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A Review Article on Late Sleep Time in Youngsters: A High Risk of Diabetes Mellitus

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Aim: **The aim was to investigate risk of Diabetes Mellitus in youngsters having late sleep time.**

Methods: **Random participants of 18-35 age group were selected in this study. Sleep habit was recorded based on questionnaire asked to participants. Late Sleep time was categorized as 10-11 pm,11pm-12am and 12 to later.**

Result: **As per this study, distribution of sleep time at 10-11 pm was 35%,11pm -12 am was 31% and after 12 am onwards was 34%. Therefore 12 am onwards had a higher prevalence of DM, than those sleeping before 11 pm.**

Conclusion: **Late sleep time at 12 am and later may be a risk factor for the prevalence of Diabetes Mellitus. Sleep time before 10 pm leads to low risk of DM.**

Keywords: **Diabetes Mellitus, Late Sleep time, Sleeping Habits, Sleep Disorders, Youngsters**

I. INTRODUCTION

Diabetes mellitus (DM), characterized by elevated blood sugar levels, is one of the most common chronic diseases in the world.

Diabetes mellitus itself is a chronic disease that is often found worldwide, with increasing prevalence, especially in developing countries [1]. It is a chronic disease where the body either doesn't produce enough insulin or can't effectively use the insulin it produces, leading to high blood glucose (sugar) levels. This excess blood sugar, known as hyperglycemia, can damage the body's organs over time, particularly the heart, blood vessels, eyes, kidneys, and nerves. The most common types are Type 1 diabetes, where the body makes little or no insulin, and Type 2 diabetes, which involves the body becoming resistant to insulin or not making enough.

Sleep disorders are a common health problem that can affect various aspects of the body's metabolism, including the risk of diabetes mellitus (DM) and its complications.

The relationship between sleep disorders and diabetes is reciprocal: sleep disorders can interfere with blood glucose control and increase the risk of insulin resistance, while diabetes can also affect sleep quality due to conditions such as neuropathic pain, increased urinary frequency at night, or hypoglycaemia during sleep[2].

Epidemiological studies have shown that sleep duration that is too short (<6 hours) or too long (>9 hours) is associated with an increased risk of diabetes [3]. This issue is of considerable importance in the field of public health, as it has aglobal impact on a substantial number of individuals. In recent years, evidence from epidemiological and laboratory studies have shown that short or disturbed sleep is associated with glucose intolerance, insulin resistance, reduced acute insulin response to glucose [4], [5], and an increased risk of developing type 2 diabetes [6-9].Research has shown that these disturbances are linked to negative health consequences, such as impaired management of blood sugar levels, heightened risk of cardiovascular disease, limited cognitive abilities, and reduced overall well-being [10].

Because sleep modulates glucose metabolism and homeostasis, and influences quality of life, identifying sleep problems may be an important factor in treating type 2 diabetes. This study aims to investigate the correlation between sleep disorders and glycemic control, with aspecific focus on examining the influence of inadequate sleep on blood glucose regulation. In addition, this study will evaluate the effects of sleep disorders on the overall quality of life and well-being of patients withT2D, taking into account the various physical, emotional, and social ramifications that may arise. Finally, this study aims to identify potential risk factors linked to sleep disturbances in the target group, includingobesity, duration of diabetes, and the presence of comorbidities. The identification of these risk factors will enable the identification of individuals at high risk and inform the development of intervention options. Late night sleep in young people can cause type 2 diabetes by disrupting the body's natural circadianrhythm, which regulates metabolism. This disruption leads to insulin resistance and inflammation, affecting blood sugar regulation and increasing the risk of developing type 2 diabetes. Poor sleep also influences hormones that control appetite, leading to increased cravings for carbohydrates and weight gain, which further elevates the risk of diabetes. it can also lead toinsulin resistance which results in higher blood sugar levels and can lead to type 2 diabetes.

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Inadequate sleep affects appetite-regulating hormones like leptin, leading to reduced leptin levels which increases cravings for high-carbohydrate foods and causes obesity. Late-night habits may also correlate with less physical activity and increased alcohol or smoking, which are also risk factors for diabetes. This indicates that late bedtime might correlate with the incidence of DM. However, the appropriate sleep timing associated with a decreased risk of DM remains unclear. We therefore conducted the current study to investigate the relationship between late sleep pattern and DM based on a community-based population.

II. MATERIAL AND METHODS

A. Inclusion: Random study was conducted on youngsters who had working profile and who were studying have late night sleep due to various reasons which ultimately leads to type II diabetes mellitus, study was done by using questionnaires for assessing common sleep disturbances from January 2025 to August 2025. Participation in the study was between 18-35 years.

B. Exclusion criteria: Patients who had congenital heart problems; or a major concurrent illness such as cancer, pulmonary disease, liver disease, severe painful peripheral neuropathy, or alcohol dependency.

Assessment of participants using questionnaires: Normal fasting blood glucose levels according to WHO are between 70 mg/dL (3.9 mmol/L) and 100 mg/dL (5.6 mmol/L). Elevated fasting blood glucose levels are an indicator of higher risk of diabetes. The criteria for diagnosis of type 2 DM can refer to the guidelines issued by the Ministry of Health in 2022.

(1) Fasting blood sugar (GDP), an examination conducted after fasting for approximately 8 hours using a blood sample from the patient's vein. Patients can be said to have type II DM if the test results show fasting blood sugar levels greater than, or equal to, 126 mg/dL.

(2) Oral glucose tolerance test (OGTT), is an examination conducted after 2 hours of glucose administration of about 75 grams by taking venous blood samples. Participants are diagnosed with type II DM if the test results show more than or equal to 200 mg/dL blood glucose level.

(3) Whole blood sugar (GDS) is a test that is done using a venous blood sample and can be done at any time, without preparation. A person can be diagnosed with type II DM using this test if the result is greater than or equal to 200 mg/dL.

(4) Hemoglobin A1c (HbA1c) is a test performed with a method standardized by the National Glycohemoglobin Standardization Program (NGSP) using the patient's venous blood sample. Patients can be diagnosed with type II DM if the HbA1c level is greater than or equal to 6.5%.

Factors causing type 2 diabetes mellitus:

- *Family history*
- *Less Physical activity:* Lack of physical activity can accelerate the pathogenesis of type 2 diabetes mellitus, leading to morbidity and mortality [11].
- *Diet:* Many studies have reported a positive association between high sugar intake and the development of T2DM [12].
- *Obesity:* Obesity tends to run in families, and families often have similar eating and exercise habits [13].
- *Hypertension.*

Physical symptoms of type 2 diabetes mellitus:

In general, Symptoms including.

(1) Frequent urination at night i.e. polyuria
(2) Feeling Extremely Thirsty i.e. polydipsia
(3) Easy hunger i.e. Polyphagia
(4) Unintentional weight loss
(5) Have blurred or unclear vision
(6) Feeling very tired
(7) healing wounds becomes difficult
(8) Frequent tingling sensation in hand and feet

III. RESULTS

The baseline clinical characteristics of the participants are presented in Table 1. There were 58 males and 42 female patients. The patients had a mean age of 29.7±11.1 yr and a mean body mass index (BMI) of 24.9±3.4 kg/m2. The mean HbA1c level was 7.1%±1.5%.

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TABLE I
CLINICAL CHARACTERISTICSOFTHEPARTICIPANTS

Features	Total No. of Participants
Sex (Male / Female)	58/42
Age	18-35 years
BMI	24.9±3.4 Kg/m2
Smoking status (Yes/ No)	49/51 Participants
Alcohol use (Yes /No)	55/45Participants
Fasting blood sugar (mg/dl)	143±52.3
Postprandial blood glucose (mg/d)	19.5±166.5
HbA1c(%)	7.1± 1.5 %
Hypertension (Yes /No)	22/78 Participants
Sleep duration (Hours/day)	
<6 hours	6.3±1.58
>6 hours	7.1±1.93

TABLE II
IN ACCORDANCE TO AGE, PREVALENCE OF LATE SLEEP-IN MALE(S) AND FEMALE(S)

Age (years)	Male(s) 58 participants	Female(s) 42 Participants	Total Number of Participa-nts (100)
18-24	25	20	45
25-30	19	13	32
31-35	14	9	23

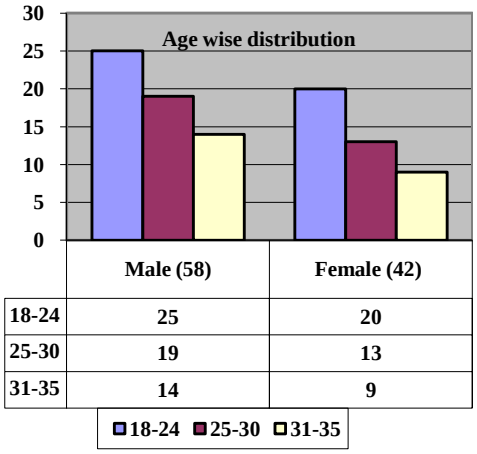

TABLE III
NO. OF PARTICIPANTS WITH DIFFERENT SLEEP TIME IN ACCORDANCE TOAGE

Age (years)	Sleep time Before 11 pm(no. of subjects)	Sleep time Between 11 pm-12 am (no. of subjects)	Sleep time between 12am - 1am(no. of subjects)
18-24	18	15	12
25-30	12	05	15
31-35	05	11	07

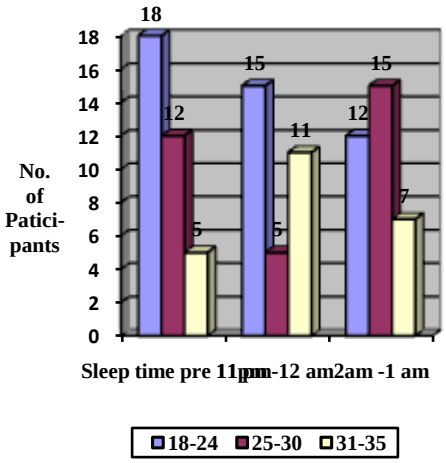

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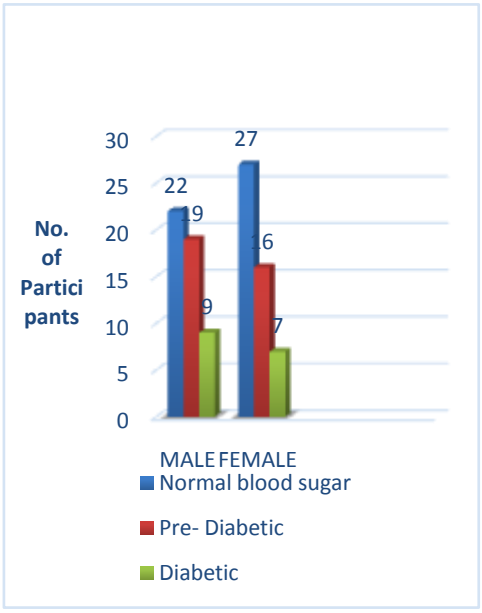
TABLE IV
BLOOD SUGAR LEVEL CHART INMALE(S) AND FEMALE(S): -

A1c	Fasting range	Male	Fe-male	Total particip-ants
Normal blood Sugar (5.7%)	99 mg/dl	22	27	49
Prediabe-tic (5.7 - 6.4%)	100-125mg/dl	19	16	35
Diabetic (6.5% or above)	126 mg/dl or above	9	7	16



IV. DISCUSSION

The focus of this population-based study was to evaluate the age-related risk factors in late sleep individuals among urban population in Dera Bassi Zirakpur of both males and females (aged 18-35yrs). In our study we found that sleep disturbances were very common in young individuals. To the best of our knowledge, this study is the small sample-sized survey to investigate various sleep disturbances which can be a cause of type 2 diabetes in lateral stages.

Using validated questionnaires, the study was conducted. In the present study, approximately half of the patients had insomnia or poor sleep, suggesting an overall poor quality of life in young age.

Sleep disturbances may have a harmful effect on glucose regulation.

According to this study, this study showed a high prevalence of multiple lifestyle and diabetic risk factors: lack of physical activity, high fat intake, sedentary life style, smoking, alcohol intake, obesity, hypertension etc.

Sleep disorders, such as obstructive sleep apnea, insomnia, use of gadgets, have been shown to be significant risk factors for diabetes mellitus (DM) and its complications. Following such lifestyle can cause sleep disorders which can affect glucose metabolism, increase insulin resistance, and increase the risk of diabetes in youngsters. Conversely, people with bad eating habits, using gadgets are also more susceptible to sleep disturbances.

The lack of physical activity is associated with a higher risk of obesity, metabolic syndrome, and insulin resistance.[14]

Our findings also corroborate previous investigations demonstrating that the prevalence of sleep disorders likely increases with age [15],[16], as the absolute incidence of any sleep disorder was higher in older adults.

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