

Editorial

Sleep- A Key for Health

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Introduction

Sleep is essential to life and to overall health. Most of us need around eight hours of good quality sleep to function properly. Lack of sleep can have profound consequences on a daily and potentially long term basis for our health and mental well being. Not getting enough sleep could lead to bad mood, lack of concentration, irritability and fatigue.

Long term health consequences related to lack of sleep would be high blood pressure, diabetes, obesity and heart diseases which may could lead to a shortened life expectancy.

Most common types of sleep disorders are sleep apnea, insomnia, narcolepsy, restless leg syndrome, sleep paralysis and Kleine-Levin syndrome. Among all the sleep disorders, sleep apnea is most common type of disorder. Sleep apnea is of three types-obstructive sleep apnea, central sleep apnea and mixed sleep apnea.

There are some studies that look at the relationship between sleep habits and risk for developing certain medical conditions which can be obesity, cardiovascular and cerebrovascular disorders.

Obesity

Lack of Sleep is now being seen as a potential risk factor for obesity along with the two most commonly identified risk factors: lack of exercise and overeating. Research into the mechanisms involved in regulating metabolism and appetite are beginning to explain what the connection between sleep and obesity might be. During sleep our bodies secrete hormones that help to control appetite, energy metabolism, and glucose processing. Obtaining too little sleep upsets the balance of these and other hormones. For example, poor sleep leads to an increase in the production of cortisol, often referred to as the "stress hormone." Poor sleep is also associated with increases in the secretion of insulin following a meal. Insulin is a hormone that regulates glucose processing and promotes fat storage; higher levels of insulin are associated with weight gain, a risk factor for diabetes [1]. Insufficient sleep is also associated with lower levels of leptin, a hormone that alerts the brain that it has enough food, as well as higher levels of ghrelin, a biochemical that stimulates appetite. As a result, poor sleep may result in food cravings even after we have eaten an adequate number of calories. We may also be more likely to eat foods such as sweets that satisfy the craving for a quick energy boost. In addition, insufficient sleep may leave us too tired to burn off these extra calories with exercise [2].

Diabetes and metabolic disorders

OSA is common in type 2 diabetes patients. The mechanism that is responsible for development of diabetes in OSA patients is very complex and multifactorial. Most of the consequences from OSA are because of intermittent hypoxia and frequent arousals which induces the sympathetic activation. Sympathetic system plays important role in glucose and fat metabolism regulation [3].

Many hormonal changes occur in OSA patients because of CO₂ retention that affects the activation of hypothalamic-pituitary-adrenal (HPA) axis and increases the secretion of Catecholamine [4].

Intermittent hypoxia also reduces insulin sensitivity and affects the beta cell function too. This is all because of Hypoxia-inducible factor-1 (HIF-1) that is increased in OSA. HIF and systemic inflammation are interrelated both get increased in OSA [5].

The mechanism linking OSA to vascular diseases in type 2 diabetes are likely to involve similar pathways to those stimulated by hyperglycemia in type 2 diabetes.

Immunity

Proper sleep reduces the risk of infections. Furthermore, total SD, sleep disruption, and/or deprivation of non-rapid eye movement (NREM) sleep increases the risk of bacteremia, life-threatening systemic infection, and even death human studies have shown association of acute sleep loss with leukocytosis and lymphopenia. Decreased number and activity of natural killer (NK) cells has been demonstrated after modest sleep loss [6,7].

Sleep and mood changes

A sleepless night causes the irritation and changes the mood for whole day. If the condition gets chronic then it can lead to long term mood disorders. Chronic sleep disorder associated with depression, anxiety and mental stress [8].

Hypertension and heart diseases

In OSA patients frequent arousal and sleep deprivation leads to intermittent hypoxemia and carbon di oxide retention. This acute hypoxemia could result to various pathophysiological responses which lead to sympathetic activation [9].

Hypoxemia also activates the systemic inflammatory pathways and increases the level of C-reactive protein, plasma cytokines and increases the lymphocyte activation and also induces endothelin-1 release in human endothelium. All these factors collectively contribute to atherogenesis. Strong correlation found between AHI and atherosclerotic plaque volume that was measured by intravascular ultrasound imaging [10].

OSA also induces intrathoracic pressure changes. When there is obstruction in airway then inspiratory effort increases that increases transmural gradient across the atria, ventricles and aorta and may disrupt ventricular function and impaired diastolic function. These cardiac changes may contribute to atrial fibrillation and heart failure [11].

Hypertension may be the result of chemoreceptor stimulation, sympathetic activation, hypoxemia and rennin –angiotensin system because of OSA.

Conclusion

Considering the many potential adverse health effects of insufficient sleep, it is not surprising that poor sleep is associated with lower life expectancy.

OSA is a serious condition that is the cause of several cardiovascular and cerebrovascular disorders. Whether treatment of OSA reduced cardiovascular risk and improves outcome is still controversial.

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