

## Assessment of Determinants of Sleep Deprivation amongst Post Graduate Students of Government Medical College, Amritsar

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### Abstract

**Background:** Sleep is an active, repetitive and reversible state of perceptual disengagement from the environment. A chronic lack or poor quality sleep increases the risk of various disorders. Post graduate students is at the top of the list of sleep deprived individuals.

**Material and methods:** A cross sectional study was conducted amongst the post graduate students of Government Medical College, Amritsar. All the post graduate students admitted to various pre, para and clinical departments during the years 2018, 2019 and 2020 formulated the sample size for this study. Semi structured proforma were developed for data collection. Chi-square test was applied, where p-value of <0.05 (on both sides) was considered to be statistically significant

**Results:** According to PSQI poor sleep quality was among 178(58%) post graduate students, excessive daytime sleepiness according to ESS was among 120(40%) post graduate students and sleep hours <7 hrs were among 182 (66%) post graduate students. After compiling results of all three, 223(72%) post graduate students were found to be sleep deprived. Association of sleep deprivation with sleep hygiene and night duties was found to be statistically significant.

**Conclusion:** Increased amount of workload on the residents and more number of night duties affect the sleep of the post graduate students and majority of them feel exhausted and fatigued after their night duties.

**Keywords:** sleep deprivation, daytime sleepiness, post graduate students, night duties, sleep hygiene, workload,

### Introduction

Sleep is an active, repetitive and reversible state of perceptual disengagement from the environment. It is a physiological process essential to life. It is an

important part of the daily routine. Human beings spend about one third of their daily time in sleeping.<sup>1</sup>

It serves different functions such as growth and repair, learning and memory consolidation etc. Both

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the quantity and quality of sleep play an important role in an individual's psychological and physical well-being. Sound sleep gives boost to all types of tissue, organ and system in the body, thereby improving the output from brain, heart, lungs etc. besides better immune function, metabolism and mood elevation as well. A chronic lack or poor quality sleep increases the risk of disorders such as high blood pressure, cardiovascular disease, diabetes, depression, and obesity.<sup>2</sup>

The requirement of sleep tends to change over the course of human life, Newborns sleep for about 12-18hrs, the demand for sleep reduces to 10hrs in children of 5-10 yr, followed by teenagers (Adolescent 8-9 hrs ) and adult (7-8 hrs).<sup>3</sup> Sleep deprivation is a general term is a state caused by inadequate sleep (sleep <7hrs) or poor quality of sleep or daytime sleepiness.<sup>4,5</sup>

Post graduate students is at the top of the list of sleep deprived individuals. The factors responsible for it includes: pressure of academic deadlines, erratic schedules, overnight on call duties, pre sleep cognition activities like active thinking, worrying, planning and analysing at bed time. Long working hours comprising of outpatient department (OPD) duties, indoor patient care and emergency services and night duties, results in shortage of time for other equally important activities in personal and social life.

## Materials and Methods

**Study setting:** The present study was conducted under the department of Community Medicine, Government Medical College, Amritsar, where study population was selected from various departments (clinical, para-clinical and pre-clinical) of the institute.

**Study population:** Post graduate students of all the departments (clinical, para-clinical and pre-clinical) studying in Government Medical College, Amritsar formulated the study population for the study.

**Study period:** The present study was proposed to be conducted over a period of one year that is 1st April 2020 to 31st March 2021.

**Sample size:** All the post graduate students

admitted to various pre, para and clinical departments of Government Medical College Amritsar during the years 2018, 2019 and 2020 formulated the sample size for this study.

**Sampling technique:** Universal sampling technique was used for the current study according to which all the post graduate students admitted with effect from year 2018-2020 were selected after applying pre-specified inclusion and exclusion criteria.

**Data collection tool:** Semi structured proformae were developed for data collection which consisted of sections shown below:

### PROFORMA I:

**Section A-** this includes the socio demographic profile of post graduate students.

**Section B-** this includes the Pittsburgh Sleep Quality Index (PSQI) scale (A standardized questionnaire). This was used to measure the quality and sleeping pattern among post graduate students. It consists of 19 self rated questions. These items are combined to form 7 components scores, each of which has a range of 0-3 points in all cases, 0 indicates no difficulty and 3 indicates severe difficulty. The 7 components scores are then added to yield 1 global score which ranges from 0-21, where 0-indicates no difficulty and 21 indicates severe difficulties in all areas.

**Section C-** This includes the Epworth Sleepiness Scale (ESS) (a standardized scale) which is a subjective measure of patient sleepiness. It consists of list of 8 situations which are rated on the tendency of the respondent to become sleepy on a scale of 0 (no chance of dozing) to 3 (high chance of dozing). The values of each response are added to give us the total score which ranges from 0-24.

### PROFORMA II

**Section 1:** This includes semi structured questionnaire which included all the possible factors affecting sleep among post graduate students. It also included questions related to assessment of quality of life.

**Section 2:** Satisfaction with Life Scale (SWLS) (a standardized scale) which consists of 5 statements that are marked on a scale of 1-7.

### Operational definitions:

Sleep deprivation is a general term is a state caused by inadequate sleep (sleep <7hrs) or poor quality of sleep or daytime sleepiness.<sup>4,5</sup>

In our study, the prevalence of sleep deprivation among post graduate students was determined by using following criteria:

Sleep quality - PSQI score  $\leq 5$

Daytime sleepiness - ESS score  $> 10$

Average sleep time <7hrs

Quality of life: Quality of life is a highly subjective measure of happiness that is an essential component of many financial decisions. Factors that play a role in the quality of life vary according to personal preferences, but they often include financial security, job satisfaction, family life, health, and safety.<sup>6</sup>

## Methodology

This cross sectional study was conducted after obtaining ethical approval from the institutional ethical committee among all the post graduate students enrolled during the years 2018, 2019 and 2020 at Government Medical College, Amritsar.

Prior to the commencement of the study, department wise lists of post graduate students admitted in above mentioned years was obtained from the Office of Director Principal, Government Medical college, Amritsar. Further, the duty rosters and mobile numbers were collected from the respective departments so that each one could be contacted during their free time.

After contacting each post graduate student telephonically, time and place suitable to them in the hospital/ college premises was decided and one to one interviews with them were held at the pre-decided slot/ time. Prior to the start of the interview, the aims and objectives of the study were explained clearly to each participant and written informed consent was taken. Each participant was contacted twice that is during phase 1 and phase 2 of the study. During the phase 1, information on socio-demographic profile was collected on a pre-tested and structured proforma, during the same phase sleep quality and

daytime sleepiness were also assessed using PSQI and ESS respectively. Because of the complexity involved in calculation of PSQI and the time required for each interview (approximately 30 minutes), participants were contacted again in phase 2 of the study, during which the results of PSQI and ESS were conveyed. After conveying the above result to each participant, they were again interviewed in which proforma II was filled and information pertaining to determinants of sleep deprivation, quality of life and satisfaction with life was collected. This phase of interview took approximately 45 minutes. Because filling of the proformae took about 1hr and 15 minutes and sparing such a long time for the same by post graduate students in one sitting was difficult, hence this study was conducted in 2 phases to avoid any inconvenience and to improve the participation.

Any post graduate student who failed to give an informed consent for participation in the study, who could not be contacted on 3 consecutive visits as well as was with diagnosed sleep disorders were excluded from the study.

### Statistical analysis:

The data was compiled and analyzed using Microsoft Excel and Epi info CDC USA. The individual scores of each participants for PSQI, ESS and satisfaction with life scale were calculated after summing up the responses to each item. Mean scores  $\pm$  standard deviation for each scale were calculated. The individual scores were interpreted against standardized protocol where for the calculation of prevalence of sleep deprivation among post graduate students fulfilling any of these three criteria i.e. PSQI  $\geq 5$ , Average sleep time  $\geq 10$  were taken as numerator where as all the post graduate students were taken as denominator. For further analysis the whole sample size was categorized into sleep deprived which consisted of those who fulfilled any of the all three above criteria and non sleep deprived, those who did not fulfill any of the above three criteria. For determining the association of various factors with sleep deprivation, chi-square test was applied where p-value of  $< 0.05$  (on both sides) was considered to be significant. If any of the expected cell value was  $< 5$  then Fischer's- exact test was used.

The distribution of data for various nominal and categorical variables was represented as frequencies and proportions where as mean  $\pm$  standard deviation was calculated for all the continuous variables.

### Results

This cross sectional study was conducted among post graduate students of Govt. Medical College,

Amritsar. This study was conducted in a phased manner where in Phase 1 total of 306 post graduate students were interviewed to assess sleep deprivation. During phase 2 the information on various factors associated with sleep deprivation was sought from 274 students. The data was analyzed using Microsoft Excel and Epi info to obtain following results.

**Table 1: Distribution of post graduate students according to socio-demographic profile (N=306).**

Variable	Number	Percentage
<b>Sex</b>		
Male	114	38
Female	192	62
<b>Religion</b>		
Hindu	173	57
Sikh	128	41
Others	05	02
<b>Caste</b>		
General	208	67
SC/ST	79	27
OBC	19	6
<b>Residential Area</b>		
Rural	28	09
Urban	278	91
<b>Type of Family</b>		
Nuclear	249	81
Joint	57	19
<b>Department</b>		
Clinical	235	77
Para-Clinical	68	22
Pre -Clinical	3	1

Table 1 shows the distribution of post graduate students according to their socio demographic profile, where females were higher in number (192;62%) in comparison to males(114;38%). Majority of the post graduate were Hindu (57%) by religion followed by Sikh (41%) religion. 67% belongs to the General Caste and majority i.e. 91% resided in the Urban areas. As far as department of posting was concerned, 77% were from clinical branches and only 1% (3) were from preclinical branches. Mean age of the post

graduate students was  $28.28 \pm 2.9$  which ranged from 24 to 42 years

According to PSQI poor sleep quality was among 178 post graduate students , excessive daytime sleepiness according to ESS was among 120 post graduate students and sleep hours <7 hrs were among 182 post graduate students. After compiling results of all three, 223 post graduate students were found to be sleep deprived.

**Table 2: Distribution of postgraduate students according to pattern of night duties (n=156)**

Variable	Number	Percentage
<b>Night duties/month</b>		
4-5	49	31
6-7	40	26
≥8	67	43
<b>Time to sleep during night duty</b>		
Yes	63	40
No	35	23
Sometimes	58	37
<b>Duration of sleep after night duty</b>		
4-5hrs	63	40
6-7hrs	83	54
>7hrs	10	06

Among the post graduate students who did night duties, 43% had ≥8 night duties in a month and 23% did not get any time to sleep during the night duties (table 2). Sleep pattern after night duty where,

average duration of sleep after night duty for almost half of postgraduates (54%) was 6-7hrs whereas only 6% got to sleep for >7 hrs.

**Table 3: Association of sleep deprivation among post graduate students with the pattern of night duties (N=156)**

Variable	Sleep deprived (n=139)	Non sleep deprived (n=17)	χ <sup>2</sup> (p-value)
<b>Night duties/month</b>			
4-5	39 (28)	10 (58)	11.17 ( 0.003)* df=2
6-7	34 (24)	06 (35)	
≥8	66 (48)	01 (07)	
<b>Time to sleep during night duty</b>			
Yes	105 (75)	16 (94)	10.44 (0.005)* df=1
No	34 (25)	01 (6)	
<b>Sleep Quality after Night Duty</b>			
Uninterrupted at least for 4 hrs	48 (34)	05 (30)	0.17 (0.673) df=1
Disturbed	91 (66)	12 (70)	

- All figures in parenthesis are percentages
- \* p < 0.05 is considered to be significant

Table 3 shows the association of sleep deprivation among post graduate students with pattern of night duties, where among the sleep deprived about half of the post graduate students (48%) were doing ≥8 night

duties/month whereas 58% of non sleep deprived were doing lesser number of night duties per month i.e. 4-5 and this difference was found to be statistically significant. Two third (75%) of the sleep deprived got to sleep during the night duty which was significantly lower than non sleep deprived (94%).



**Table 4: Association of sleep deprivation among post graduate students with their satisfaction with life scale (N=274)**

Satisfied with life	Sleep deprived (n=223)	Non sleep deprived (n=51)	$\chi^2$ (p-value)
Satisfied	103 (46)	38 (74)	27.77 (0.000)* df=2
Neutral	23 (10)	11 (22)	
dissatisfied	94 (44)	02 (04)	

- All figures in parenthesis are percentages
- \*p < 0.05 is considered to be significant

Table 7 shows the association of sleep deprivation among post graduate students with satisfaction with life scale, where a significantly higher proportion of non sleep deprived were satisfied (74%) and neutral (22%) on satisfaction with life scale in comparison to 46% and 10% of sleep deprived respectively. 44% of sleep deprived were dissatisfied with life in comparison to 4% of non sleep deprived.

### Discussion

In the present study, the prevalence of sleep deprivation among post graduate students was determined as per any of the three criteria, viz. Global Pittsburg Sleep Quality Index (PSQI) which determines sleep quality, Epworth Sleepiness Scale (ESS) which determines daytime sleepiness and average sleep time,

**Poor sleep Quality:** As per PSQI, the present study has shown that, 178(58%) of post graduate students had poor sleep quality with mean score of  $5.65 \pm 3.4$  which was higher than the cut off of 5. This study was comparable with the study conducted by Garg S, in which 65% of the post graduate students had poor sleep quality.<sup>7</sup>

**Daytime sleepiness:** As per the ESS, the present study has shown 40% post graduate students had daytime sleepiness of which, 30% had mild daytime sleepiness while 8% had moderate daytime and 2% had severe daytime sleepiness. The mean value of ESS was  $9.07 \pm 3.85$ . Our study was comparable with studies conducted by Siddalingaiah HS et al and by Sharma A et al, where the prevalence of daytime sleepiness among post graduate students was 47.4% and 33.3% respectively.<sup>8,9</sup>

**Average sleep time:** According to the Mayo clinic, the average sleep time of adults should be between 7-9 hrs and total time less than 7 hours is considered as insufficient sleep or sleep deprivation.<sup>10</sup> The present study has indicated that 182 (66%) post graduate students had <7hrs of sleep which is comparable with the study conducted by Garg S<sup>10</sup>

In the present study majority (62%) of sleep deprived post graduate students were doing night duties whereas opposite trend was observed among non-sleep deprived, where 67% were not doing night duties. This difference was found to be statistically significant. Comparable results were found in a study conducted by Qanash S et al where 71% of night shift workers had poor sleep quality.<sup>11</sup>

In the present study, 44% of sleep deprived post graduate were dissatisfied with their life as compared to 2% of non sleep deprived. Comparable results were found in the study conducted by Singh A et al where satisfaction with life had positive correlation with sleep deprivation.<sup>12</sup>

### Conclusion

Present study highlights the prevalence of sleep deprivation among post graduate students of Government Medical College, Amritsar and also identifies the determinants of sleep deprivation. The results of this study reflects that workload on the residents and number of night duties affects the sleep of the post graduate students and majority of them feel exhausted and fatigued after their duties. This study also indicates that sleep deprivation is more among post graduates who were not satisfied with their life.

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**Conflict of interest-** Nil

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