

Sleep Disorders and their Consequences on the Military Personnel: A Narrative Review

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Abstract

Sleep is an integral part of the human life, and its disorders, depending on cognitive or emotional behaviors, cause a series of changes in the physical and mental activity of human beings. Therefore, as quality of sleep decreases, quality of life, performance and work efficiency will decrease as well. Military societies are in dire need of high quality sleep because of their duty of securing and protecting countries. For many reasons, including stressful and dangerous martial situations, sleep disorders are seen in both active and retired military personnel. The aim of the present study was to review the sleep disorders and their consequences on the military staff.

Keywords: Sleep Disorders, Sleep Quality, Military Personnel

Introduction

Sleep is a physiological and dynamic activity which reduces the awareness of the self and the environment. In the past, sleep was considered as a process where brain activity is reduced or completely eliminated.¹ During sleep, the body is physiologically active and a variety of dynamic fluctuations in the central nervous system and hemodynamic changes occur in the respiratory-ventilation and metabolic systems.² Sleep represents one-third of every person's life and has a tremendous impact on how people live and function throughout their lives. In fact, it is as important as the air we breathe and the food we eat.³ It is believed that good sleep strengthens health. Previous studies have shown that sleep disorders are common and associated with complications and mortality.⁴ Thus, sleep disorders in recent years have been considered as a branch of medicine, and their role in a number of seemingly unrelated clinical problems have been revealed.¹ In fact, sleep plays an important role in the rehabilitation and the focus of the individual's senses, and paying attention to its quality and quantity is considered to be extremely important.² Sleep disorders are also common in the military. In military societies, sleep disorders can lead to an increase in the Body Mass Index (BMI), non-compliance with sports standards, poor nutritional and health status, and most importantly, reduced military efficiency in the face of war, and other risks.⁵ These issues actually point out the importance of recognizing sleep disorders throughout every society as well as the military community. Therefore, in this review, sleep disorders and their consequences on the

military personnel have been studied.

Sleep Disorders

In today's stressful and competitive society, sleep deprivation or sleep disorders have gradually become a common social problem.⁶ Studies have shown that diseases such as anxiety and insomnia can cause severe injury and even death if left untreated.⁷

In 2014, the third edition of the International Classification of Sleep Disorders was published, which was comprised of six major groups: 1- Insomnia, 2- Sleep apnea syndrome (obstructive sleep apnea) 3- Centralized sleep and wake disorders 4- Circadian sleep-wake disorders 5- Parasomnia 6- Sleep-related movement disorders. This grouping is based on the main symptoms. The treatment of sleep disorders includes dietary changes, sleep hygiene, medication, and, in the case of sleep-dependent respiratory disorders, the use ventilators with positive and non-invasive pressure.⁸

However, sleep disorders (more than 90 types of disorders), each of which have a clear diagnostic criterion, can be divided into three major groups: 1- Nighttime insomnia (difficulty falling asleep, continuing to sleep or sleep without rest) 2- Daily drowsiness caused by nighttime insomnia 3- Sleep disturbing behaviors such as obstructive sleep apnea, parasomnia etc.⁹

Consequences of Insomnia in Military Personnel

Insomnia (dissatisfaction with the quality or quantity of sleep with complaints of falling asleep or continuing to sleep)

is one of the most common types of sleep disorders and a risk factor for a wide range of physiological and psychological disorders including depression, drug, antidepressants, etc. with obvious clinical anxiety and social, functional, and occupational problems.¹⁰ Cases such as old age, female gender (women twice as much as men) and poor socioeconomic status are the most common causes of insomnia, although their causes are not well-known.^{11,12} According to another study, about a third of the people in the West experience a number of insomnia symptoms each year.¹³ Depression is the most common cause of chronic insomnia.¹⁴ Of course, insomnia alone is not a diagnosis, but a symptom of a sleep disorder that has its own specific treatment.⁹

A person's vulnerability to sleep deprivation at various times, is different. Sleep deprivation can lead to many complications, such as increased risk of death, daily drowsiness, decreased consciousness, and hypothermia. Sleep deprivation is associated with increase in sympathetic activity, reducing cognitive functions such as attention and information processing, decision-making, and response time. The risk of coronary heart disease is higher in people with less than 6 hours of sleep than in people with a sleep period of more than 6 hours. Sleep deprivation also increases the hunger and appetite for salty foods and increases the risk of obesity in the military.⁵ Actually, insomnia is associated with decreased physical, mental, and cognitive impairment.^{14,15}

Bramoweth and Germain noted that insomnia is a common disorder in the military, especially those stationed in support of combat efforts. Situational stressors such as exposure to war, mild Traumatic Brain Injury (mTBI), irregular sleep and wake schedules, and delayed home return are all contributing to insomnia. However, insomnia is a risk factor for psychological stress reactions such as Post Traumatic Stress Disorder (PTSD), depression, suicide, and even the intent to kill other military or civilian people. Military people with mTBI are significantly affected by insomnia and have the majority of sleep disorders, which can impede their recovery, rehabilitation and military performance.¹⁶ Other similar studies suggest that insomnia affects 10-22 percent of civilians, while it is highly prevalent in active military personnel¹⁷ as well as retired veterans.¹⁸ Recent studies have shown a higher prevalence of insomnia among American men and women and Western allies who participated in the Operation Iraqi Freedom, compared to the civilian samples, 24-54%.¹⁸ In both military and civilian populations, insomnia is often associated with mental and physical health disorders such as PTSD, depression, brain injury and chronic pain.¹⁸ Many other studies have suggested that war PTSD has a major role in insomnia.¹⁹⁻²¹ Studies in Iran on chemical warfare veterans and their spouses showed insomnia and

poor sleep quality in these people due to PTSD in war veterans and excessive fatigue and confusion in their spouses. Studies also found that poor sleep quality in these people led to their severe depression and high consumption of antidepressants.²²⁻²⁴

Consequences of Respiratory Sleep Apnea Syndrome on Military Personnel

Obstructive Sleep Apnea Syndrome (OSAS) is a relatively common sleep-related disorder with a prevalence of 2-4%, characterized by repeated periods of partial or complete upper airway obstruction during sleep. It occurs in following arterial oxygen deprivation, cerebral arousal, and respiratory effort to end respiratory failure. The main clinical findings include daytime sleepiness and long night snoring.²⁵⁻²⁸ However, patients may also have other complaints such as morning headaches, insomnia, or nightmares. The diagnosis is nocturnal polysomnography (PSG) and is the treatment of choice in adults with persistent positive airway pressure.^{25,28,29} Lack of timely diagnosis can lead to a range of serious complications, including hypertension and systemic hypertension, cardiovascular disease, cognitive impairment, and psychiatric symptoms such as depression, irritability, and anxiety.³⁰⁻³³ Due to the nature of the disease that respiratory events occur during sleep, the diagnosis is usually delayed.³⁰ The US Department of Defense medical information has reported a significant increase in the diagnosis of insomnia and Obstructive Sleep Apnea (OSA) in all military services. From 2001 to 2009, OSA detection rates increased 8.5-fold due to the nature of the disease.³⁰ The US Department of Defense medical information has reported a significant increase in the diagnosis of insomnia and Obstructive Sleep Apnea (OSA) in all military services. From 2001 to 2009, OSA detection rates increased 5.8-fold.²⁰ Sleep disorders are most likely the result of increased insomnia.^{34,35} However, previous studies using PSG on the military personnel showed that OSA appears primary.³⁶⁻³⁸ Primary insomnia and OSA are conditions which are initially called "insomnia complex".³⁹ So sleep apnea may be exacerbated by the harmful effects of insomnia and lack of sleep, which makes military personnel in need of care. Failure to fully address all aspects of sleep disorders can potentially jeopardize the ability of military personnel to perform their duties or fully respond to treatment.²⁰ Current studies have linked experiences or war zones to the development of physical and psychological problems, especially OSA, including TBI-related illnesses, PTSD disorder, depression etc.^{18,40-42} Mysliwiec et al, have shown that 58.1% of the military personnel under study had one or more symptoms of sleep disorders and that OSA patients were twice as likely as those with PTSD and 1.5 times more parasomnia likely to have physical and psychological pain.⁴³ Collen et al. reported

that 97.4% of TBI soldiers complained of OSA as a primary diagnosis. A more comprehensive assessment of sleep disorders and related diagnoses may have important implications for the health and well-being of the military personnel.³⁵

Consequences of Sleep-related Movement Disorders on Military Personnel

Restless Legs Syndrome (RLS), Periodic Limb Movement Disorder (PLMD), Sleep-related Leg Cramps, Sleep-related Cramping Teeth, and Sleep Rhythmic Movement Disorder (RMD) are classified as Sleep-Related Movement Disorders (SRMD) (44). These clinical conditions are characterized by relatively simple, usually stereotyped, movements that can disrupt sleep and cause insomnia, poor sleep quality, fatigue and excessive daytime sleepiness. Physiological movements such as hypnotic jumps may occur during sleep. In some patients, the frequency and intensity of these movements may increase and cause sleep disorders.⁴⁴ The RLS is a sleep disorder characterized by four pathognomonic clinical features: (a) Involuntary movement of the legs, which is an unpleasant and inappropriate movement in the legs. (b) Unpleasant feeling that gets worse when you move or insist on moving. (c) Unpleasant feeling that is reduced by a slight shift or insistence on movement. (d) Unpleasant feeling in insisting on moving that is worse at night than during the day. These symptoms represent four basic criteria for detecting the presence of RLS.⁴⁵ Several epidemiological studies have evaluated the occurrence of RLS in the general population. These studies have observed a large variation in prevalence between 0.1% and 15%.⁴⁶ Higher prevalence has been reported in certain conditions (from high to low) respectively, in renal failure,⁴⁷ pregnancy,⁴⁸ and neuropathy.⁴⁹ Also, RLS is associated with depression.⁵⁰ As these conditions are common in military and veterans with PTSD,⁵¹ it is important to study the symptoms of RLS in these individuals. One study revealed that the prevalence of RLS was 1.16% in the elderly and 15.15% in the Chinese veterans. Also, the prevalence of RLS in the Chinese veterans was higher than their foreign counterparts. The prevalence of RLS in the elderly increases significantly with age, but the severity of RLS symptoms does not correlate with advancing age. Since the rate of diagnosis and treatment for RLS adults is extremely low in China and other countries, more attention should be paid to RLS knowledge.⁵² In a study by Rezaeitalab et al.⁵³ on thirty-one Iranian military veterans with PTSD it was revealed that all veterans had OSA while the prevalence of RLS was 22.5%. The high prevalence of RLS in these individuals suggests that PTSD in veterans may be associated with RLS. Insomnia, nightmares, sleep-related movement disorders and daytime sleepiness are often reported by PTSD veterans.⁵⁴ Studies using PSG have shown that the high

coefficient of PLMD is a sleep-related disorder in veterans with PTSD. Since PLMS is the most important target finding for RLS, it can be expected that RLS is high in these patients.⁵⁴⁻⁵⁶

Consequences of Parasomnia on Military Personnel

Parasomnia is a group of sleep disorders that includes unwanted events or experiences that occur when you start sleeping, sleeping, or waking up. Parasomnia may include abnormal movements, behaviors, emotions, perceptions, or dreams. Although the behaviors may be complicated and seemingly purposeful to others, you sleep during the event and often have no recollection of what has happened. If you have parasomnia, it is difficult to sleep at night.⁵⁷ Nightmares and disturbing night behaviors that occur after traumatic experiences have had various clinical features that overlap with other diagnoses of parasomnia. Nightmares with frequent occurrence of long, very lifeless dreams that cause significant distress or clinical disturbance in the social, occupational, or other function are prominent features of Parasomnia.⁴⁴ Occasional nightmares are part of a normal response to life stressors, with 85% of adults reporting at least one nightmare per year.⁵⁸ Participants from World War II generation had a significantly higher incidence of nightmares (7.2% in men and 7% in women). However, in normal populations this rate was 3.5% in men and 4.8% in women.⁵⁹ Nightmares are more common among patients with sleep disorders, depression, anxiety, and PTSD.⁶⁰⁻⁶² In addition, nightmares are associated with an increased risk of suicide in the military and civilian population.^{63,64} As sleep disorders are frequently reported in the US military personnel, this population may have a high incidence of nightmare disorder (NDO).²⁰ However, most research on the evaluation of sleep disorders in active duty military personnel has focused on insomnia, OSA, and PTSD.^{20,65} Following traumatic and stressful experiences, sleep disorders, including Trauma-Related Nightmares (TRN), have been reported.⁶⁵ The experience of nightmares is usually in the form of severe mental stress associated with periods of sleep disorder or deprivation. A limited number of laboratory tested cases have been reported with Eye Movement Disorder (RBD) and PTSD. Although not unique to PTSD, TRN has been recognized as a "hallmark" of the disorder and has a rate of up to 90%.^{66,67} The TSD including provocative traumatic experiences and the clinical features of trauma-related nightmares and disturbing psychotic nocturnal behaviors, is recognized as a specific parasomnia.⁶⁸ It should be noted that the physiology of PTSD traumatic nightmares is different compared to natural dreams. Traumatic nightmares are largely seen during sleep and the disrupt Rapid Eye Movement (REM) and are often associated with movement activity.⁴³ The TSD meets the basic criteria for a parasomnia

defined in the International Classification of Sleep Disorders because it includes abnormal sleep, sleep-related movements, behaviors, and autonomic nervous system activity that are not explained by another clinical disorder.⁴⁴ A study by Mysliwiec et al. reported a very low incidence of parasomnia among military personnel, with only 6 out of 725 military personnel suffering from various symptoms of parasomnia such as nightmares and sexual dysfunction. Therefore, there is a need for more studies on this group in the military community compared to civilians.³⁸

Consequences of Narcolepsy (Sleep Attack) on Military Personnel

Chronic narcolepsy disorder is seen primarily as a tendency to fall asleep and most cataplexy (sudden loss of coordination and muscle tone during waking). Cataplexy is generally mild and is caused by severe emotions. These emotions are usually positive (e.g. laughter), but different emotions have been reported. Patients with narcolepsy also experience disturbed night sleep, sleep paralysis, hallucinations in sleep and wakefulness.^{44,69} The clinical presentation of narcolepsy varies with age and its exact cause is not fully understood. Its causes can be environmental (stress, trauma, exposure to toxins and infection), genetic or autoimmune.⁷⁰⁻⁷² People with narcolepsy may tend to be overweight. This is not fully understood, but may be due to lower levels of physical activity, diet, metabolism, medication use, or a combination of these. Narcolepsy is also associated with an increased risk of depression. This may be because the symptoms of narcolepsy can be stressful.⁷³ Baseline Sleep Characteristics were explored for 71 US military service members with mTBI and indicated that 32% were suffering from restless legs syndrome and 6% were suffering from catalepsy. Older participants and those who were more aggressive, anxious or depressed had higher risks of OSA, catalepsy, etc.⁷⁴ Another study on 200 veterans and 20 former prisoners of war found that although exogenous factors (trauma) play an important role in accelerating PTSD and narcolepsy, but there is a genetic marker for narcolepsy in both groups. It has also been shown in this study that with the onset of PTSD, narcolepsy can be resistant and progressive.⁷⁵ Vergun reported that two most common sleep disorders in the military are insomnia and obstructive sleep apnea, whereas narcolepsy is not a common sleep disorder among the military personnel.⁷⁶

There has been no study on the other unexplained groups of sleep disorders in the military community. Of course, given the evidence of these unreported groups of disorders, one can guess that there is a high outbreak in active military and retired veterans following stressful events, especially war and stressful military situations. Studies on sleep disorders in the military community in Iran are also extremely limited, so further studies are needed to address the problem of military

disorders in order to provide solutions or treatments to increase the efficiency of the military personnel.

Conclusion

Sleep is extremely important for the operational readiness of the military personnel both operational and support, but is often overlooked during operational planning. Sleep disorders have serious consequences for the psychological, physical, and practical preparation both now and in the future. This means promoting healthy sleep and preventing sleep disorders may increase the readiness and resilience of the forces. The planning and management of sleep gives military units and their commanders the benefits of maintaining alertness, the medium-term tactical advantage of reduced sleep sensitivity and behavioral health disorders, and a long-term strategic advantage by increasing the efficiency of consciousness. Although the majority of publications have mentioned that seven to eight hours of sleep is considered to be standard for both the military and normal people, there is little guidance on how to achieve quality sleep.

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