MAK HILL Publications Research Journal of Medical Sciences

Research Article
doi: 10.36478/makrjms.2024.8.206.210

OPEN ACCESS

Key Words
Sleep disorders, chronic diseases, community health

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Received: 11 May 2024
Accepted: 7 July 2024
Published: 10 July 2024

Citation: M. Ramanjaneyulu, J. Prathyusha Rao and Deepthi Rao Gorukanti, 2024. Prevalence of Sleep Disorders and Their Association with Chronic Diseases: A Community-Based Cross-Sectional Study. Res. J. Med. Sci., 18: 206-210, doi: 10.36478/makrjms. 2024.8.206.210

Prevalence of Sleep Disorders and Their Association with Chronic Diseases: A Community-Based Cross-Sectional Study

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Abstract
Sleep disorders have increasingly been recognized as a significant factor influencing general health, often associated with chronic diseases. To investigate the prevalence of sleep disorders and their association with chronic diseases in a community setting. A community-based cross-sectional study was conducted involving 120 participants selected through simple random sampling. Data were collected via structured interviews and validated sleep questionnaires. Chronic diseases were confirmed through medical records and patient self-reporting. The study revealed a high prevalence of sleep disorders among the participants, with a significant association found between sleep disturbances and chronic diseases such as diabetes and hypertension. Sleep disorders are prevalent in the general population and are associated with various chronic diseases, emphasizing the need for healthcare strategies integrating sleep management into chronic disease prevention and care.

INTRODUCTION

Sleep disorders encompass a range of conditions that disrupt normal sleep patterns, significantly affecting an individual's health and quality of life. Chronic diseases, such as diabetes, cardiovascular diseases and hypertension, have been linked to poor sleep, creating a complex interplay that can exacerbate both conditions. This study explores the prevalence of sleep disorders within a community and their association with chronic health conditions[1-2].

The relationship between sleep and chronic diseases is bidirectional. For instance, poor sleep can lead to an increased risk of developing chronic conditions, while existing chronic diseases can further disrupt sleep patterns. The impact of sleep on health extends beyond mere physical health, influencing mental well-being, daily functioning and overall life satisfaction[3].

Research has shown that sleep deprivation and sleep disorders are associated with metabolic dysregulation, increased cardiovascular risks, impaired immune function and increased inflammatory responses. Furthermore, chronic conditions themselves, such as diabetes, can significantly impact sleep by causing frequent urination, pain, or discomfort, leading to fragmented sleep patterns[4].

The importance of sleep in managing chronic diseases is evident, yet it remains under-addressed in community health strategies. This gap underscores the need for more comprehensive studies to elucidate the relationship between sleep disorders and chronic diseases to enhance public health interventions[5].

Aim and Objectives

To determine the prevalence of sleep disorders and their association with chronic diseases in a community-based population.

- To assess the prevalence of sleep disorders among the community members.
- To identify chronic diseases prevalent within the study population.
- To explore the association between sleep disorders and chronic diseases in the community.

MATERIALS AND METHODS

Source of Data: Data were collected from a community-based sample comprising adult residents of a suburban area.

Study Design: The research was designed as a cross-sectional study.

Study Location: The study was conducted in a suburban community within a larger metropolitan area.

Study Duration: Data collection occurred over a period of six months, from January to June 2023.

Sample Size: The study included 120 participants, determined by feasibility within the community setting.

Inclusion Criteria: Participants were adults aged 18 years and above, residing in the community during the study period.

Exclusion Criteria: Individuals with acute medical conditions or hospitalization within the past month were excluded from the study.

Procedure and Methodology: Participants were randomly selected and approached for data collection, which involved structured interviews and completion of validated questionnaires addressing sleep patterns and chronic disease status.

Sample Processing: Not applicable, as the study primarily involved questionnaire data and review of medical records.

Statistical Methods: Data were analyzed using descriptive statistics to determine the prevalence rates and logistic regression was employed to assess the association between sleep disorders and chronic diseases.

Data Collection: Data collection was facilitated through face-to-face interviews and self-administered questionnaires, ensuring confidentiality and voluntary participation. Data from medical records were accessed with consent to confirm reported chronic diseases.

RESULTS AND DISCUSSIONS

(Table 1) provides a summary of the prevalence of various sleep disorders among 120 community members. Insomnia was found to be the most common sleep disorder, affecting 21.7% of the population, which translates to 26 individuals. Sleep apnea was present in 10% of the participants, equating to 12 people. Restless Legs Syndrome (RLS) and Narcolepsy were less prevalent, affecting 5% and 3.3% of the study population, respectively. This table highlights the relative frequency of different sleep disorders within the community, with insomnia being the most common.

Table 1: Prevalence of Sleep Disorders Among the Community Members

Sleep Disorder Type	Total n=120	Prevalence n (%)
Insomnia	120	26 (21.7%)
Sleep Apnea	120	12 (10%)
Restless Legs Syndrome (RLS)	120	6 (5%)
Narcolepsy	120	4 (3.3%)

Table 2: Association Between Sleep Disorders and Chronic Diseases in the Community

Condition	With Sleep Disorders n=48	Without Sleep Disorders n=72	OR	95% CI	P value
Hypertension	22 (45.8%)	12 (16.7%)	4.1	2.1-7.9	<0.001
Diabetes	16 (33.3%)	2 (2.8%)	17.0	3.9-74.1	<0.001
Heart Disease	12 (25%)	0 (0%)	Inf	Not Computable	<0.001
Chronic Respiratory Diseases	8 (16.7%)	2 (2.8%)	7.2	1.6-32.8	0.002

(Table 2) explores the association between sleep disorders and chronic diseases among the participants, dividing them into those with sleep disorders (n=48) and those without (n=72). The odds ratio (OR) and confidence intervals (95% CI) indicate the strength and precision of these associations, respectively. The study found a strong association between sleep disorders and hypertension, with an OR of 4.1, suggesting that individuals with sleep disorders are over four times more likely to have hypertension compared to those without sleep disorders. This association was statistically significant with a P value of less than 0.001. Diabetes showed an even stronger association, with an OR of 17.0, indicating that those with sleep disorders are 17 times more likely to have diabetes. Similarly, heart disease was exclusively found in those with sleep disorders, represented by an infinite odds ratio, underscoring a potentially very strong link between sleep disorders and heart disease. Chronic respiratory diseases also showed a significant association, with an OR of 7.2, indicating that individuals with sleep disorders are more than seven times likely to have respiratory diseases compared to those without. These findings underline significant associations between sleep disorders and various chronic conditions within the community, highlighting the importance of addressing sleep issues as part of broader public health strategies.

The prevalence of sleep disorders in our study reveals that insomnia is the most common, affecting 21.7% of participants. This is consistent with other studies, such as by Tedjasukmana[6] ,which reported that insomnia affects about 10-30% of the adult population globally. The prevalence of sleep apnea in our study (10%) aligns with the findings of Mann Cet [7].who suggested a prevalence of 9-14% among middle-aged adults. Restless Legs Syndrome (RLS) and narcolepsy showed lower prevalence rates of 5% and 3.3%, respectively. These findings are in agreement with Zhang[8].who reported a general prevalence of RLS around 5-10% in Western populations and Butris [9]. who noted that narcolepsy typically affects about 0.02-0.05% of the general population, indicating a higher prevalence in our study which could suggest local or demographic variations.

(Table 2): Association Between Sleep Disorders and Chronic Diseases in the Community

The association between sleep disorders and chronic diseases revealed significant correlations. Our findings that individuals with sleep disorders are significantly more likely to have hypertension (OR= 4.1) are supported by the work of Akset[10] who demonstrated a similar relationship, emphasizing the role of poor sleep in cardiovascular regulation. The strikingly high association between sleep disorders and diabetes in our study (OR=17.0) echoes the findings of Katz Pet[11] who linked disrupted sleep patterns to impaired glucose metabolism and increased diabetes risk. Heart disease showed an infinite odds ratio, suggesting an exclusive presence in individuals with sleep disorders, which resonates with the studies by Gomes[12] highlighting that sleep disorders, particularly sleep apnea, are a significant risk factor for heart disease. The association with chronic respiratory diseases (OR=7.2) also finds backing in the study by Sircu[13] which linked obstructive sleep apnea with higher incidences of respiratory complications.

CONCLUSION

Our community-based cross-sectional study illuminated significant insights into the prevalence of sleep disorders and their associations with chronic diseases among community members. The findings reveal that a substantial portion of the population is affected by various sleep disorders, with insomnia being the most prevalent, affecting approximately 21.7% of the participants. Other conditions such as sleep apnea, restless legs syndrome and narcolepsy also contribute to the sleep disorder burden in this community.

Critically, this study highlights the strong association between sleep disorders and chronic diseases. Individuals with sleep disorders were found to be significantly more likely to suffer from

hypertension, diabetes, heart disease and chronic respiratory diseases compared to those without sleep disorders. These associations underscore the potential of sleep disorders to serve as risk indicators or contributory factors for the development and exacerbation of various chronic conditions.

The strong correlation between sleep disorders and serious health conditions such as diabetes and heart disease, evidenced by odds ratios as high as 17.0, suggests that effective management of sleep disorders could be a crucial component in the prevention and management of these chronic diseases. This evidence advocates for the integration of sleep health into public health policies and individual healthcare planning.

Given the implications of sleep disorders on overall health, as demonstrated in our study, there is a pressing need for healthcare systems to not only recognize but actively incorporate sleep health into routine screenings and management plans for individuals with or at risk of chronic diseases. Moreover, public health interventions aiming to improve sleep hygiene and treat sleep disorders could be significantly beneficial in reducing the burden of chronic diseases and enhancing the quality of life for many individuals.

In conclusion, this study contributes valuable data to the growing evidence of the interlinkages between sleep health and chronic diseases, advocating for heightened awareness and proactive management of sleep disorders in the community setting.

Limitations of Study

- **Cross-Sectional Design:** The cross-sectional nature of the study limits the ability to infer causality between sleep disorders and chronic diseases. This design only captures a snapshot in time, thus we cannot establish whether sleep disorders precede or result from chronic diseases, or if they are mutually influencing over time.
- **Sample Size and Generalizability**: With a sample size of 120 individuals, the findings might not be generalizable to broader populations. The limited sample may also reduce the statistical power of the study, making it challenging to detect smaller effects of sleep disorders on certain less prevalent chronic conditions.
- **Self-Reported Data:** The reliance on self-reported data for assessing sleep disorders and some chronic disease statuses can introduce recall bias and inaccuracies. Participants may not accurately remember or may underreport their symptoms or disease status, which could affect the reliability of the results.
- **Selection Bias:** The method of participant selection, if not perfectly random, can lead to selection bias, affecting the representativeness of the study population to the general community. This can skew the prevalence rates and associations observed.
- **Lack of Detailed Sleep Assessment:** The study utilized questionnaires to diagnose sleep disorders, which, while useful for large-scale screenings, lack the precision of clinical assessments such as polysomnography. This may lead to misclassification of sleep disorder types and severities.
- **Control of Confounding Variables:** While the study accounted for the presence of chronic diseases, it may not have adequately controlled for other potential confounding variables such as age, gender, socioeconomic status, lifestyle factors (like alcohol consumption, smoking, and physical activity), and medication use, all of which can influence both sleep quality and chronic disease risk.
- **No Objective Measures of Health Status:** The study primarily relied on self-reports and did not include objective measures of health status, such as blood tests, physical examinations, or medical records for all conditions, which might have provided more accurate and comprehensive data.
- **Regional Limitations:** Conducted within a specific suburban community, the results may not reflect the prevalence or associations of sleep disorders in different settings-urban or rural-or in different cultural or ethnic groups.

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