



ORIGINAL RESEARCH PAPER

Community Medicine

AN ANALYTICAL CROSS SECTIONAL STUDY ON SLEEP DISORDERS IN TYPE 2 DIABETES MELLITUS PATIENTS ATTENDING MASTER HEALTH CHECKUP CLINIC IN TERTIARY CARE, CHENNAI

KEY WORDS: Type 2 Diabetes Mellitus, Sleep Quality, Sleep Disorders, Sleep Duration, Pqsi

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ABSTRACT

INTRODUCTION: Diabetes remains a major public health problem and pose a challenge even today. More than the disease, complications associated with the disease necessitates frequent contact with the health care system for both prevention and management. Sleep is considered as one such essential factor. Physiological data suggests that short term partial sleep restriction leads to striking alterations in metabolic and endocrine functions including reduced carbohydrate tolerance, insulin resistance, increased sympathetic tone and increased cortisol concentration. In addition, patients with type 2 diabetes mellitus are reported to have higher rates of insomnia, excessive daytime sleepiness and a higher incidence of restless leg syndrome.

OBJECTIVE: The objective of the study is to identify the association of sleep disturbances among patients with type 2 diabetes in chennai population and to determine the predictors of sleep impairment in this population using a validated instrument, the Pittsburgh Sleep Quality Index (PSQI).

METHODOLOGY: This is a cross sectional study done with a sample size of 120 subjects above 20 years of age attending master health checkup clinic in Stanley Medical College, Chennai. The subjects were selected by systematic random sampling, in this study. The data was collected using Interview and Survey method using Pittsburgh Sleep Quality Index questionnaire which was used to assess the sleep quality. The data was compiled using Microsoft Excel and analysed using SPSS version 16.

RESULTS: On analysis it was found that the incidence of diabetes among our study population was 28.33%. The Pittsburgh Sleep Quality Index questionnaire revealed that there was an increased incidence of poor sleep quality among diabetics (72%) compared to non-diabetics (28%) (p<0.001). Also there was an increased incidence of shorter duration of sleep (< 6 hours) among diabetics (61%) compared to non-diabetics (19%) (p<0.001). Study findings indicated that sleep disturbances among type 2 diabetes mellitus patients are common.

CONCLUSION AND RECOMMENDATIONS: In conclusion the observed sleep quality disturbances highlight the need to increase the awareness of patients and healthcare providers so as develop better diagnostic, therapeutic, promotive and preventive strategies.

INTRODUCTION:

Diabetes remains a critical public health challenge. India, in specific already stands as the diabetic capital of the world. More than the disease per se ,it is the complications associated with the disease ,such as renal, cardiovascular and peripheral vascular disorders, that necessitates frequent contact with the health care system for both it's prevention and management. In addition to these, there is a dying need to understand the other determinants of the disease in order to develop additional prevention strategies. One such essential factor is sleep. Sleep is a common condition in the modern society with evidence showing that we are sleeping on an average only 6.8 hrs per night, which is 1.5hrs less than we did centuries ago ^(1,2). Factors responsible for this change include long work time , increase in shifts and night work, advent of newer facilities like television ,radio and internet ⁽³⁾.

Physiological data suggests that short term partial sleep restriction leads to striking alterations in metabolic and endocrine functions including reduced carbohydrate tolerance, insulin resistance, increased sympathetic tone and increased cortisol concentration ⁽⁴⁾. These findings suggest that long-term sleep curtailment may predispose individuals to overt clinical diabetes. In addition, patients with diabetes are reported to have higher rates of insomnia, excessive daytime sleepiness and a higher incidence of restless leg syndrome. A majority of these patients may also have obstructive sleep apnea (OSA). OSA and diabetes mellitus share several risk factors, including advanced age and obesity.

The present study was carried out to identify the association of sleep disturbances among patients with type 2 diabetes in chennai population and to determine the predictors of sleep impairment in this population using a validated instrument,

the Pittsburgh Sleep Quality Index (PSQI).

MATERIALS AND METHODS:

This is a cross sectional study done after obtaining clearance from the Institutional Ethical Committee. A statistically adjusted sample size of 120 subjects, above 20 years of age were considered. The subjects for the study, were considered from master health checkup clinic, Stanley Medical College, Chennai. The subjects were selected for the study by systematic random sampling, ensuring equal chance of participation in the study.

An informed consent was obtained from all the subjects who participated in the study. Subjects who were not willing to participate in the study were excluded. The data was collected using Interview and Survey method using Pittsburgh Sleep Quality Index questionnaire which was used to assess the sleep quality(19). This consists of about 10 questions which assesses various aspects of sleep pattern starting from the duration, sleep latency ,other problems associated with sleep maintenance, how this disturbance affects their day to day activities, early morning somnolence etc., based on which the score was given under 7 categories each of which ranging from 0 to 4. Patients with a score < 5 were considered to have a good sleep quality while those with score >5 were considered to have a poor sleep quality.

Also the patients were also categorized based on their duration of sleep. Those who slept for <6 hrs a day were placed under the category of Short sleep, those who slept between 6 to 10 hrs a day were considered normal and those who slept for >10hrs a day were placed under the category of long sleep.

Patients who were considered for the study were given a case

study proforma wherein they were asked to fill in the basic demographic details such as name ,age, address ,gender and details regarding their diabetic status (diabetic or non-diabetic).

STATISTICAL ANALYSIS:

The data was compiled using Microsoft Excel. The statistical package SPSS (version 16) was used for analysis and proportions were calculated for nominal data ,mean and standard deviation were used for continuous data. Categorical data was expressed in percentage and relative risk of each factor was assessed. Chi square test is used to test the significance i.e; to test if there was any significant difference in the sleep pattern among the diabetics and non-diabetics. p value <0.05 was considered as statistically significant.

RESULTS:

At the end of the analysis it was found that there was an increased incidence of poor quality of sleep diabetes (≥5 PQSI) among those who had diabetes (71.64% vs 28.30%) according to PQSI scoring (p<0.001) with a relative risk score of 2.29. Also there was an increased incidence of shorter duration of sleep (<6hrs/day) among those who had diabetes (61.19% vs 18.87%) according to PQSI scoring (p<0.001) with a relative risk score of 2.04. Hence it was found that diabetics had more than 2 times risk of developing poor quality of sleep and also shorter duration of sleep compared to those who had no diabetes. This clearly establishes the significant link between sleep disorders and type 2 diabetes mellitus(Table 1).

DISCUSSION:

In a study conducted by Yaggi HK it was found that both short duration of sleep were associated with increased risk of diabetes in which it was found that people who slept for a longer duration were three times more likely to develop diabetes. Our study reflected the same. In a study conducted by Knutson KL et al it was found that exposure to 5 days of 4-hour sleep durations was associated with a 40% reduction in glucose tolerance to intravenous glucose and a 30% reduction in the acute insulin response to glucose (20) which is in line with our results which suggest a positive association between shorter sleep duration of < 6hrs and diabetes. and was also found to be statistically significant. This is also in line with the Sleep Heart Health study conducted by Gottlieb DJ et al which also suggests an increased risk of diabetes among

those who slept for less than 6hrs a day(6).

In a study conducted by Rajendran et al on about 120 subjects , it was found that a higher proportion of type 2 diabetics had a PQSI score ≥5 which suggests that poor sleep quality shows a positive association with type 2 diabetes. In our study also it gave similar results with poor sleep quality was significantly associated with diabetes.

CONCLUSION:

We can safely conclude that a higher proportion of diabetics had a history of a shorter sleep duration and also poor quality of sleep compared to the non diabetics. Our analysis demonstrated that those who had diabetes showed a two fold higher risk of sleep disorder. We recommend assessment of sleep quality and sleep disorders as a part of the regular medical evaluation to achieve good glycemic control in persons with type 2 diabetes mellitus.

LIMITATIONS:

A subjective method was used to evaluate the sleep quality possibly lowering the objectivity of the study. a more objective method, for example polysomnography , could be combined with a subjective method providing a more satisfactory study. Furthermore although the results in this study indicated that diabetics had a poor quality of sleep no further interventions were given to those who suffered from sleep disorders. Also this study was done only on about 150 subjects which is a small sample size.

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DECLARATIONS:

FUNDING:

Nil

CONFLICTS OF INTEREST:

There are no conflicts of interest

ETHICAL APPROVAL:

Prior permission was obtained from the Institute of Ethical Committee, Stanley Medical college

Table 1: Shows the percentages of diabetics and non diabetics in each of the categories under sleep quality and duration and the last two columns represent the relative risk and chi-square values

S.No	Sleep –Quality and Quantity Assessment	Diabetics (n=67)	Non Diabetics (n=53)	Relative Risk	Chi-Square P value
1.	Sleep Quality using PQSI Poor (≥5) Good (<5)	48(71.64) 19(28.36)	15(28.30) 38(71.70)	2.29	<0.001*
2.	Sleep Duration Short Sleep (<6 hrs) Normal Sleep (6-10 hrs) Long Sleep (>10 hrs)	41(61.19) 21(31.34) 7(10.45)	10(18.87) 31(58.49) 12(22.64)	2.04	<0.001*

p value significant (<0.05)

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