

Duration and Quality of Sleep in the Severity of Type 2 Diabetes Mellitus in Rural India

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Abstract: Aim of the study was to enumerate the sleep duration and sleep quality in type 2 diabetes patients in rural INDIA. **Material and methods:** All the patients underwent an interview to record information on age sex and duration of diabetes. Hb1AC, and mean blood glucose were done. At the end of the visit, each participant was asked to complete PSQI, a validated 19 questionnaire used to measure the quality and pattern of sleep in the past 1 month. It produces global quality score from 0 to 21, derived from seven components. The components include subjective sleep quality, sleep latency, sleep duration habitual sleep efficacy, sleep disturbances, use of sleep medication, and day time dysfunction. People with a global score equal or less than 5 are defined to have good sleep quality, while a global score more than 5 identifies those with poor sleep quality. This study was done in rural population with diabetes to enlighten the sleep duration and quality. **Results:** 32 patients [64%] have good sleep latency. Sleep duration of 36 patients [72%] is more than 7 hours. Average duration of sleep of 50 patients is 7.56 hours. Habitual sleep efficiency is 0 in most patients [n=48(98%)]. Average time of onset of sleep is 10:24 PM and average time of getting up from bed is 5:10 AM. 84%[N=42] have a score of 1 in sleep disturbances. 65% of them get up in the middle of the night and 80% of them get up for using the toilet for micturition. 96% of patients did not use any sleep medication. Most patients [n=26(52%)] have score 2 i.e. fairly good quality of sleep. **Conclusion:** People of rural India have fairly good sleep quality. Their sleep latency is good. They have good sleep duration. Most have nocturia but have sleep without many disturbances. They have good habitual sleep efficacy. They do not take sleeping pills. They do not have daytime dysfunction. They have a good score PSQI.

Keywords: PSQI, type 2 diabetes, sleep in diabetes, rural India

1. Introduction

Chronic partial sleep loss due to bedtime restriction and sleep complaints are increasingly prevalent in modern society. During the past few years, evidence from laboratory and epidemiologic studies has accumulated, suggesting that decreased sleep duration and/or quality may adversely affect glucose regulation and increase the risk of type 2 diabetes mellitus.

Two published laboratory studies have reported alterations in glucose regulation during partial sleep restriction. In the first study, 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 [1] These findings were confirmed in another study that used a randomized cross-over design with 2 nights of sleep restriction or extension (4-hour vs 10-hour bedtimes) [2]. After the second night of each condition, caloric intake was replaced by constant intravenous glucose infusion, and blood samples were collected every 20 minutes. After sleep restriction, morning glucose levels were higher and insulin levels were lower than after sleep extension [2]. Preliminary data from an ongoing study revealed a marked reduction in glucose tolerance and insulin sensitivity after 8 nights of 5-hour bedtimes compared with 8-hour bedtimes [3]. The consistency of these findings, despite differences in experimental design, suggests that sleep restriction has adverse effects on glucose metabolism.

A much larger number of epidemiologic studies, summarized in references from 4 to 14 have explored the relationship between sleep duration and/or quality and diabetes. The prospective studies, which involved different geographical locations, were remarkably consistent, indicating that short or poor sleep may increase the risk of

developing type 2 diabetes. Evidence from cross-sectional studies suggests that a diabetic condition may involve a reduction in sleep duration or an impairment of sleep quality. Neuropathic pain and nocturia have been suggested as 2 possible causes of decreased sleep quality[14].

Normal average sleep duration was decreased from 8.0- 8.9 hrs per night in 1960 to about 6.9- 7.0 hrs in 2000-2002[15, 16]. Poor sleep quality and insufficient sleep is commonly seen @ 46 – 69% [17-20].

Current evidence has shown that poor sleep quality is associated with increased risk of insulin resistance and obesity [21-24]. Furthermore, it is shown that poor sleep quality and short sleep duration increase the risk of diabetes [25- 28]. A close relationship between diabetes and disturbed sleep has been proposed as the incidence of both disorders has increased during recent years [29-31]. Short sleep duration has been observed to be related to increased risk of diabetes [32, 33]. Difficulty initiating sleep, difficulty maintaining sleep and excessive daytime sleepiness are more common in diabetic patients [34, 35]. Nocturia and neuropathic pain have been proposed as possible causes of decreased sleep quality in diabetes [36].

With increasing incidence of diabetes in rural India due to urbanization, it is worth to study the sleep pattern in people with diabetes in rural India. So, the aim of the study was to enumerate the sleep quality in type 2 diabetes patients in rural INDIA

2. Materials and Methods

A total of 50 people were enrolled with diagnosis of type 2 diabetes belonging to rural community in India.

Exclusion criteria were as follows;

Newly diagnosed type 2 diabetes with less than 1 year since diagnosis.

Type 1 diabetes

History of any systemic diseases such as anemia, thyroid disease, liver dysfunction, cardio vascular disease, pulmonary disease, renal impairment, stroke and peripheral vascular disease

Psychological disease and diagnosed sleep disorders need regular medical treatment

Restless leg syndrome,

Shift workers

Psychotropic and anticonvulsant drug users

History of treatment with opioids and routine use of benzodiazepines

Known diabetic complications on medical interventions, such as established peripheral neuropathy, diabetic neuropathy, diabetic nephropathy and retinopathy

Alcoholism and habitual smoking

Pregnancy and lactation

Study design

All the patients underwent an interview to record information on age sex and duration of diabetes. Hb1AC, and mean blood glucose.

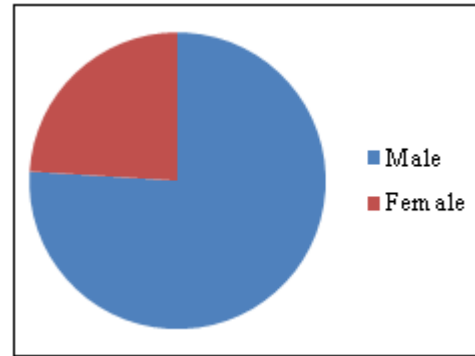
At the end of the visit, each participant was asked to complete PSQI, a validated 19 questionnaire used to measure the quality and pattern of sleep in the past 1 month. It produces global quality score from 0 to 21, derived from seven components. The components include subjective sleep quality, sleep latency, sleep duration habitual sleep efficacy, sleep disturbances, use of sleep medication, and day time dysfunction. People with a global score equal or less than 5 are defined to have good sleep quality, while a global score more than 5 identifies those with poor sleep quality.

3. Results:

Age: Out of 50 patients taken into study, age distribution is as follows. Maximum number was in the age group 61 to 70 i.e 32% and minimum number was in the age group 21 to 30 i.e. 4%. Mean age is 51.36 years

Age group	Number of patients
21- 30	2 [4%]
31- 40	10[20%]
41- 50	14[28%]
51- 60	8[16%]
61- 70	16[32%]

Sex: 38 patients [76%] are males and 12 [24%] are females out of 50 patients enrolled.



Duration of diabetes: Duration varied from 2 yrs to 20 yrs. Distribution is as follows

Duration in years	Number	Percentage
2-5	11	44 %
6-10	11	44 %
11-15	2	4 %
16-20	1	2 %

Average age of onset of diabetes 7.3 yrs.

PSQI:

Component 1: Most patients [n=26(52%)] have score 2 i.e. fairly good quality of sleep.

Component 2: 32 patients [64%] have good sleep latency.

Component 3: Sleep duration of 36 patients [72%] is more than 7 hours. Average duration of sleep of 50 patients is 7.56 hours.

Component 4: Habitual sleep efficiency is 0 in most patients [n=48(98%)]. Average time of onset of sleep is 10:24 PM and average time of getting up from bed is 5:10 AM.

Component 5: 84%[N=42] have a score of 1 in sleep disturbances. 65% of them get up in the middle of the night and 80% of them get up for using the toilet for micturition.

Component 6: 96% of patients did not use any sleep medication.

Component 7: Daytime dysfunction is not present in 60% [n=30] of patients. 24% had a problem in engaging in daytime activity. 36% had a problem to keep up enthusiasm to get things done.

Global score distribution is as follows:

Global score	Number [n=50]	Percentage
0-5	40	80%
6-10	10	20%
11-15	0	0%
16-21	0	0%

The mean HbA1C level was 7.1 and 53% of patients had good glycemic control with an hbA1C value below 7.

3. Discussion

This study was done in patients completely of rural origin with agriculture as main profession. The effect of diabetes and disturbed sleep was independent of age and sex. As duration of diabetes increases sleep quality decreases. This is because the patients had enthusiasm to get things done and other medical conditions. Most patients sleep late and get up

early as suggested by the time. This is because of the agricultural background. Most patients have good sleep duration i.e. 7hours. Most patients have no disturbance in sleep except for nocturia which was observed in 68%. Nocturia did not have any influence on quality of sleep. Use of sleep medication and day time dysfunction is not observed in most patients. PSQI global score in patients with diabetes in rural population is less than 5 which suggest good sleep quality. Conclusion:

This study was done in rural population with diabetes to enlighten the sleep duration and quality.

- 1) People of rural India have fairly good sleep quality.
- 2) Their sleep latency is good.
- 3) They have good sleep duration
- 4) Most have nocturia but have sleep without any disturbances.
- 5) They have good habitual sleep efficacy.
- 6) They do not take sleeping pills.
- 7) They do not have daytime dysfunction
- 8) They have a good score PSQI.

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Author Profile



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