorder? Laar, Pevernagie, Mierlo, and Overeem (2015) acknowledge that about 50% of those who utilize a sleep clinic have a psychiatric disorder comorbid with insomnia. Now this does not include all diagnoses of insomnia. Blythe et al. (2009) conclude that there is a very small percentage of insomnia cases that are unrelated to other conditions. For the most part, insomnia is often comorbid with mood and anxiety disorders, like most sleep-wake disorders. Having a diagnosis of anxiety or depression may very well effect how individuals sleep at night. Accordingly, depression may increase sleep latency, REM sleep, and how many awakenings occur during the night or early morning (Pullen et al., 2013). This can be attributed to the depressive state that the individual may be in or excessive thoughts that are running through their head. Laar et al. (2015), predicted that “there are clear differences in nature and severity of subjective sleep

variables depending on presence and type of psychiatric comorbidity and that patients with comorbid psychiatric disorders will generally show more severe insomnia.” What Laar and his colleagues found in 2015 was that those who had comorbid mood disorders had higher Insomnia Severity Index (ISI)-scores compared to those who did not have any comorbidity with insomnia. Patients with comorbid anxiety disorders had higher subjectivity to sleep efficiency (SE) as well.

Relatedly, bipolar disorder is one of the many mood disorders that are comorbid with insomnia. All types of sleep disturbances are common among individuals diagnosed with being bipolar (Pullen et al., 2013). This is significant, according to Pullen et al. (2013), because there have been “11 studies performed on 631 patients with bipolar disorder.” This “revealed that insomnia was the most common precursor of mania and the sixth most common symptom associated with the condition” (Pullen et al., 2013). Unfortunately, insomnia can make the symptoms of bipolar disorder more predominant. Knowing this, however, may be crucial to the individual who is diagnosed with bipolar disorder. Individuals may be able to better gage when they are about to have a manic episode if they know that their insomnia symptoms are worsening.

Insomnia and other sleep-wake disorders may have quite an effect on young adults with psychiatric disorders. Robillard et al. (2016) conducted a study evaluating how sleep-wake and circadian activity cycles of young adults with anxiety, depression, and bipolar disorders are related to psychiatric symptoms and psychotropic medications. It was hypothesized that those who had persistent, severe symptoms would have a delay in their sleep-wake schedule and poorer sleep consolidation in general. The

results determined that those who took medication actively had earlier sleep onset times ($p=0.001$), longer sleep periods ($p=0.001$), and just an overall longer amount of sleep ($p=0.001$) (Robillard et al. 2016). What can be acknowledged is that those taking antipsychotics “were significantly predictive of longer sleep period and longer total sleep time” (Robillard et al., 2016). The severity of symptoms did not seem to make a difference in sleeping habits. This study is important because it can open the idea that medicine prescribed for a psychiatric disorder may help the individual sleep better, whether it be in young adults or older individuals. Accordingly, Khurshid (2015) suggests that the only way for optimal treatment to be achieved in people with psychiatric disorders and insomnia is for both to be targeted during treatment.

Biological and Neurobiological Focus

So far, some biological perspectives have been touched upon. We have looked at the use of polysomnography (PSG) and how airflow, leg movements, brain wave activity and heart activity can all influence an individual’s sleep. This section will be a continuation of other biological components. The biological perspective in psychology allows researchers to look at the impact that one’s brain, immune system, nervous system, and genetics function in correspondence with an individual.

Depending on the disorder each one of these can play a different role. Floam, Simpson, Nemeth, Scott-Sutherland, Guatam, and Haack (2014) acknowledged that variations in sleep patterns may occur. Accordingly, research has noted that low sleep efficiency may be associated with higher levels of cortisol, as seen from PSG. Furthermore, higher blood pressure may also be associated with a reduced amount of sleep

(Floam et al., 2014).

Although research is scarce, Floam et al. (2014) conducted a study looking at the extent to which sleep characteristics predict variables for the inflammatory, autonomic, and hypothalamus-pituitary-adrenal (HPA) systems, presuming that insomnia may have an effect on the mentioned systems. To test this, researchers used regression analyses to determine whether actigraphy-based sleep variables were predictors of the inflammatory, autonomic and HPA systems. Accordingly, their findings demonstrated that “HPA upregulation (as indicated by increased cortisol levels) was significantly associated with wake after sleep onset (WASO)” (Floam et al., 2014). This would then correspond to the prior research. As for the autonomic component, Floam et al. (2014) found that blood pressure was not significant, even when higher in the insomnia group. On the other hand, heart rate variability, blood pressure and norepinephrine levels were found to be increased in those who have insomnia (Floam et al, 2014). Again, although there is limited research this information may be useful to an individual who believes they have insomnia. The individual can pay attention to if and when these factors are elevated how they have been sleeping.

Specifically looking at sleep-wake regulation the neurobiological perspective is going to have a major impact on insomnia. Sleep-wake regulation is relatively important in trying to maintain normal sleep. But how is this controlled? For starters, according to Georgina Casey (2015), the suprachiasmatic nucleus (SCN), ventrolateral preoptic nucleus (VLPO), noradrenaline (NA), serotonin (5HT), and gamma aminobutyric acid (GABA) can all have an influence on sleep-wake regulations. To better understand how these all work in

sync, refer to Figure 1.

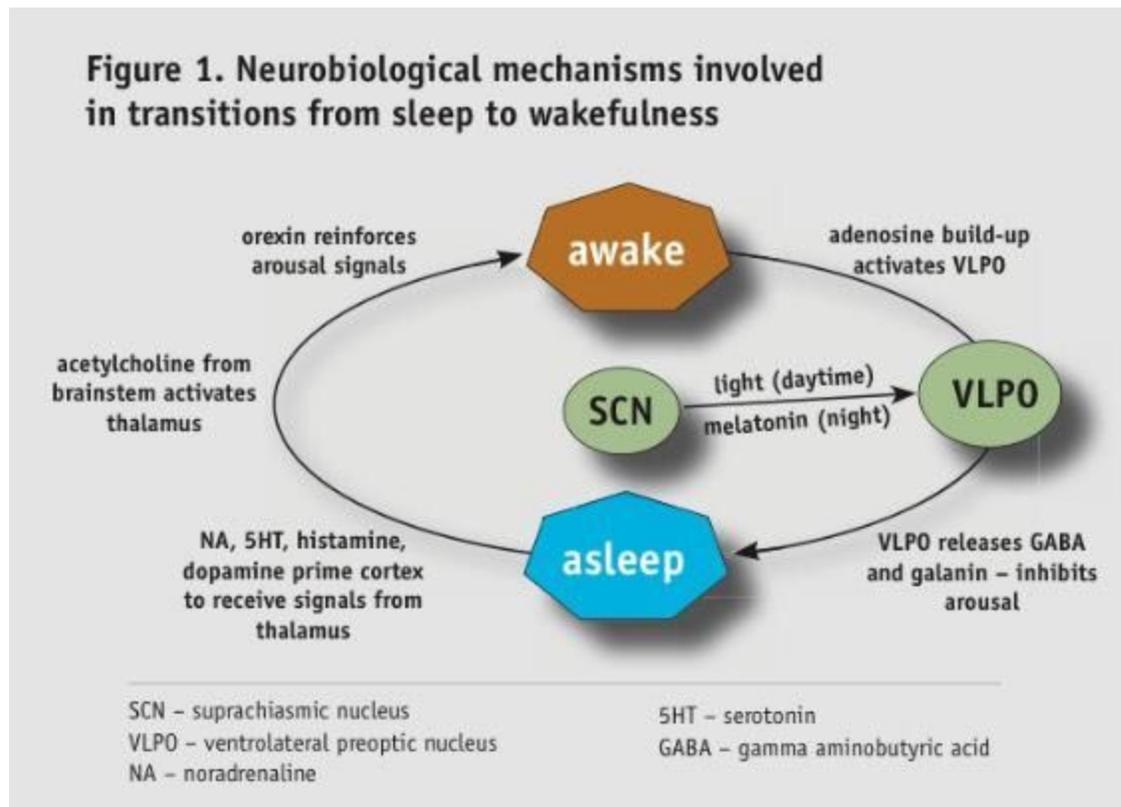


Figure 1: From Casey, G. (2015). Resting Easy in Sleep. *Kai Tiaki Nursing New Zealand*, 21(11), 20-24.

Riemann et al. (2015) suggest there are two main processes that govern sleep-wake rhythms. These would include a circadian process and a homeostatic process. Riemann et al. (2015) indicated:

The circadian process reflects the fact that, from the cellular to the system level, the variation in intrinsic activity over 24 hours follows a sinusoidal curve. This activity is controlled by an internal clock located in the suprachiasmatic nuclei and synchronized to the time of day by external cues, predominantly the light-dark cycle. The homeostatic process, which is the need for sleep

(sleep pressure) as a function of the time since the last adequate sleep, is an indicator of homeostatic sleep drive. This process can be measured retrospectively by the amount of slow wave activity during sleep; the longer someone has been awake, the more slow wave activity will be recorded in his or her electroencephalogram (EEG).

This two-fold system is an indicator as to what happens during sleep-wake regulation, or what should happen. Assumably, this process can be related to insomniacs and their sleep-wake patterns. When a person is not obtaining an adequate amount of sleep this is when an individual's sleep-regulation

becomes imbalanced. An individual may be so deprived of sleep they have a hard time catching up.

Other aspects of sleep-wake regulation include adenosine. Adenosine is a “byproduct of the breakdown of adenosine triphosphate (ATP), which is the main energy molecule in cells” (Casey, 2015). Often it is when an individual is awake for long periods of time that they then desire an urge to sleep. Casey (2015) suggests that this is due to the buildup of adenosine found in the brain. Accordingly, adenosine is commonly viewed as a sleep promoter and allows arousal by blocking activity taking place in the orexin system (Riemann et al., 2015). Coinciding, orexin is found in the hypothalamus, released in the brain and is critical to wakefulness (Casey, 2015). These are only a few of the components found to affect sleep regulation.

Behavioral Perspective

A change in your biological or neurobiological components may be interrelated with those of the behavioral perspective. As we have seen, fatigue may affect your home, work, and social life due to a loss of energy. It is in psychology that the behavioral perspective is often viewed as the way someone acts out certain behaviors due to the environment or learned experiences. Perlis et al. (1997) believe that insomnia can be understood through the behavioral aspect, that “the perspective provides a compelling conceptualization and the treatments that derive from the theory have demonstrated clinical efficacy” (Perlis et al., 1997). It is believed that an individual may be predisposed to insomnia due to specific trait characteristics. These traits can be found in all different biopsychosocial perspectives. The traits can extend from hyperarousal to simply excessive worry.

Yet, the insomnia episodes are elicited due to precipitating factors. This implies that life stressors or stressful events are often associated with insomnia (Barlow & Durand, 2015, Perlis et al., 1997). Regardless of what the trait or precipitating factor is, there is clearly some link to insomnia cases.

As mentioned in previous sections, insomnia tends to cause daytime fatigue. This fatigue can lead to specific impairments. These impairments may include inability to pay attention or focus. These, however, are not the only impairments that may be caused from engaging in sleepless nights. Another effect loss of sleep may have would be on emotion. According to Cronlein, Langguth, Eichhammer, and Busch (2016), evidence suggests that sleep disturbances directly influence emotional processing. To better understand this Cronlein et al. (2016) examined the effect of “chronically disturbed sleep on emotional processing by investigating two samples of patients with sleep disorders.” These groups included those who had insomnia and those who had sleep apnea. To determine what effect little sleep had on emotional processing the Facial Expressed Emotion Labelling (FEEL) was used for the measurement of one’s ability to recognize emotions through facial expressions. The results found in this study supported the researchers’ hypothesis. Those who fell under the insomnia and sleep apnea groups performed significantly less on the FEEL test when compared to those who were considered to have normal sleep (Cronlein et al., 2016). Interestingly enough, sleep deprivation does have an effect on whether or not someone can identify different emotions. Individuals may not realize what processes sleep deprivation is really affecting. This study can be important to sleep-wake disorders because it adds

another dynamic of how sleep disturbances may cause an impairment other than fatigue.

Just like for the rest of the sleep-wake disorders the behavioral perspective is pertinent in insomnia. The amount of sleep one gets is correlated with how tired one is the next day. If an individual is more tired than usual their behavior may be differently than it normally is. Again, this can be due to a sense of fatigue which may cause perceptions and other functions to be off imbalance.

Treatment

Treatment is something every individual with a disorder hopes to receive to get themselves better. Treatments can be used for any of the psychological perspectives. Generally, for treatment of insomnia a medical professional is the one who needs to prescribe you something. These options are not necessarily limited to just the pharmacology aspect, however. For treating insomnia there is a list of treatments that may be beneficial. Doctors may suggest stimulus control, sleep restriction, or relaxation training. Stimulus control can be used to dismantle associations between a person's bedroom and troubles sleeping. Often, patients are told to leave their bedroom if they are not asleep within 20 minutes of them being in there (Blythe et al., 2009). On the other hand, Blythe et al. (2009) note:

Sleep restriction limits time in bed at night and bans daytime napping in an effort to promote sleep consolidation. This option should be considered for patients who spend too much time in bed in a misguided attempt to facilitate sleep. Relaxation training, including guided imagery, progressive muscle relaxation, yoga, or meditation, is intended to lower physical and mental

activation prior to sleep.

These three solutions may be referred to as what Riemann et al. (2015) calls cognitive behavioral therapy for insomnia (CBT-I). CBT-I tends to be the most common treatment for insomnia. CBT-I would be more associated with the behavioral perspective in psychology. Other components of CBT-I include sleep hygiene and cognitive techniques. This treatment appears to be more effective in the long run (Riemann et al., 2015). It may be the little things that you do or do not do throughout your day that are causing your sleep difficulties. If a quick change in your routine does not solve your difficulties with sleeping there are still other options that might work.

As mentioned previously, something as simple as sleep hygiene can be used in maintaining sleep. Knowing what truly affects sleep is extremely important. Blythe et al. (2009) and Casey (2015) suggest the following principles regarding sleep hygiene. Applicable to everyone, individuals should only sleep for the time needed to feel refreshed the next day, try to stay between 7-9 hours of sleep, keep a consistent sleep schedule, caffeine should not be consumed at least 6 hours before bed, alcohol and heavy meals should be limited in the late evening, exercising is great but excessive exercise should be avoided 3 to 4 hours before going to bed, and television and computer use should be limited before bed. The use of phones should be limited as well due to the light that it gives off.

Furthermore, pharmacology and pharmacotherapy may be used in treating insomnia. It is important to have the right medication for specific sleep symptoms. When an individual has trouble falling asleep and has no other symptoms, Blythe et al. (2009) suggests the use of Zaleplon.

Zaleplon has a short half-life and may be used to reduce onset sleep time. However, drugs with a short half-life are not always the answer to the solution. In some cases, a drug with a longer half-life is needed. Those who have trouble staying asleep may need to take something like zolpidem CR. The CR formulation may help some individuals more (Blythe et al., 2009). Among the most common pharmacological uses, benzodiazepines and benzodiazepine-receptor agonists are often used for treatment (Riemann et al., 2015). It's important to acknowledge that benzodiazepines and benzodiazepine-receptor agonists seem to only have short term effects. In the long run, they may end up causing more harm to the individual because dependency can become a problem. (Riemann et al., 2015). Essentially, it can be inferred that the pharmacology treatments are more associated with those of the biological and neurobiological perspectives in psychology. This type of treatment would, assumingly, help regulate if something was off in the body.

Conclusion

This paper intended to provide an overview of what a sleep-wake disorder may consist of while specifically focusing on the symptoms, causes, and treatments of

insomnia. Insomnia is one of the most predominant sleep-wake disorders known to date. Many suggest that the causes of insomnia may be due to life stressors, a preexisting medical condition, or some biological dysfunction. All of these are important to keep track of so proper treatment can be provided. Treatments can include a wide range of things from cognitive behavioral therapy for insomnia to just knowing the proper sleep hygiene tips to pharmacology uses.

When looking at the biological and behavioral perspectives the symptoms of insomnia remain the same. They differ in the fact that the biological perspective is viewed as being internal and the behavioral perspective is viewed as being external. However, they are related. The processes occurring inside of your body may affect your behavior if something is not functioning properly. Although related, there is a difference in the type of treatment for each. The biological perspective focuses on the use of pharmacology and pharmacotherapy while the behavioral perspective tends to use cognitive behavioral therapy. Regardless, it has been shown that insomnia can really begin to affect an individual; if you are an individual who has trouble sleeping be sure to talk to your doctor about your symptoms.

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