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A Study on Sleep Quality among Patients Seeking Care at the Non-Communicable Diseases Outpatient Department within a Rural Healthcare Setting

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Abstract: ***Background: Sleep quality is an integral aspect of overall health and well-being, particularly for individuals afflicted by non-communicable diseases such as diabetes, hypertension, cardiovascular diseases, and other chronic conditions. This study aimed to assess the sleep quality of patients attending the Non-communicable Diseases Outpatient Department (NCD OPD) of a rural hospital. Objectives: To assess sleep quality and identify factors associated with poor sleep quality among patients attending NCD OPD in a rural hospital. Methods: A cross-sectional study was conducted among patients attending the NCD OPD of a rural hospital. A pretested semi-structured questionnaire based on the Pittsburgh Sleep Quality Index (PSQI) was used to collect data. A PSQI global score 5 or more is considered as poor sleep quality. Data was entered in Microsoft Excel spreadsheet and analysed using SPSS v 20. Results: 154 patients took part in the study. The mean age of the participants was 56.9 years (SD = 12.0 years). More than half of the participants were men (57%). 54.5% subjects were above 60 years of age. 39% were hypertensives. The mean PSQI score was 5.0 (SD = 1.9), indicating poor sleep quality. The most common sleep problems reported by the participants were difficulty falling asleep (80.5%), cannot get to sleep with in 30 mins (73.4%) and waking up during the night (66%). Conclusion: This study suggests that patients attending the NCD OPD of a rural hospital in Maharashtra have poor sleep quality. This is likely due to a combination of factors, including the stress of living with a chronic disease, usage of tobacco products, increasing age, diabetes, hypertension, overweight, physical inactivity. Routine screening for sleep quality and targeted management of modifiable risk factors could help improve sleep health in this population. Sleep education should be included in NCD care.***

Keywords: Sleep Quality, PSQ Index, NCD

1. Introduction

Sleep is a basic biological necessity, and its reduction or absence is known to have a number of negative effects on human metabolism and cognitive performance.[1] A brief period of sleep, which is defined as resting for less than six hours per night, as well as sleep deprivation and/or sleep restriction, have been linked to a variety of chronic diseases.[2] The risk of diabetes, obesity, hypertension, breast cancer, coronary heart disease, poor bone density, increased body mass index, and insulin resistance has been significantly elevated by sleep deprivation.[3]

There is growing evidence linking sleep and cardiovascular disease. Poor sleep quality and short sleep duration are associated with activation of the sympathetic nervous system and increased inflammation, which can lead to endothelial dysfunction. This dysfunction is a key factor in the development of atherosclerosis and the increased risk of cardiovascular diseases[4] Type 2 diabetes is influenced by a mix of genetic factors (like age and gender) and environmental factors (like obesity and lifestyle). Research shows a U-shaped relationship between sleep duration and type 2 diabetes. This means that both very short and very long sleep durations are linked to a higher risk of developing this chronic disease.[5],[6]

According to global data on 48 countries' sleep reports, not a single one of them is able to get an average of eight hours of sleep every night. According to who sleeps the worst, Japan, Saudi Arabia, Sweden, India, and the Philippines are the top five nations.[7] According to Indian studies, the prevalence of hypertension is 25% in rural areas and 33% in urban areas.[8] The prevalence of Diabetes in India was 9.6% in 2021 and will rise to 10.9% by 2045[9]. With the increase in the prevalence of Non-Communicable Diseases (NCD's) in India, we conducted an observational study to assess sleep quality among people attending Non Communicable Disease (NCD) Clinic. This research helps policymakers consider more than just medication and strengthens baseline data for NCD individuals, paving the way for future preventive measures.

2. Methods

This observational cross-sectional study was conducted at a tertiary care hospital's rural NCD OPD between April and July. Participants were males and females aged 30-65, including newly diagnosed and self-reported pre-diagnosed NCD patients, who provided informed consent. Individuals with end organ damage, malignant hypertension, pregnant women, and those unwilling to participate were excluded. The study included 154 participants. Inclusion and exclusion criteria were applied, and written consent was obtained by the

principal investigator. Detailed personal histories, including age, medical history, addiction history, family history, and treatment history, were documented. Anthropometric measurements such as height and weight were taken to calculate BMI. Blood pressure was measured twice in the sitting position after a 5-minute rest, and the average was recorded. Standard questionnaires assessed sleep quality and quality of life.

Tools for Assessment

Pittsburgh Sleep Quality Index (PSQI): Sleep quality was measured using the PSQI, a reliable questionnaire that looks at sleep patterns and factors affecting sleep over a 1-month period. This self-reported questionnaire has a total score ranging from 0 to 21. A score above five indicates poor sleep quality. The reliability and validity of the PSQI were confirmed with a Cronbach's alpha of 0.76.[10,11]

Statistical analysis: Data was entered into Microsoft Excel and analysed using IBM SPSS Statistics, version 20. Categorical data from the study was summarized as frequencies and proportions, while continuous data was expressed as means and standard deviations. Normality of the continuous data was evaluated using the Kolmogorov-Smirnov test. The association between sleep quality and was analysed using the Chi-square test. A 'P value' of less than 0.05 was considered significant. Ethical clearance for the study was obtained from the Institutional Ethics Committee.

3. Results

The analysis revealed that 90 participants (58%) had good sleep quality, while 64 participants (42%) had poor sleep quality, with an average PQSI score of 5.06 ± 1.93. Age-wise, 51% were under 60 and 49% were over 60. Gender distribution showed that 57% were male and 43% female. Among participants, 22% had no co-morbidities, 39% had hypertension, 16% had diabetes, and 23% had both. In terms of BMI, 49% were normal weight, 42% were overweight, 5% were obese, and 4% were underweight. Habit-wise, 80% did not chew tobacco, 84% did not smoke, and 77% did not consume alcohol.

The study included 154 participants aged 30-65 years (Table 1). Among participants under 60 years, 35 (22.7%) reported poor sleep quality, while 44 (28.6%) reported good sleep quality. For participants over 60 years, 29 (18.8%) had poor sleep quality, and 46 (29.9%) had good sleep quality. The Chi-Square value was 0.503, with a P value of 0.478, showing no significant association with sleep quality and age.

In terms of gender, 23 males (14.9%) reported poor sleep quality, and 43 males (27.9%) had good sleep quality. Among females, 41 (26.6%) had poor sleep quality, and 47 (30.5%) had good sleep quality. The Chi-Square value was 2.141, and the P value was 0.143, indicating no significant association between gender and sleep quality.

For co-morbidities, 24 individuals with hypertension (15.6%) reported poor sleep quality, and 36 (23.4%) had good sleep quality. Among those with diabetes, 11 (7.1%) had poor sleep quality, and 14 (9.1%) had good sleep quality. For individuals with both hypertension and diabetes, 17 (11.0%) had poor sleep quality, while 19 (12.3%) had good sleep quality. Among participants without co-morbidities, 12 (7.8%) had poor sleep quality, and 21 (13.4%) had good sleep quality. The Chi-Square value was 0.964, with a P value of 0.810, showing no significant association between co-morbidities and sleep quality.

Regarding the history of alcohol consumption, 19 (12.3%) with a history of alcohol consumption reported poor sleep quality, and 16 (10.4%) had good sleep quality. Among participants without a history of alcohol consumption, 45 (29.2%) had poor sleep quality, while 74 (48.1%) had good sleep quality. The Chi-Square value was 3.021, and the P value was 0.082, indicating no significant association between sleep quality and history of alcohol consumption.

For the history of smoking, 16 participants with a history of smoking (10.4%) reported poor sleep quality, while only 8 (5.2%) had good sleep quality. Among non-smokers, 48 (31.2%) had poor sleep quality, and 82 (53.2%) had good sleep quality. The Chi-Square value was 7.380, and the P value was 0.007, indicating a significant association between sleep quality and smoking history.

Table 1: Association of Multiple Variables with Sleep Quality

Variables	Sleep Quality	Poor	Good	Chi- Square	P value
Age	< 60 years	35	44	0.503	0.478
	> 60 years	29	46		
Gender	Male	23	43	2.141	0.143
	Female	41	47		
Co Morbidities	HTN	24	36	0.964	0.810
	DM	11	14		
	Both	17	19		
	None	12	21		
H/o Alcohol	No	45	74	3.021	0.082
	Yes	19	16		
H/o Smoking	No	48	82	7.380	**.007***
	Yes	16	8		
H/o Tobacco Chewing	No	46	77	4.354	**.037***
	Yes	18	13		
BMI	Underweight	3	3	1.404	0.705
	Normal	30	45		
	Overweight	29	36		
	Obesity	2	6		

Lastly, for the history of tobacco chewing, 18 participants (11.7%) with a history of tobacco chewing had poor sleep quality, and 13 (8.4%) had good sleep quality. Among non-tobacco chewers, 46 (29.9%) had poor sleep quality, and 77 (50.0%) had good sleep quality. The Chi-Square value was 4.354, and the P value was 0.037, indicating a significant association between sleep quality and tobacco chewing history.

The study concluded that significant associations existed between sleep quality and both a history of smoking (P = 0.007) and tobacco chewing (P = 0.037). Other variables such as age, gender, co-morbidities, and history of alcohol consumption did not show significant associations with sleep quality.

Table 2: Distribution of Sleep Components of PSQI and their severity

Sleep Components	No Difficulty	Mild Difficulty	Moderate Difficulty	Severe Difficulty
Subjective Sleep Quality	46 (30%)	93 (60%)	15 (10%)	0
Sleep Latency	10 (6%)	**67 (44%)**	**65 (42%)**	**12 (8%)**
Sleep Duration	15 (10%)	**72 (47%)**	**62 (40%)**	**5 (3%)**
Sleep Efficiency	153 (99%)	1 (1%)	0	0
Sleep Disturbance	27 (18%)	124 (81%)	3 (2%)	0
Use of Sleep Medication	150 (97%)	4 (3%)	0	0
Daytime Dysfunction	82 (53%)	**67 (44%)**	**4 (3%)**	**1 (1%)**

The study assessed various components of sleep quality among the participants (Table2). For subjective sleep quality, 46 (30%) reported no difficulty, 93 (60%) experienced mild difficulty, 15 (10%) had moderate difficulty, and none reported severe difficulty. Regarding sleep latency, 10 (6%) had no difficulty, 67 (44%) had mild difficulty, 65 (42%) experienced moderate difficulty, and 12 (8%) had severe difficulty. In terms of sleep duration, 15 (10%) reported no difficulty, 72 (47%) had mild difficulty, 62 (40%) experienced moderate difficulty, and 5 (3%) had severe difficulty. Sleep efficiency showed that nearly all participants, 153 (99%), had no difficulty, while only 1 (1%) experienced mild difficulty, with no reports of moderate or severe difficulty. Sleep disturbances were reported by 27 (18%) with no difficulty, 124 (81%) with mild difficulty, and 3 (2%) with moderate difficulty. Most participants, 150 (97%), did not require sleep medication, while 4 (3%) had mild difficulty in this aspect. Lastly, regarding daytime dysfunction, 82 (53%) reported no difficulty, 67 (44%) had mild difficulty, 4 (3%) had moderate difficulty, and 1 (1%) experienced severe difficulty. These findings highlight that while certain aspects of sleep quality, such as sleep efficiency and use of sleep medication, showed minimal difficulty among participants, other areas like subjective sleep quality and sleep latency had higher proportions of mild to moderate difficulties.

4. Discussion

In this study, we found the mean GPSQI score to be 5.06±1.93, reflecting the overall sleep quality of the participants. This GPSQI score aligns with the results of Himel Mondal et al.,[12] who reported a similar mean score of 4.95±3.77 in a rural population of Bengal. However, the GPSQI score in our study is notably lower compared to George S et al., who found a mean score of 8.04±4.59 in rural Kerala[13]. These discrepancies highlight the differences in sleep quality across various regions, suggesting that local environmental and lifestyle factors may play a significant role.

Our research identified key factors affecting sleep quality, with significant associations found for smoking (16%, P < 0.05) and tobacco chewing (20%, P < 0.05). Himal Purani et al.[14] observed that individuals with poorer sleep quality (PSQI: 6.6±0.5) reported higher levels of smoking-related symptoms. The degree of association varied depending on the smoking outcome, with the strongest link between sleep quality and withdrawal symptoms. Similarly, Dugas EN et al.[15] found that 36% of participants reported poor sleep quality (PSQI > 5) and that higher cigarette consumption was associated with poor sleep quality (OR [95% CI], 1.03 [1.001–1.05]). In contrast, Chang et al.[16] and Vinson et al.[17] found no significant effects of alcohol consumption on sleep quality, which aligns with our study's findings indicating no significant association between alcohol and sleep quality.

Furthermore, our study showed no significant associations between sleep quality and other demographic factors such as age (P = 0.478), gender (P = 0.143), co-morbidities (P = 0.810), and BMI (P = 0.705). These findings are in line with the study by GeorgeS et al., [13]which also revealed no significant associations between these factors and sleep quality in older adults.

These findings underscore the importance of addressing specific lifestyle factors, particularly tobacco use, that significantly impair sleep quality. Future interventions should focus on promoting healthy habits and raising awareness about the detrimental effects of smoking and tobacco chewing on sleep. Furthermore, regional variations in sleep quality suggest the need for tailored public health strategies that consider local lifestyle and environmental factors.

5. Conclusion

Our study revealed 42% of the study participants experiencing poor sleep quality with significant association with smoking and tobacco chewing. These findings underscore the importance of addressing use of tobacco products as a potential risk factor for sleep disturbances among individuals with NCDs.

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