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INFLUENCE OF DIABETES ON SLEEP QUALITY: A LITERATURE REVIEW

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Abstract: This study aims to analyze the relationship between sleep disorders, such as insomnia, excessive daytime sleepiness and sleep apnea, and diabetes. Through clinical trials and statistical data, the impacts of these disorders on the quality of life and glycemic control of individuals with diabetes were investigated. The results revealed that insomnia is associated with a higher risk of developing type 2 diabetes and interferes with glycemic control in diabetic patients. Excessive daytime sleepiness has been shown to be related to insulin resistance and higher prevalence of type 2 diabetes. Sleep apnea has been identified as a significant risk factor for the development of type 2 diabetes and negatively affects glycemic control in already diagnosed patients. The pathophysiological mechanisms underlying this relationship include hormonal changes, chronic low-grade inflammation, insulin resistance, and endothelial dysfunction. These factors act in concert, contributing to the onset and progression of diabetes. Early identification and adequate treatment of sleep disorders in patients with diabetes are essential to improve quality of life and reduce the risk of complications. In this context, therapeutic approaches such as cognitive behavioral therapy, the use of appropriate medications, and continuous positive airway pressure therapy have been shown to be effective in improving symptoms and controlling diabetes in patients with sleep disorders. The adoption of a healthy lifestyle, including regular physical activity, balanced diet, and stress management, also plays a crucial role in the management of these conditions. Given this evidence, it is critical that healthcare professionals are aware of the relationship between sleep disorders and diabetes in order to take an integrated approach to the care of these patients. Investments in further research are needed to deepen our understanding of

the pathophysiological mechanisms involved and to develop more effective prevention and treatment strategies aimed at improving the quality of life and clinical outcomes of individuals with diabetes and sleep disorders.

Keywords: Sleep disorders, insomnia, excessive daytime sleepiness, sleep apnea, diabetes, glycemic control, quality of life.

INTRODUCTION

Diabetes is a chronic disease that occurs when the pancreas does not produce enough insulin or when the body cannot properly use the insulin it produces. Insulin is a hormone that regulates the level of glucose in the blood. A lack of insulin or its resistance can lead to high blood glucose levels, which can cause damage to the body's organs and tissues over time. [1]

There are three main types of diabetes: type 1, type 2 and gestational diabetes. Type 1 diabetes is an autoimmune disease that occurs when the immune system attacks the beta cells in the pancreas, which are responsible for producing insulin. Type 2 diabetes is the most common type of diabetes and occurs when the body cannot properly use the insulin it produces. Gestational diabetes occurs during pregnancy and usually disappears after delivery.[2]

The pathophysiology of diabetes involves a complex interaction between genetic and environmental factors, including obesity, sedentary lifestyle and inadequate diet. Obesity is one of the main risk factors for the development of type 2 diabetes, as adipose tissue produces inflammatory substances that can interfere with insulin action. In addition, lack of physical activity and excessive consumption of carbohydrate-rich foods can lead to increased blood glucose and insulin resistance.[3]

The Ministry of Health has invested in diabetes prevention and control campaigns, with the aim of making the population aware of the importance of healthy habits and early diagnosis of the disease. In 2013, the National Diabetic Health Plan was launched, which aims to improve care for patients with diabetes, reduce complications and increase quality of life. The measures aim to prevent and control the complications of diabetes, through the provision of medication and supplies for blood glucose monitoring, in addition to health education and physical activity programs for patients with diabetes.[1,2]

IMPACTS OF DIABETES ON PHYSICAL HEALTH

Diabetes is a chronic disease that can affect multiple systems in the body and cause a range of health complications. High blood glucose levels can damage blood vessels, nerves and vital organs, resulting in serious health problems. One of the most common complications of diabetes is diabetic neuropathy, which affects the body's nerves and can cause pain, tingling, and loss of sensation in the hands and feet. Diabetes also increases the risk of cardiovascular diseases such as coronary artery disease, heart attack, stroke, as well as developing kidney failure, blindness and limb amputation. Gestational diabetes can also have negative effects on the physical health of both mother and baby. The mother may have a premature birth, develop pre-eclampsia and have a higher risk of type 2 diabetes in the future.[4]

Diabetes can have significant impacts on sleep quality. The condition can cause insomnia, excessive daytime sleepiness, and sleep apnea, a condition in which breathing is interrupted during sleep. These sleep problems can lead to increased fatigue, decreased concentration and impaired cognitive performance, compromising physical health and significantly affecting patients' quality of life.[4]

IMPACT OF DIABETES ON SLEEP QUALITY

Insomnia is common in patients with diabetes and can be caused by hyperglycemia, diabetic neuropathy and emotional problems such as depression and anxiety. Excessive daytime sleepiness can also affect these patients and can be a sign of sleep apnea, a condition where breathing is interrupted during sleep. Sleep apnea is a common complication and can be caused by being overweight, high blood pressure and high blood sugar levels. Sleep apnea can increase the risk of cardiovascular diseases such as coronary artery disease, heart attack and stroke.[5]

Appropriate treatment of diabetes can help improve sleep quality in patients with the disease. However, many patients still face difficulties regarding the diagnosis and treatment of sleep apnea and other sleep-related complications. It is important for healthcare professionals to be aware of these issues and to work together with patients to find appropriate and personalized solutions. The Ministry of Health has adopted measures to improve the diagnosis and treatment of sleep problems in patients with diabetes through specific guidelines for sleep apnea in patients with diabetes in clinical recommendations.[1,2,4]

INSOMNIA

Insomnia is a sleep disorder that affects a person's ability to fall asleep or stay asleep through the night. It is a common condition, affecting around 30% of the population at some point in their lives. Symptoms include difficulty falling asleep, waking up frequently during the night, waking up too early, and feeling tired or drowsy during the day. Insomnia can be acute, lasting just a few days or weeks, or chronic, lasting several months or longer.[6]

Insomnia can have a significant impact on the quality of life of those affected, leading to physical health problems including fatigue, headaches, gastrointestinal problems and an increased risk of chronic conditions such as obesity and heart disease. In addition, it can negatively affect performance at work or school, concentration and cognitive performance, as well as the quality of personal relationships. [6]

The effects of insomnia on quality of life are many and varied. Sleep deprivation can lead to emotional problems such as irritability, anxiety and depression. Insomnia can also have a negative impact on physical health. In addition, lack of sleep can impair the immune system, making the body more susceptible to infections and disease.

Several clinical trials have explored the relationship between insomnia and the risk of developing type 2 diabetes. A study published in the journal Sleep in 2011 followed more than 5,000 participants over a five-year period and found that insomnia was associated with a significantly higher risk. greater risk of developing type 2 diabetes. The results indicated that individuals with insomnia had an approximately 30% greater risk compared to those without the sleep disorder.[7]

According to the International Diabetes Federation, it is estimated that approximately 50% of individuals with type 2 diabetes have some degree of insomnia.8 Furthermore, a prospective cohort study published in the journal Diabetologia in 2015 found that the presence of insomnia was associated with an increased risk of developing type 2 diabetes in women.9 The pathophysiology underlying this relationship is still not fully understood. However, there is evidence that insomnia may contribute to insulin resistance and increased systemic inflammation, key factors involved in the development and progression of type 2 diabetes.

To treat insomnia in people with diabetes, integrated therapeutic approaches are

recommended. This may include behavioral interventions such as sleep hygiene, cognitive behavioral therapy and relaxation techniques. In selected cases, the use of sleeping medication may be considered, provided it is duly prescribed by a health professional.[4]

EXCESSIVE DAYTIME SLEEPINESS

Excessive daytime sleepiness (EDS) is a condition in which a person has a strong desire to sleep during the day, regardless of how much sleep they had during the night. This condition can be caused by a variety of factors, including sleep disturbances, stress, anxiety, depression, and sleep apnea. The impact of EDS on quality of life is significant, as people who suffer from this condition find it difficult to maintain an adequate level of concentration and productivity at work or at school. Furthermore, EDS impairs the ability to drive safely, increasing the risk of traffic accidents.[10]

People who suffer from this condition may also have an increased risk of obesity, diabetes, cardiovascular disease and stroke. In addition, lack of sleep can impair the immune system, making the body more susceptible to infections and disease. Clinical trials and statistical data have investigated the association between EDS and diabetes, providing valuable information about this relationship.[11]

Epidemiological studies have demonstrated a higher prevalence of EDS in individuals with type 2 diabetes. A study published in the journal Sleep in 2013 evaluated patients with type 2 diabetes and found that EDS was present in approximately 37% of participants. Furthermore, a systematic review published in the journal Diabetes Care in 2015 analyzed several studies and concluded that the presence of EDS was associated with an increased risk of developing type 2 diabetes.[12]

EDS has also been linked to diabetic complications and worse glycemic control. A study published in the journal Diabetes Research and Clinical Practice in 2016 investigated the relationship between EDS and diabetic complications in patients with type 2 diabetes. The results indicated that the presence of EDS was associated with a higher risk of diabetic retinopathy, peripheral neuropathy and diabetic nephropathy. Another study published in the journal Sleep in 2017 showed that EDS was associated with worse glycemic control, evidenced by higher levels of glycated hemoglobin (HbA1c).[13,14]

Statistical data also confirm the association between EDS and diabetes. According to the International Diabetes Federation, it is estimated that around 30% to 40% of people with type 2 diabetes have EDS.8 The pathophysiology underlying this relationship is still not fully understood. However, insulin resistance and systemic inflammation are key factors that may contribute to the association between EDS and diabetes.

In addition to physical impacts, EDS can also affect people's mental health. Lack of adequate sleep can lead to mood issues such as irritability, anxiety and depression. In addition, it can harm interpersonal relationships, as the person may have difficulty concentrating and interacting with others. Studies show that people who suffer from this condition have a significantly lower quality of life than those who do not have this condition. This includes a worse perception of general well-being, lower functional capacity and more health problems related to quality of life.[15]

Proper treatment of EDS in patients with diabetes is essential to improve quality of life and reduce the risk of complications. In addition to adequate glycemic control, therapeutic approaches for EDS may include lifestyle adjustments, improved sleep hygiene and, in selected cases, the use of specific medications to promote daytime wakefulness.

To treat excessive daytime sleepiness, it is important to identify and treat the underlying cause. This can include lifestyle changes such as sleeping more hours at night and reducing stress, as well as medical treatments such as cognitive behavioral therapy or medication. To deal with EDS, it is important to adopt healthy sleep habits, such as keeping a regular sleep schedule,[4]

SLEEP APNEA

Sleep apnea is a sleep disorder characterized by temporary interruption of breathing during sleep. This occurs when the airways become obstructed or relax too much, preventing air from flowing into the lungs. Sleep apnea can have a significant impact on people's quality of life, affecting their physical, mental and emotional health.[16]

One of the main impacts of sleep apnea is daytime fatigue. Because people cannot get quality sleep at night, they may feel tired and drowsy during the day, which can affect their performance at work, school, and daily activities. Also, lack of adequate sleep can lead to problems with memory, concentration, and coordination. Furthermore, constant daytime fatigue can lead to mood problems such as irritability, anxiety and depression. In addition, sleep apnea can impair interpersonal relationships, as the person may have difficulty concentrating and interacting with others.[17]

Sleep apnea can also lead to physical health problems such as high blood pressure, heart disease, type 2 diabetes and obesity. This is because temporarily stopping breathing during sleep can increase blood pressure, heart rate, and blood sugar levels, putting a person at risk for developing these conditions.[18]

Its association with diabetes has been widely investigated through clinical trials and statistical data, revealing important information about this relationship. Clinical studies have shown a strong association between sleep apnea and the risk of developing type 2 diabetes. A study published in the journal Diabetes Care in 2014 followed a large sample of participants over several years and found that the presence of sleep apnea sleep was associated with a significantly increased risk of developing type 2 diabetes. The results showed that individuals with sleep apnea had an approximately two-fold increased risk compared to those without the sleep disorder.[19]

Furthermore, sleep apnea is also related to diabetic complications and worse glycemic control in patients already diagnosed with diabetes. A study published in the journal Sleep in 2017 analyzed the relationship between sleep apnea and glycemic control in individuals with type 2 diabetes. The results revealed that the presence of sleep apnea was associated with higher levels of glycated hemoglobin (HbA1c), indicating worse glycemic control.[20]

Statistical data also confirm the association between sleep apnea and diabetes. According to the International Diabetes Federation, it is estimated that approximately 40% of individuals with type 2 diabetes have sleep apnea.8 A population study published in the journal Sleep in 2012 found that sleep apnea was associated with an increased risk of development of type 2 diabetes in women.[21]

The pathophysiology of this relationship is still not fully understood, but evidence suggests that sleep apnea may play a crucial role in the development and progression of type 2 diabetes. Sleep apnea is associated with insulin resistance, which is one of the key mechanisms involved in the pathogenesis of diabetes. During episodes of sleep apnea, there is a decrease in tissue oxygenation, leading to a chronic low-grade inflammatory response. This chronic inflammation contributes to the insulin resistance and endothelial dysfunction that are hallmarks of type 2 diabetes.[3,4]

In addition, sleep apnea can also lead to increased production of stress hormones such as cortisol, which interfere with glucose regulation. Oxidative stress plays an important role in the pathophysiology of sleep apnea and diabetes, contributing to endothelial dysfunction and tissue damage.[3]

It is important to highlight that sleep apnea is not only a consequence of diabetes, but can also be a risk factor for its development. Early identification of sleep apnea in individuals with diabetes is essential for better disease control and prevention of complications. Early diagnosis is essential to prevent its negative effects on quality of life. It's important to be aware of symptoms, such as loud snoring, breathing pauses during sleep and excessive daytime sleepiness, and seek a doctor for evaluation.

Appropriate treatment of sleep apnea in patients with diabetes is essential to improve glycemic control and reduce the risk of complications. Continuous positive airway pressure (CPAP) therapy is the gold standard treatment for sleep apnea and has shown significant benefits in improving symptoms and controlling diabetes.[22]

Therefore, it is important to seek medical advice and adopt healthy sleep habits, such as maintaining a regular sleep schedule, avoiding alcohol and tobacco consumption before going to bed and sleeping on your side, losing weight, practicing regular physical activities and sleeping in an environment comfortable and free from distractions.

CONCLUSION

The relationship between sleep disorders such as insomnia, excessive daytime sleepiness and sleep apnea and diabetes is evident. From clinical trials and statistical data, it was evident that these sleep disorders play a significant role in the development and control of diabetes, negatively affecting the quality of life of individuals.

Insomnia has been shown to be associated with a higher risk of developing type 2 diabetes, in addition to interfering with glycemic control in diabetic patients. Excessive daytime sleepiness, in turn, was associated with insulin resistance and a higher prevalence of type 2 diabetes. Sleep apnea stood out as an important risk factor for the development of type 2 diabetes, in addition to aggravating the glycemic control in patients already diagnosed.

The pathophysiological mechanisms involved in this relationship range from the influence of stress hormones to chronic low-grade inflammation, insulin resistance and endothelial dysfunction. These factors interact in a complex way, contributing to the onset and progression of diabetes. Thus, it is essential that health professionals are aware of the symptoms of sleep disorders in patients with diabetes, for an early diagnosis and adequate treatment. The identification and treatment of insomnia, excessive daytime sleepiness and sleep apnea can significantly improve the quality of life of these individuals, in addition to helping with glycemic control and preventing complications related to diabetes.

Therefore, a multidisciplinary approach, involving physicians, sleep specialists and health professionals, is essential for comprehensive and effective care for patients with diabetes and sleep disorders. Based on the evidence presented, it is necessary to invest in additional research to deepen our understanding of these complex relationships and to develop more effective prevention and treatment strategies.

CONFLICT OF INTERESTS

There is not any.

FINANCING

Owned by the researchers

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