



## **“A STUDY ON SLEEP DISTURBANCES AND SLEEP QUALITY AMONG MEDICAL UNDERGRADUATE STUDENTS AND ITS ASSOCIATION WITH ACADEMIC PERFORMANCE.”**

**Uppala Ravi Teja<sup>1</sup>, Dr. K. Venkata Prasanna<sup>2</sup>, Dr Karampudi. Amulya Sanghamithra<sup>3\*</sup>, Dr. Kuchipudi. Purnachandra Rao<sup>4</sup>, Dr. Chaganti Mohan Krishna Sasank Dhar<sup>4</sup>**

### **Abstract:**

**BACKGROUND:** Sleep is a part of normal human physiology, affects the capacity of individual learning, academic performance and neural-behavioral functions. Sleep cycle is regulated by the circadian rhythm. Sleep consists of two phases that alternate with one another throughout the sleep cycle. Academics are major part, which affects sleep cycle, which in return affects academic results. Medical students are one subgroup of the general population who appear to be especially vulnerable to poor sleep, perhaps due to the long duration and high intensity of study that can be emotionally challenging, and lifestyle choice.

**OBJECTIVES:** To study the sleep disturbances and sleep quality among medical students and to determine the association of sleep disturbances and sleep quality with academic performance.

**METHODOLOGY:** It was an Institutional based analytical cross-sectional study done among Medical students(n=600) of all four academic years in two months. EPWORTH SLEEPINESS SCALE (ESS): self-administered questionnaire used to assess daytime sleepiness. PITTSBURGH SLEEP QUALITY INDEX (PSQI): a self-rated questionnaire which assesses sleep quality and disturbances over a 1-month time interval. The data collected had been entered in Microsoft excel and analyzed using SPSS 26 software.

**RESULTS:** Out of 600 study subjects based on PSQI, 206(34.3%) of them have mild sleep difficulty, 202(33.7%) had moderate sleep difficulty. According to ESS, 332(55.3%) had higher normal daytime sleepiness, 19(3.2%) had severe excessive daytime sleepiness. There was statistical significance between ESS, PQSI and academic grades. (P<0.05).

**CONCLUSION:** Sleep quality and sleep disturbances had significant influence on academic performance of the medical students.

**Keywords:** Academic, ESS, Medical students, PQSI, Sleep.

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<sup>1</sup>MBBS Final Year Part II, ASRAMS

<sup>2</sup>Assistant Professor, Department of Community Medicine, Government Medical College, Nandyal, A.P

<sup>3\*</sup>Second year postgraduate, Department of Community Medicine, ASRAMS, Eluru.

<sup>4</sup>MBBS(Graduated), ASRAMS, Eluru.

**\*Corresponding Author:** Dr Karampudi. Amulya Sanghamithra

\*Second year postgraduate, Department of Community Medicine, ASRAMS, Eluru.

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**INTRODUCTION:** Sleep is a part of normal human physiology, affects the capacity of individual learning, academic performance and neural-behavioural functions<sup>1</sup>. Sleep cycle is regulated by the circadian rhythm, which is driven by Supra Chiasmatic Nucleus (SCN) of the hypothalamus<sup>2</sup>. Sleep consists of two phases that alternate with one another throughout the sleep cycle. These include non-rapid eye movement (NREM) and rapid eye movement (REM)<sup>3</sup>. The NREM made up of 3 stages, N1(light sleep), N2(deeper sleep) and N3(deepest non-REM sleep). REM occurs every 90 minutes. REM and N3 are most commonly affected in cases of sleep deprived persons<sup>4</sup>.

Sleep disturbance can result from a combination of occurrences that can happen before sleep and encompass disorders or problems initiating and maintaining sleep. Sleep disturbances can include parasomnias such as Nightmares, sleep walking, periodic limb movements and spontaneous awakenings that occur after falling asleep. External factors can contribute to sleep disturbances such as medications, electronic devices, and shift work that requires daytime sleep<sup>5</sup>.

Sleep quality is vital to health, and the cumulative long-term effects of poor sleep quality are associated with numerous serious health outcomes such as diabetes, cardio-vascular disease, depression, anxiety, heart attack, obesity, and stroke. Many individuals who work during the night in transportation, healthcare, and service industries must sleep during the day, which affects sleep quality, sleep quantity, and misaligns the individual's circadian rhythm<sup>5</sup>. The problem of poor sleep quality is faced by university students where academic demand is fairly high<sup>6</sup>.

Sleep deprivation affects lot of day-to-day activities. Academics are major part, which affects sleep cycle, which in return affects academic results. Medical students are one subgroup of the general population who appear to be especially vulnerable to poor sleep, perhaps due the long duration and high intensity of study, clinical duties that include overnight on call duties, work that can be emotionally challenging, and lifestyle choice<sup>7</sup>.

Medical students are continuously under high academic stress and pressure. Adequate sleep is essential to refresh them every day and help in learning and memory processing. Sleep disturbances are common in medical students and worsen their academic performance. Medical students and their facilitators should comprehend the negative effects of sleep deprivation on student academics and should take adequate measures to improve the sleep quality of students<sup>8</sup>. Poor sleep

quality has been associated with reduced academic achievement.<sup>9</sup> The academic performance of many students is affected by their inadequate sleeping habits, which is not much realized by students<sup>10</sup>.

It is important to know the sleeping problems and the extent to which sleeping disturbances and poor sleep quality are having effect on the academic performance. Later these sleep disturbances can cause numerous serious health outcomes such as diabetes, cardio-vascular disease, depression, anxiety, heart attack, obesity, and stroke. There are few studies in this area, which have reported the impact of proper sleep on the academic performance of medical students. Hence, this study was planned to study the sleep disturbances and sleep quality among medical students and to determine the association of sleep disturbances and sleep quality with academic performance.

**METHODOLOGY:** It was an Institutional (Alluri Sitarama Raju Academy of Medical sciences, Eluru) based analytical cross-sectional study done among Medical students(n=600) of all four academic years in two months (August -September,2022) by universal sampling technique. Students who accepted to participate in the study were included. Those who were absent on the days of data collection and students of any known illness of psychiatry disorders were excluded. EPWORTH SLEEPINESS SCALE (ESS): a self-administered questionnaire used to assess daytime sleepiness. PITTSBURGH SLEEP QUALITY INDEX (PSQI): a self-rated questionnaire which assesses sleep quality and disturbances over a 1-month time interval.

After explaining the contents of ESS and PQSI to study participants and asked to mark the responses for the questionnaire. Each batch had been visited for three days and students who were absent on these days of data collection were excluded. The collected data had been entered in Microsoft excel 2019 and analysed using SPSS 26 trial version software. Qualitative data was analysed by applying chi-square test. The results were presented in the form of tables, graphs and figures.

Informed written consent was obtained from all participants after providing detailed information on objectives of the study, risk and benefits involved and voluntary nature of participation. The confidentiality of the study participants was maintained throughout the study. Permission from Institutional ethical committee was obtained.

### **RESULTS:**

Out of 600 study subjects based on PSQI, majority 206(34.3%) of them have mild sleep difficulty, 202

(33.7%) had moderate sleep difficulty, 175(29.2%) had severe sleep difficulty, 17(2.8%) had no sleep difficulty. (Figure:1)

According to ESS, 332(55.3%) belong to higher normal daytime sleepiness, 117(19.5%) belong to lower normal daytime sleepiness, 110(18.3%) belong to mild excessive daytime sleepiness, 22(3.7%) belong to moderate excessive daytime sleepiness, 19(3.2%) belong to severe excessive daytime sleepiness. (Figure:2)

There was a statistically significant association between academic performance and PSQI, ESS with  $p < 0.05$ . (Table 1 & 2)

## DISCUSSION:

### BASED ON PSQI:

In this study based on PSQI, majority 206(34.3%) of them have mild sleep difficulty, 202 (33.7%) had moderate sleep difficulty, 175(29.2%) had severe sleep difficulty, 17(2.8%) had no sleep difficulty. In a study by Feng GS<sup>11</sup>, 19% of the medical students were found to have poor sleep quality as assessed by the Pittsburgh Sleep Quality Index (PSQI). In this study it is 29.2%. can be due to sample size. In a study conducted by Rehab Ali Mohamed *et al.*,<sup>12</sup> According to the PSQI, 13.2% of the students scored a good quality of sleep and 86.8% of them suffer from poor sleep quality. But in this study, it's 29.2% reported poor sleep quality can be due to geographical factors. In a study conducted by Correa CC *et al.*,<sup>13</sup> The results for the PSQI were analyzed 39.5% of the participants classified their sleep quality as either very or fairly bad. In contrast in this study revealed 29.2% students having bad sleep quality.

### BASED ON ESS:

In this study 332(55.3%) belong to higher normal daytime sleepiness, 117(19.5%) belong to lower normal daytime sleepiness, 110(18.3%) belong to mild excessive daytime sleepiness, 22(3.7%) belong to moderate excessive daytime sleepiness, 19(3.2%) belong to severe excessive daytime sleepiness. In a study conducted by Giri PA<sup>14</sup> among 150 Indian medical students, 30.6% reported an ESS > 10, indicating daytime sleepiness. Where as in this study it is 25.2% which are comparable. In a study conducted by Zailinawati AH *et al.*,<sup>15</sup> Among Malaysian medical students revealed that daytime sleepiness occurred in 35.5% (as assessed by Epworth Sleepiness Score [ESS] > 11), and poor sleep quality was reported by 16%. These have wide margin with this study may be due to the scale of the population.

## ASSOCIATION BETWEEN GRADES AND PSQI:

There was a statistically significant association between academic performance and PSQI with Chi-square: 116.731; p-Value= 0.01. In a study conducted by Rehab Ali Mohamed *et al.*,<sup>12</sup> Relation between quality of sleep and academic achievement, the data showed that 90% of students with good sleep quality have a satisfactory academic achievement ( $p = 0.00$ ). In this study having significance of  $p = 0.01$  in association of grades and PSQI, in second class percentage of severe sleep difficulty are much higher this observation makes to conclude that lack of sleep exerts pressure on academics scoring.

## ASSOCIATION BETWEEN GRADES AND ESS:

There was a statistically significant association between academic performance and ESS with Chi-square: 80.631; p-Value= 0.01. In study conducted by Mohammed Alsaggaf *et al.*,<sup>16</sup> There was no impact of sleep disturbances or stress on the academic performance with  $p > 0.05$ . These is quite opposite to the findings established in this study. Reason may be the sample size taken in that study was relatively low while compared to this study.

**LIMITATIONS:** In an institutional based study just sleep behaviour and its association with academic performance can't be inferred directionally. So, study can't be generalised.

**CONCLUSION:** Sleep quality and sleep disturbances had significant influence on academic performance of the medical students.

**RECOMMENDATIONS:** Mental well-being of medical students should be ensured by conducting yoga classes and redesigning the syllabus for reducing academic load and academic stress. Sleep hygiene promoting programmes should be recommended in medical colleges.

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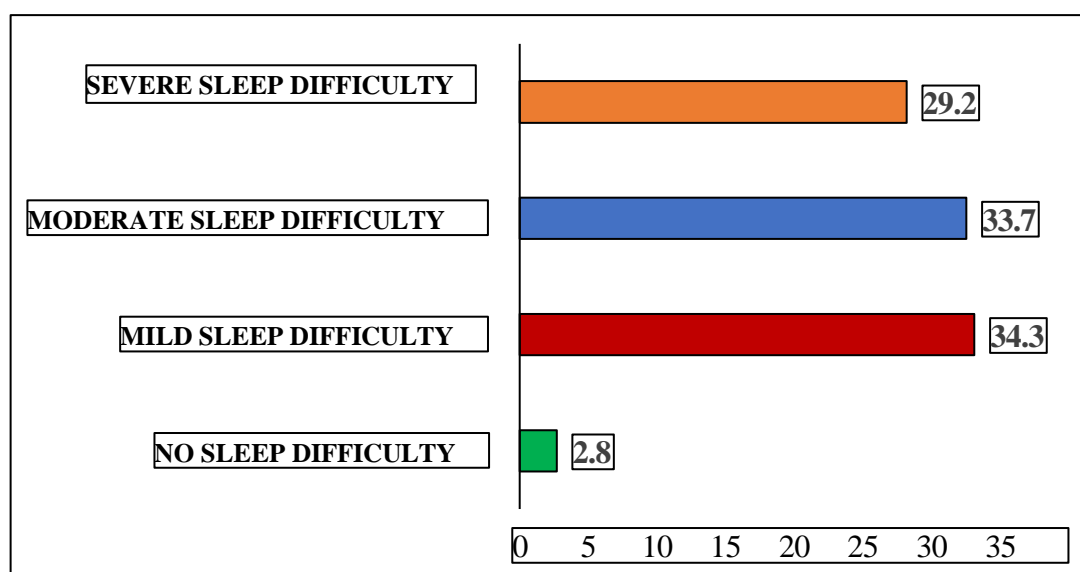
**CONFLICTS OF INTEREST:** Nil

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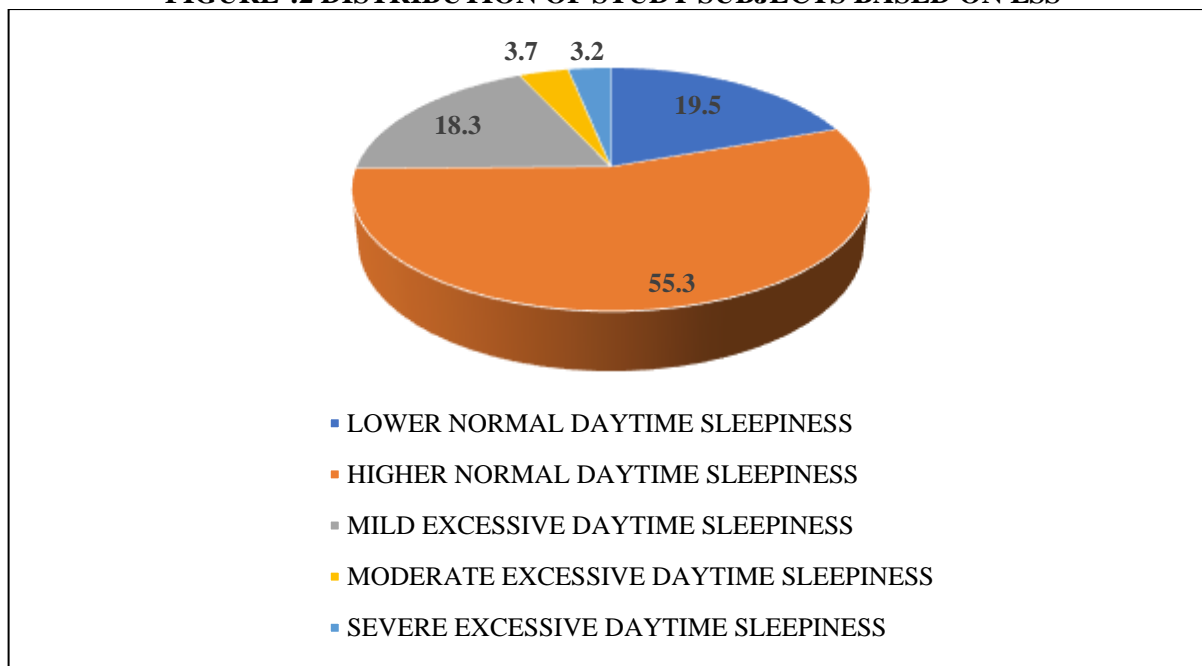
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**FIGURE-1: DISTRIBUTION OF STUDY SUBJECTS BASED ON PSQI**



**FIGURE-:2 DISTRIBUTION OF STUDY SUBJECTS BASED ON ESS**



**TABLE-1: ASSOCIATION BETWEEN GRADES AND PSQI**

Grades	PSQI				Total
	No sleep difficulty (%)	Mild sleep difficulty (%)	Moderate sleep difficulty (%)	Severe sleep difficulty (%)	
Distinction	1(2.3)	3(6.8)	37(84.1)	3(6.8)	44(100)
First class	8(2.2)	125(34.2)	148(40.4)	85(23.2)	366(100)
Second class	8(4.2)	78(41.1)	17(8.9)	87(45.8)	190(100)
<b>Total</b>	<b>17(2.8)</b>	<b>206(34.3)</b>	<b>202(33.7)</b>	<b>175(29.2)</b>	<b>600(100)</b>

Chi-square: 116.731; df:6; **p-Value= 0.01**

**TABLE-2: ASSOCIATION BETWEEN GRADES AND ESS**

Grades	ESS					Total
	Lower normal daytime sleepiness	Higher normal daytime sleepiness	Mild excessive daytime sleepiness	Moderate excessive daytime sleepiness	Severe excessive daytime sleepiness	
Distinction	23(52.3)	17(38.6)	2(4.5)	1(2.3)	1(2.3)	44(100)
Fist class	72(19.7)	192(52.5)	84(23)	17(4.6)	1(0.3)	366(100)
Second class	22(11.6)	123(64.7)	24(12.6)	4(2.1)	17(8.9)	190(100)
<b>Total</b>	<b>117(19.5)</b>	<b>332(55.3)</b>	<b>110(18.3)</b>	<b>22(3.7)</b>	<b>19(3.2)</b>	<b>600(100)</b>

Chi-square: 80.631; df:8; **p-Value= 0.01**