



General Medicine

ASSESSMENT OF SLEEP QUALITY IN CORONARY ARTERY DISEASE ATTENDING TERTIARY CARE CENTER IN PUDUCHERRY-A CROSS SECTIONAL STUDY.

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ABSTRACT **Background:** Coronary artery disease is among the leading causes of death and disability worldwide. One recently emerging modifiable risk factor is sleep duration. A higher prevalence of myocardial infarction was found among those sleeping more than 9 hours and more symptomatic coronary heart disease was prevalent among those who slept less than 6 hours. **Objectives:** 1. To identify quality of sleep among patients with coronary artery disease. **Material and Methods:** This study was cross sectional study carried out among adult patients with coronary artery disease in the department of general medicine for a period of 3 months. Participants with intake of sedatives, chronic alcoholics, sleep disorders, psychiatric conditions and those working in night shifts were excluded from the study. The sample size was estimated to 100. The data was collected in a semi structured questionnaire. Statistical analysis was done using descriptive statistics. **Results:** 62% were males and 38% were females. 53% slept between 6 to 7 hours and 21% slept between 5 to 6 hours. According to PSQI, 63% were found to have poor sleep quality and 37% were found to have good sleep quality. 75% of the patients with multiple comorbidities has poor sleep quality and 25 % of patients have reported good sleep quality. **Conclusion:** The sleep quality among the people with CAD was poor and interventions can be directed to improve the sleep quality among them to improve their quality of living.

KEYWORDS : Sleep deprivation, sleep quality, coronary artery disease, risk factors, modifiable, non-communicable disease.

INTRODUCTION

Coronary artery disease (CAD) are among the leading causes of death and disability worldwide¹. It manifests as stable angina, unstable angina, myocardial infarction or sudden cardiac death^{1,2}. It was estimated the prevalence to be 154 million in the year 2016 and contributed to 32.7% of the total burden due to cardiovascular disease⁴. CADs pose substantial medical and economic burden globally⁵. Many risk factors have been found to be responsible for the occurrence of coronary artery disease. Some of them include smoking, obesity, diabetes, hypertension and hyperlipidemia⁶. The recent changes in the above said lifestyle and behavioral factors were responsible for increasing trend in the incidence of CAD and CAD related deaths⁷. One recently emerging modifiable risk factor is sleep duration⁸.

Adults require 7–9 h of sleep per night to promote optimal health. A comprehensive sleep profile includes both duration and quality of sleep⁸. It was documented that short term sleep restriction resulted in adverse physiologic effects. A group of individuals made to sleep four hours per night for 6 nights had their cortisol levels raised alongside decreased glucose tolerance and increased sympathetic activity⁹. Even a sleep deprivation for a single night resulted in raised blood pressure levels and sympathetic activity¹⁰. A higher prevalence of myocardial infarction was found among those sleeping more than 9 hours a day and more symptomatic coronary heart disease was prevalent among those who slept less than 6 hours per night¹¹. So there suspected to be a U-shaped relationship between sleep and coronary artery disease¹².

With the above insights, the present study was conducted with the aim of identifying whether sleep deprivation is a modifiable risk factor for coronary artery disease. The objectives were to identify quality of sleep among patients with coronary artery disease and to find out the association between sleep deprivation and coronary artery disease. This is the first time the objective is studied in the present study setting. Only fewer studies were present in south Tamil Nadu addressing the above said research question.

Material and Methods

The present study was cross sectional study carried out in the department of general medicine, Sri Venkateswaraa Medical College Hospital and Research centre, Pondicherry among the adult patients diagnosed with coronary artery disease attending to the OPD. The study was carried out for a period of 3 months between September 2023 and November 2023. Ethical clearance for the study was obtained from the institutional ethics committee. Informed consent was obtained from all the participants. Patients who were taking benzodiazepines and other sedatives, chronic alcoholics, preexisting

sleep disorders, patients with psychiatric conditions and patients involved in regular night shifts were excluded from the study.

The sample size for the study was calculated using the formula $n = Z^2 Pq/E^2$, Where P is the proportion of population with characteristic of interest and it is 8% from the article by Krishnan MN¹³. The q was $(1-p) = 92\%$. Keeping E-Standard allowable error as 8%. The sample size was estimated to be 113.

The data was collected using a semi structured interview schedule. The questionnaire consisted of two parts. Part A dealt with socio-demographic characteristics and comorbidities and part B consisted of Pittsburgh Sleep Quality Index Questionnaire¹⁴. The socio-demographic variables included were age, sex and place of residence. The details of comorbidities like previously existing heart disease, diabetes, hypertension was collected along with the treatment pattern. The details regarding certain risk factors like smoking and alcohol were also collected. The PQSI consisted of 9 questions and addressed a total of 7 components. Total score of all the 7 components is added together to arrive at the final score.

The data collected were entered into Microsoft excel 2019 and the master chart was created. The master chart was then loaded onto SPSS version 26 for statistical analysis. Descriptive statistics were used in analysis of the data. The qualitative variables were expressed using frequency and percentage. Bar charts used to represent the data photographically.

RESULTS

The participants included into the study was 100. 21% of the study population were in the age group of 30-45 years, 42% were in the age group more than 60 years and 37% between 46 to 60 years.

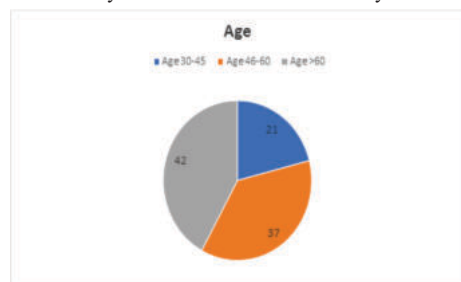


Fig 1: Pie Chart Showing Age Distribution In The Study Population

In the study population, 62% were males and 38% were females. 58% were residing in urban area and 42% were residing in rural areas 59% were obese and 41% were non obese



Fig 2: Bar Chart Showing Gender Distribution In The Study Population

32% sleep for up to a maximum of 30 minutes in the afternoon, 14% sleep between 30 to 60 minutes and 6% for more than 60 minutes (Table 1).

Table 1: Socio-demographic Characteristics Among The Study Participants.

Variables	Frequency (n=100)	
Age	30-45	21
	46-60	37
	>60	42
Sex	Male	62
	Female	38
Residence	Urban	58
	Rural	42
Obese	Yes	59
	No	41
Hours of afternoon sleep per day	Nil	48
	0 to 30 mins	32
	30 to 60 mins	14
	>60 mins	6

54% had diabetes and 63% had hypertension. 21% reported that they were smokers and 35% reported that they consumed alcohol (Table 2).

Table 2: Distribution According To Comorbidities And Behavioral Characteristics.

Variables	Frequency (n=100)	
History of preexisting heart disease	Yes	100
	No	0
Diabetes mellitus	Present	54
	Absent	46
Hypertension	Present	62
	Absent	38
Smoking	Present	21
	Absent	79
Alcohol consumption	Present	35
	Absent	65

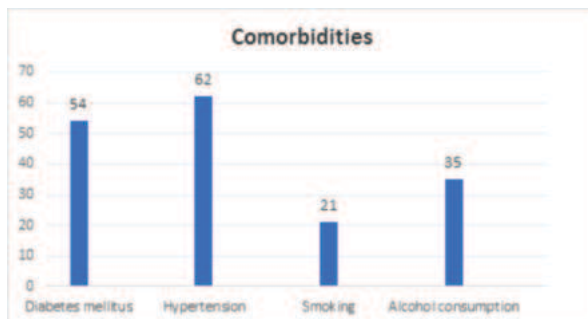


Fig 3: Bar Chart Showing Comorbidities In The Study Population

With regard to the components of PQSI, 48% reported to have fairly good subjective sleep quality and 22% reported to have fairly bad sleep quality. 44% reported to have 16 to 30 minutes of sleep latency followed by 26% with 31 to 60 minutes of sleep latency. 53% reported a sleep duration of 6 to 7 hours and 21% reported a sleep duration of 5 to 6 hours. 59% had habitual sleep efficacy between 75 to 84% and

26% had habitual sleep efficacy of more than 85%. 69% had sleep disturbance score of 1 to 9 followed by 11% with a score between 19 and 27. 59% had no daytime dysfunction (Table 3).

Table 3: Distribution According To Sleep Quality.

Variables	Frequency (n=100)	
Subjective sleep quality	Very good	14
	Fairly good	48
	Fairly bad	22
	Vary bad	16
Sleep latency	<15 mins	11
	16-30 mins	44
	31-60 mins	26
	>60 mins	19
Sleep duration	>7 hours	18
	6-7 hours	53
	5-6 hours	21
	<5 hours	8
Habitual sleep efficacy (%)	>85	26
	75-84	59
	65-74	10
	<65	5
Sleep disturbances	0	13
	1-9	69
	10-18	7
	19-27	11
Use of sleep medications	Not during the past month	68
	Less than once a week	21
	Once or twice a week	9
	Three or more times a week	2
Daytime dysfunction	0	59
	1-2	22
	3-4	13
	5-6	6



Fig 4: Bar Graph Showing Quality Of Sleep Assessed Using Pittsburgh Sleep Quality Index Global Score Among The Study Participants.

As seen from the above bar chart (Fig 4), 37% had PQSI score between 0 to 4 which indicates poor sleep quality and for 63% it was between 5 and 21 which indicates that the majority of the patients with CAD has poorer sleep quality. There appears a positive correlation between sleep deprivation and coronary artery disease.

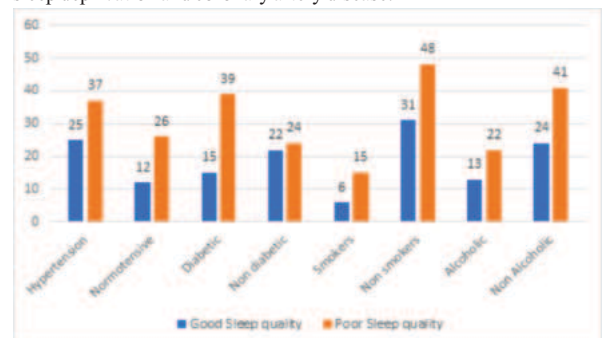


Fig 5: Bar Graph Showing Quality Of Sleep In Relation With Comorbidities

As seen from the above bar chart (Fig 5), among the patients with coronary artery disease, 40% of hypertensive patients has good sleep quality and 60% had poor sleep quality, 31 % of normotensive patient has good sleep quality and 69% has poor sleep quality. 28% of diabetic patients has good sleep quality and 72% had poor sleep quality, 47 % of non-diabetic patient has good sleep quality and 53% has poor sleep quality. 28% of smokers has good sleep quality and 72% had poor sleep quality, 39 % of non-smokers has good sleep quality and 61% has poor sleep quality. 37% of alcoholics has good sleep quality and 63% had poor sleep quality, 37 % of non-alcoholics has good sleep quality and 63% has poor sleep quality.



Fig 6 : Pie Chart Showing Sleep Quality In Patients With Both Diabetic And Hypertension

As seen from the above pie chart (Fig 6), A total of 31 patients have both diabetes and hypertension. 75% of the patients with multiple comorbidities has poor sleep quality and 25 % of patients have reported good sleep quality.

DISCUSSION

A comprehensive sleep profile includes both duration of sleep and quality of sleep⁸. Studies have reported a U-shaped association between quality of sleep and the incidence of cardiovascular disease and hence sleep can be looked up on as a modifiable risk factor for coronary artery disease¹². Hence, the present study was conducted with the aim of identifying whether sleep deprivation is a modifiable risk factor for coronary artery disease.

The present study was cross sectional study carried out in the department of general medicine of a tertiary care hospital among the people suffering from coronary artery disease to examine the sleep quality among them. The objectives were to identify quality of sleep among patients with coronary artery disease and to find out the association between sleep deprivation and coronary artery disease. The period of study was 3 months and those with previously diagnosed psychiatric conditions and sleep disorders were excluded. Informed consent was obtained from all the participants included into the study. A total of 100 participants were included and among them ,54% were diabetic and 63% were hypertensive.

63% participants were found to have poor sleep quality, score between 5 and 21 and 37% had good sleep quality. With regard to the components of PQSI, about half reported fairly good sleep and quarter reported sleep latency between 31 to 60 minutes. Only 85 had sleep duration of more than 7 hours. 59% had habitual sleep efficacy between 75 to 84%. The Mexican Teacher Cohort found that poor sleep quality and sub clinical cardiovascular disease go hand in hand¹⁵. A study by Hoevenaer-Blom MP et al reported that sufficient sleep is very vital in reducing the cardiovascular risk among the individuals¹⁶.

A study by Twig G et al reported person with abnormal sleep quality were at two times increased risk of getting coronary artery disease than those with normal sleep quality and the study also linked sleep quality with diabetes mellitus¹⁷. Kwok Cs et al reported divergence from the recommended 7 to 8 hours of sleep to be associated with higher risk of both cardiovascular events and mortality. Subjective poor-quality sleep had a risk ratio of 1.5 in comparison to those who perceived their sleep quality to be good¹⁸. Sharma M et al reported that both impaired sleep duration and sleep quality are associated with increased proportion of coronary artery disease¹⁹. Poor sleep in turn leads to increased oxidative stress in the body and the above would aid in the pathogenesis of coronary artery disease²⁰.

limitation of the study is that the sleep quality is self reported one. Though Pittsburgh sleep quality index (PQSI) was used which looked into multiple components of sleep quality. The results of the study cannot be generalised as it was done in a single centre.

CONCLUSION

Many participants were found to have poor sleep quality. Sleep is a modifiable risk factor and is linked to many adverse events. Individuals who have multiple comorbidities were found to have poorer quality of sleep compared to individuals with fewer comorbidities. Individuals with diabetes mellitus was found to have poorer sleep quality. Improving the quality of sleep among the participants will aid in decreasing morbidity associated with decreased sleep. Improving the sleep quality among the general population might help reduce the incidence of Coronary artery disease for which further studies are required.

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Only fewer studies addressed the above issue in the study setting. One