Impact of Irregular Sleep Patterns on Blood Pressure among Urban Adults in a Selected Ward of Guwahati, Assam

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***Abstract*—Introduction: Sleep plays a critical role in cardiovascular regulation. Irregular sleep patterns may contribute to elevated blood pressure and increase the risk of hypertension. Objectives: To assess the impact of irregular sleep patterns on blood pressure among urban adults in a selected ward of Guwahati, Assam. Methodology: A cross-sectional study was conducted among 50 adults aged 25–60 years using purposive sampling. The Pittsburgh Sleep Quality Index (PSQI) was used to assess sleep quality. Blood pressure was measured using a validated digital sphygmomanometer. Data were analysed using descriptive and inferential statistics. Results and Interpretation: A significant association was found between poor sleep quality (PSQI > 5) and elevated blood pressure ($p < 0.05$). Participants with irregular sleep had higher prevalence of prehypertension and hypertension. Conclusion: Irregular sleep patterns are significantly associated with increased blood pressure. Promoting healthy sleep hygiene is essential for cardiovascular health.**

***Keywords*—Sleep Quality, Blood Pressure, PSQI, Hypertension, Urban Adults**

I. INTRODUCTION

Hypertension, commonly known as high blood pressure, is a significant public health concern and a leading risk factor for cardiovascular diseases globally. Lifestyle factors, including diet, physical activity, stress, and sleep patterns, are closely associated with blood pressure regulation. Among these, sleep patterns particularly irregular sleep has emerged as a modifiable risk factor. Irregular sleep patterns can disrupt circadian rhythms, influence autonomic nervous system function, and elevate cortisol levels, all of which can contribute to elevated blood pressure.

In urban settings such as Guwahati, the capital city of Assam, rapid urbanization, work-related stress, and lifestyle changes have led to increasingly irregular sleep schedules among adults. Despite this, limited research has been conducted locally to explore how these altered sleep habits influence cardiovascular health, particularly blood pressure.

This study investigates the relationship between irregular sleep patterns and blood pressure among urban adults in a selected ward of Guwahati, Assam, thereby contributing to a better understanding of modifiable lifestyle factors in hypertension prevention and management.

II. OBJECTIVES

General Objective:

- To assess the impact of irregular sleep patterns on blood pressure among urban adults in a selected ward of Guwahati, Assam.

Specific Objectives:

1. To determine the prevalence of irregular sleep patterns among the study population.
2. To measure the blood pressure levels of participants with regular and irregular sleep patterns.
3. To examine the association between irregular sleep and elevated blood pressure.
4. To identify demographic and lifestyle factors associated with both sleep patterns and blood pressure.

Operational Definitions:
Irregular Sleep Pattern:
Defined as poor sleep quality with a global PSQI score greater than 5. It includes issues such as delayed sleep onset, fragmented sleep, insufficient sleep duration, and daytime dysfunction.

Blood Pressure:

The force exerted by circulating blood on arterial walls, measured in millimeters of mercury (mmHg) using a digital sphygmomanometer. Categorized as per JNC 7 guidelines:

- Normal: Systolic <120 mmHg and Diastolic <80 mmHg
- Prehypertension: Systolic 120–139 or Diastolic 80–89 mmHg
- Hypertension: Systolic ≥140 or Diastolic ≥90 mmHg

Urban Adults:
Men and women aged 25 to 60 years residing in an urban area (as per municipality classification) for at least one year.
PSQI:
The Pittsburgh Sleep Quality Index (PSQI) is a standardized self-report questionnaire designed to measure sleep quality and disturbances over a 1-month time interval. In the context of our study, PSQI refers to a validated tool used to assess the sleep quality of adult participants

III. HYPOTHESIS

Null Hypothesis (H_0):

- There is no significant relationship between irregular sleep patterns and blood pressure among urban adults in a selected ward of Guwahati, Assam.

Alternative Hypothesis (H_1):

- There is a significant relationship between irregular sleep patterns and elevated blood pressure among urban adults in a selected ward of Guwahati, Assam.

IV. METHODOLOGY

Research Design:
A quantitative cross-sectional descriptive study design was adopted to assess the relationship between irregular sleep patterns and blood pressure among urban adults.

Study Setting:
The study was conducted in ward no 19 of Guwahati City, Assam, characterized by urban residential populations with diverse lifestyles and occupations.

Study Population:
Urban adults aged 25 to 60 years residing in the ward no 19 of Guwahati.

Sample Size:
A total of 50 participants were selected for the study.

Sampling Technique:
Purposive sampling was used to select eligible participants based on inclusion and exclusion criteria.
Inclusion Criteria:

- Adults aged 25–60 years
- Residents of the selected ward for at least 1 year
- Willing to participate and give informed consent

Exclusion Criteria:

- Individuals diagnosed with psychiatric illness or sleep disorders
- Those on antihypertensive or sleep medications
- Pregnant women
- Shift workers or night duty professionals

Data Collection Tools:

1. Structured Demographic and Lifestyle Questionnaire – to gather personal, occupational, and lifestyle-related data.
2. Pittsburgh Sleep Quality Index (PSQI) – a standardized self-reported tool to assess sleep quality over the past month. A PSQI score >5 indicates poor/irregular sleep.
3. Digital Blood Pressure Monitor – used to measure systolic and diastolic blood pressure in a seated, rested position. Two readings were taken 5 minutes apart, and the average was recorded.

Data Collection Procedure:

- Ethical clearance and permission were obtained from relevant authorities.
- Informed written consent was taken from each participant.
- Data collection was done via face-to-face interviews and on-site BP measurements.

Data Analysis:

- Data were entered in MS Excel and analyzed using SPSS (version 25).
- Descriptive statistics (mean, percentage, standard deviation) were used.
- Chi-square test and Pearson correlation were applied to assess the relationship between sleep patterns and blood pressure.

V. RESULTS AND INTERPRETATION

Key Findings:

- Prevalence of Irregular Sleep: 62% of participants had irregular sleep patterns.
- Blood Pressure Distribution:
    - Among participants with irregular sleep patterns, 45% had elevated blood pressure.
    - Among those with regular sleep, only 18% had elevated blood pressure.
- Statistical Analysis:
    - A significant association was found between irregular sleep patterns and elevated blood pressure ($p < 0.05$).
    - Positive correlation ($r = 0.42$) between PSQI score and systolic blood pressure.

Interpretation:

- The results suggest that irregular sleep patterns are significantly associated with higher blood pressure among the study population. Individuals with poor sleep hygiene are more prone to developing hypertension.

VI. DISCUSSION

The findings of this study align with existing literature that identifies poor or irregular sleep as a risk factor for hypertension. Sleep disturbances interfere with normal cardiovascular regulation, possibly through mechanisms involving increased sympathetic nervous system activity and hormonal imbalances (e.g., elevated cortisol levels).

The study also observed that younger adults with demanding work schedules, irregular eating habits, and increased screen time were more likely to experience sleep disturbances and elevated blood pressure. These findings highlight the growing impact of urban lifestyle changes on health.

Despite the limitations of the cross-sectional design, the study provides a snapshot of how sleep irregularities are influencing cardiovascular health in an urban Indian context.

VII. DELIMITATIONS

- The study was limited to one urban ward in Guwahati and may not be generalizable to all urban or rural populations.
- The sample size was relatively small (n=50).
- Self-reported sleep patterns may be subject to recall bias.
- The study did not account for confounding factors like caffeine or alcohol intake in detail.

VIII. RECOMMENDATIONS

1. Health Promotion: Create awareness among urban adults about the importance of regular sleep in maintaining optimal blood pressure.
2. Lifestyle Interventions: Encourage work-life balance and reduced screen time before sleep.
3. Routine Screening: Include sleep assessment in routine health checkups for early identification of at-risk individuals.
4. Further Research: Conduct longitudinal studies with larger sample sizes to establish causality.

IX. CONCLUSION

This study concludes that irregular sleep patterns are significantly associated with elevated blood pressure among urban adults in a selected ward of Guwahati, Assam. Sleep behaviour should be considered a modifiable risk factor in hypertension prevention strategies. Promoting healthy sleep hygiene can be an effective and low-cost public health intervention to reduce the burden of cardiovascular diseases in urban populations.

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