

A cross sectional study to assess sleep quality in Type 2 diabetes

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Abstract

Introduction: One of the commonest metabolic diseases is Diabetes mellitus. It is estimated that around 592 million people across the world would be living with diabetes by the year 2035. Multiple studies have recognized sleep disorder a novel risk factor for diabetes via peripheral neuropathy or endocrine metabolic pathway. **Objective:** The present study was undertaken to assess the sleep quality in type 2 diabetic patients. **Methods:** Thirty cases of controlled type II diabetes mellitus and thirty non-diabetic age matched controls, including both males and females, were assessed for sleep quality. Sleep quality was assessed by Pittsburgh sleep quality index (PSQI). **Results:** Demographic data was not significantly different between cases and controls. Sleep quality was significantly lower in cases when compared to controls ($P < 0.01$). **Conclusion:** We have observed decrease in the quality of sleep in patients of diabetes. We recommend further studies to explore the association for planning and developing better treatment procedures.

Key words: Diabetes, Sleep quality, Life style disorders.

Introduction

One of the commonest metabolic diseases is Diabetes mellitus. It is estimated that around 592 million people across the world would be living with diabetes by the year 2035 [1]. Presently china tops the list followed by India. Based on the previous studies it has been observed that there is a 10 fold rise in Diabetes mellitus from the year 1971-2000 (rise is 1.2% to 12.1%) [2,3].

A study stated that sleep disturbances are found to be very common in type 2 diabetes patients and may be due to impairment in glucose metabolism and physical distress [4]; [5]. Quality of sleep is very important to lead a healthy life; it reduces the stress and burden experienced in handling the routine personal and professional life. Many studies stated that sleep disorder is a novel risk factor in the development and occurrence of diabetes. Multiple studies have recognized sleep disorder a novel risk factor for diabetes via peripheral neuropathy or endocrine metabolic pathway [6,7]. Studies stated that long-term sleep disturbances

that are over looked routinely may further lead to chronic conditions [8]. A study reported that one of the major reasons for the increased prevalence of sleep abnormalities is due to insulin administration. The basis of poor sleep is associated with respiratory abnormalities in-turn a symptom of diabetes [9].

Aim and objectives

The present study was undertaken to assess the sleep quality in type 2 diabetic patients.

Materials and Methods

Study design: The present study was a case control study.

Setting: the study was conducted at with King Fahad Hospital, Saudi Arabia in collaboration Katuri Medical College, Guntur, India.

Participants- Thirty cases of controlled type II diabetes mellitus and thirty non-diabetic age

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matched apparently healthy controls, including both males and females, were assessed for sleep quality after obtaining written informed consent. The following criteria were used while selecting the cases.

Inclusion & exclusion criteria

1. The individuals of controlled (i.e. fasting blood sugar level ≤ 126 mg/dl and post prandial blood sugar level ≤ 180 mg/dl) type II diabetes mellitus.
2. Age between 40-60 years.
3. Not suffering from any major complications or diseases.

Results

Demographic data was not significantly different between cases and controls. Sleep quality was significantly lower in cases when compared to controls ($P < 0.01$) (Table no 1).

Table-1: Comparison of demographic data and sleep quality among cases and controls

Sno	Parameter	Cases	Controls	P Value
1	Age (years)	43.54 \pm 5.66	44.73 \pm 5.84	0.4261
2	Gender (Male: female)	18:12	20:10	
3	Height	166.77 \pm 22.45	162.58 \pm 26.76	0.5138
4	Weight	72.68 \pm 16.83	66.22 \pm 18.10	0.1576
5	Global PSQI	11.45 \pm 5.16	8.17 \pm 1.46	0.0014**

Data was presented as Mean \pm SD. * $P < 0.05$ is significant, ** $P < 0.01$ is significant, *** $P < 0.001$ is significant.

Discussion

Type 2 diabetes one of the most common prevalent chronic diseases in the world, has now become a global challenge. The incidence of diabetes both in the developed and developing countries has reached the epidemic proportions and India currently known to be the diabetic capital possessing the largest number of diabetic patients, experiencing an epidemic of type 2 diabetes. According to International Diabetic Federation (IDF) in the year 2013 reported that around 62.4 million of the Indians are diabetic [11, 12].

There are many complications of diabetes on health one such is the poor quality of sleep, these in turn may affect the quality of life of an individual with diabetes. Certain studies even reported that there are difficulties in initiating sleep in the subjects with diabetes when compared to healthy individuals [13]. As sleep is an important activity

All the participants were subjected to general and physical examination.

Variables

Assessment of sleep quality- Sleep quality was assessed by Pittsburgh sleep quality index (PSQI).[10] it has 19 questions and assesses seven components of sleep. Final score ranges between 0 to 21. Scores equal or below 5 indicates good sleep quality.

Data analysis- Data was analyzed by SPSS 20.0. Statistical test applied are student t test. P value less than 0.05 was considered significant.

in refreshing the body and improving the regular activities of the person. The poor quality of sleep has greater impact on the body functions leading to reduced physical and mental activities inversely affecting the quality of life. The present study is aimed to learn the quality of sleep in subjects with Type 2 diabetes.

Our study had shown a poor sleep quality in subjects with type 2 diabetes irrespective of the genders. Similar observation was made in a study stating that longer duration of diabetes had greater impact on the quality of sleep further affecting the quality of life leading to depression and anxiety [14].

There are certain studies that had elicited the effects of poor sleep leading to stress induced diabetes [15] highlighting the inter-relationship

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between sleep and diabetes and vice versa. The data retrieved regarding the sleep quality and duration of the sleep is self-reported for which we cannot directly compare our results retrieved with those of the other studies used polysomnographic measures of sleep disturbances.

Various factors like diet and snoring may also be the influencing factors for the sleep disturbances found, that could be further studied. The present study helps in educating the population to learn the importance of self-management of diabetes that will improve the sleep quality and further helps in the betterment of the quality of life.

Most of the studies stated that the modern life style, prolonged unhealthy eating habits, alcohol abuse, lack of physical activity and obesity are the most commonly reported and investigated risk factors for diabetes mellitus. During sleep there are certain changes in our systemic and cognitive functions such as reduced blood pressure this may be due to decrease in the sympathetic activity, hyper or hypoventilation, hormonal secretion and hypothermia, reduction in peripheral vascular resistance and cardiac output is also experienced [14].

During sleep melatonin and leptin are secreted, wherein melatonin is involved in sleep regulation and leptin increases the intake of carbohydrates leading to predispose obesity which may further lead to chronic degenerative disease like diabetes mellitus [15]. On the other hand sleep deprivation causes increase in cortisol levels, known to inhibit production of insulin. High cortisol levels raised due to sleep deprivation shows reduced glucose metabolism and high glucose levels. 16 Poor sleep in diabetic patient affects blood glucose control and glucocorticoids production causing the insulin resistance thus, making him feel more tired than a normal individual. Diabetes with retinopathy is also well studied, the study states that diabetes with retinopathy creates an hypoxic condition leading to poor oxygen supply to the retina.

Nocturia and frequent urination are the other reasons for the poor blood glucose control occurs that might be one of the causes for sleep deprivation or poor sleep in diabetic patients [17,18]. Poor quality of sleep noticed in type-2 diabetic patients may further lead to other mental

health complications such as mood swings, depression, anxiety and physical health complications like cardiovascular or gastrointestinal problems [18].

Conclusion

We have observed decrease in the quality of sleep in patients of diabetes. We recommend further studies to explore the association for planning and developing better treatment procedures.

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