



**“A DESCRIPTIVE STUDY TO DETERMINE THE RELATIONSHIP
BETWEEN SLEEP QUALITY AND BLOOD GLUCOSE
FLUCTUATION IN PATIENTS WITH TYPE 2 DIABETES
MELLITUS AT NARAYAN MEDICAL COLLEGE AND HOSPITAL
(NMCH), JAMUHAR, SASARAM, ROHTAS, BIHAR”**

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Abstract

Type 2 diabetes mellitus (T2DM) is a chronic metabolic disorder characterized by persistent hyperglycemia resulting from insulin resistance, impaired insulin secretion, or a combination of both. It is one of the leading non-communicable diseases globally and poses a substantial burden on individuals, families, and healthcare systems. T2DM is associated with multiple acute and chronic complications, including cardiovascular disease, nephropathy, neuropathy, retinopathy, and diabetic foot ulcers, all of which can significantly impair quality of life and increase mortality. Effective diabetes management therefore requires a comprehensive and holistic approach that addresses not only blood glucose control but also lifestyle and behavioral factors that influence disease progression.

Sleep is a fundamental biological process essential for physical restoration, neurocognitive functioning, hormonal balance, and metabolic homeostasis. Adequate and good-quality sleep plays a critical role in regulating glucose metabolism, insulin sensitivity, appetite hormones, inflammatory responses, and



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autonomic nervous system balance. Sleep deprivation, fragmented sleep, and poor sleep quality can adversely affect glucose homeostasis by increasing insulin resistance, elevating cortisol levels, stimulating sympathetic activity, and promoting systemic inflammation. These physiological changes may worsen glycemic instability and contribute to poor metabolic outcomes in individuals with diabetes.

A Sleep is a vital physiological process that helps maintain metabolic and hormonal balance. Studies suggest that approximately 40–60% of patients with type 2 diabetes mellitus experience poor sleep quality and sleep disturbances. Poor sleep and disturbed sleep patterns can negatively affect glucose metabolism and insulin sensitivity.

The present study aimed to assess the relationship between sleep quality and blood glucose fluctuation among patients with type 2 diabetes mellitus. A quantitative descriptive correlational research design was adopted. The study was conducted at Narayan Medical College and Hospital (NMCH), Jamuhar, Bihar. A total of 60 patients were selected using purposive sampling technique. Data were collected using the Pittsburgh Sleep Quality Index (PSQI) and blood glucose measurements (fasting blood glucose, postprandial blood glucose, and HbA1c).

The findings revealed that most of the participants belonged to the age group of 51–60 years and majority were male. A large proportion of patients had moderately fluctuating blood glucose levels. A statistically significant moderate positive correlation was found between sleep quality and blood glucose fluctuation ($r = 0.62$, $p = 0.001$), indicating that poor sleep quality is associated with greater glucose variability. A significant association was also found between sleep quality and selected demographic variables such as age and educational status.

Keywords

Type 2 Diabetes Mellitus, Sleep Quality, PSQI, Glycemic Variability, Blood Glucose

Introduction

Type 2 diabetes mellitus is a chronic metabolic disorder characterized by persistent hyperglycemia resulting from insulin resistance, impaired insulin secretion, or both. It is one of the most rapidly increasing non-communicable diseases worldwide and poses a major public health challenge. The prevalence of diabetes is rising due to factors such as sedentary lifestyle, unhealthy dietary habits, obesity, stress, and urbanization. Long-term uncontrolled diabetes leads to various complications affecting multiple organ systems, including cardiovascular diseases, nephropathy, neuropathy, retinopathy, and diabetic foot problems, which significantly reduce the quality of life and increase mortality.



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Effective management of type 2 diabetes mellitus requires a comprehensive approach that not only focuses on medication and dietary control but also considers lifestyle factors such as physical activity, stress management, and sleep. Among these, sleep is an essential physiological process that plays a crucial role in maintaining metabolic and hormonal balance. Adequate and good-quality sleep is necessary for proper glucose metabolism, insulin sensitivity, and overall health.

Poor sleep quality, sleep deprivation, and disturbed sleep patterns have been shown to negatively affect glucose regulation. These conditions can increase insulin resistance, elevate cortisol levels, and activate the sympathetic nervous system, leading to impaired glucose metabolism. As a result, patients with poor sleep quality may experience greater fluctuations in blood glucose levels, making diabetes management more difficult.

Sleep disturbances such as insomnia, frequent awakening, restless sleep, nocturia, and obstructive sleep apnea are commonly reported among patients with type 2 diabetes mellitus. These disturbances may be caused by fluctuating blood glucose levels, diabetic complications, medication effects, stress, and associated comorbidities. Poor sleep not only affects physiological processes but also influences behavioral aspects such as medication adherence, dietary habits, and physical activity, further worsening glycemic control. In recent years, there has been growing evidence highlighting the relationship between sleep quality and blood glucose levels. Poor sleep quality has been associated with higher glycated hemoglobin (HbA1c) levels and increased glycemic variability. Despite this, sleep quality is often overlooked in routine diabetes care, particularly in low-resource settings where awareness and healthcare access are limited.

Nurses play a vital role in the management of diabetes by providing education, monitoring patient progress, and promoting healthy lifestyle practices. Assessing sleep quality among patients can help identify hidden factors contributing to poor glycemic control. Interventions such as sleep hygiene education, stress management, and lifestyle modification can improve sleep quality and support better diabetes outcomes.

Therefore, it is important to study the relationship between sleep quality and blood glucose fluctuation among patients with type 2 diabetes mellitus. Understanding this relationship can help in developing effective nursing interventions and improving the overall management and quality of life of patients.

Objectives

1. To assess the sleep quality among patients with type 2 diabetes mellitus .
2. To assess the level of blood glucose fluctuations among patients with type 2 diabetes mellitus.
3. To determine the relationship between sleep quality and blood glucose fluctuation among patients with type 2 diabetes mellitus.



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4. To associate the sleep quality and blood glucose fluctuations with selected socio-demographical variable among patients with type 2 diabetes mellitus .

Hypotheses

H₁: There is a significant relationship between sleep quality and blood glucose fluctuation among patients with type 2 diabetes mellitus.

H₂: There will be a significant association between sleep quality and blood glucose fluctuation among patients with type 2 diabetes mellitus with their selected socio-demographic variables

Methodology

A quantitative descriptive correlational research design was selected for this study.

Setting and Sample

The study was conducted in a hospital setting among 60 patients with types 2 diabetes mellitus. purposive sampling technique was used.

Inclusion Criteria

- Age 30–65 years
- Diagnosed with type 2 diabetes mellitus
- Patients receiving treatment for at least 6 months

Tool

- Demographic data sheet
- Pittsburgh Sleep Quality Index (PSQI)
- Blood glucose assessment (FBS, PPBS, HbA1c records)

Analysis

- Descriptive: Mean, percentage
- Inferential: Paired t-test, Chi-square



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Result

Table 1 : Demographics Characteristics (N = 60)

Variable	Category	Frequency	Percentage (%)
Age	30–40 years	12	20.0
	41–50 years	18	30.0
	51–60 years	20	33.3
	61–65 years	10	16.7
Gender	Male	34	56.7
	Female	26	43.3
Occupation	Farmer	18	30.0
	Laborer	12	20.0
	Private Job	10	16.7
	Homemaker	14	23.3
	Others	6	10.0
Education	Illiterate	10	16.7
	Primary	18	30.0
	Secondary	20	33.3
	Graduate+	12	20.0
Marital Status	Married	48	80.0
	Unmarried	6	10.0
	Widowed	6	10.0
Religion	Hindu	40	66.7
	Muslim	16	26.7
	Others	4	6.6
Residence	Rural	38	63.3
	Urban	22	36.7



Table 2: Table 2: Blood Glucose Fluctuation Level (N = 60)

Level	frequency	percentage 10%
Control	20	33.3%
Moderate	25	41.7%
High	15	25%

Table 3: Correlation Between Sleep Quality and Blood Glucose Fluctuation

Level	r- Value	p- Value	Result
Sleep quality Vs Blood glucose	0.62	0.001	Significant

Discussion

The findings of the present study revealed that a majority of patients with type 2 diabetes mellitus had varying levels of blood glucose fluctuation, with a considerable proportion experiencing moderate fluctuations. Poor sleep quality was commonly observed among the participants.

The study identified a statistically significant moderate positive correlation between sleep quality and blood glucose fluctuation ($r = 0.62$, $p = 0.001$), indicating that patients with poorer sleep quality tend to have higher variability in blood glucose levels. This finding suggests that sleep disturbances play an important role in glycemic instability.

The association analysis showed that sleep quality had a significant relationship with selected demographic variables such as age and educational status, while no significant association was found with gender, occupation, marital status, or religion.



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These findings are consistent with previous studies, which indicate that poor sleep quality negatively affects glucose metabolism and insulin sensitivity. Disturbed sleep may lead to increased insulin resistance, hormonal imbalance, and poor self-care practices, ultimately resulting in poor glycemic control.

Conclusion

The study concludes that there is a statistically significant relationship between sleep quality and blood glucose fluctuation among patients with type 2 diabetes mellitus. Poor sleep quality is associated with higher and unstable blood glucose levels.

Improving sleep quality may contribute to better glycemic control and overall health outcomes in diabetic patients. Therefore, assessment of sleep quality should be considered an important component of diabetes management.

Implications

- Improves holistic patient care in diabetes management
- Helps in early identification of sleep-related problems
- Useful for nursing practice and patient counseling
- Promotes lifestyle modification and better self-care
- Enhances glycemic control and reduces complications

Limitations

- Small sample size (N = 60)
- Study limited to one hospital setting
- Cross-sectional design limits causal inference
- Self-reported sleep assessment (PSQI)

Recommendations

- Conduct studies with larger sample size
- Include multi-center research settings
- Use longitudinal or experimental designs
- Incorporate objective sleep assessment methods
- Develop nursing interventions to improve sleep quality



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References

1. American Diabetes Association. (2023). Standards of medical care in diabetes—2023. *Diabetes Care*, 46(Suppl. 1), S1–S291.
2. World Health Organization. (2023). *Global report on diabetes*. Geneva: WHO Press.
3. International Diabetes Federation. (2022). *IDF diabetes atlas (10th ed.)*. Brussels: IDF.
4. Ministry of Health and Family Welfare. (2022). *National programme for prevention and control of diabetes in India*. New Delhi.
5. Kumar, V., Abbas, A. K., & Aster, J. C. (2020). *Robbins Basic Pathology (10th ed.)*. Elsevier.
6. Guyton, A. C., & Hall, J. E. (2021). *Textbook of Medical Physiology (14th ed.)*. Elsevier.
7. Ganong, W. F. (2020). *Review of Medical Physiology (26th ed.)*. McGraw-Hill.
8. Smeltzer, S. C., et al. (2021). *Brunner & Suddarth's Medical-Surgical Nursing (15th ed.)*.
9. Potter, P. A., & Perry, A. G. (2022). *Fundamentals of Nursing (10th ed.)*. Elsevier.
10. Polit, D. F., & Beck, C. T. (2021). *Nursing Research (11th ed.)*.
11. Kothari, C. R. (2020). *Research Methodology*. New Age International.