

## A Comparative Descriptive Study of sleep quality impact among Day scholar and Hostel dweller Medical undergraduates upon academic performance

Mahd Aftab Khan<sup>1</sup>, Farhat Rehana Malik<sup>2</sup>

### ABSTRACT

**Objective:** To assess the sleep quality among the Hostel dweller and Day Scholar groups of undergraduate medical students with comparison among the groups and determine the effects of sleep quality upon their academic performance.

**Study Design:** A Comparative Descriptive Study.

**Place and Duration:** Department of Community Health Science at Peshawar Medical College from 1<sup>st</sup> December 2019 to 30<sup>th</sup> June 2020.

**Methodology:** The students with complete modular exam taken were included in the study with convenient sampling technique, whereas others with no consent, absent, sick and on leave were excluded. The students with PQLI score < 5 and PQLI score > 5 were graded with poor and good sleep respectively. Academic performance was gauged through self-administered questionnaire with percentage scores in the last module along with the demographic profile of the students.

**Results:** The total sample of 231 students had mean age of  $21.65 \pm 1.05$  with a range of 19- 25 years with 55.4% female students. Poor sleep reported in 69.3% with mean PSQI score of the students as  $6.77 (\pm 3.62)$ . Hostel dwellers had significantly poor sleep as compared to day scholars (P-Value= 0.011). The academic achievement of “Poor Sleepers” (59.05%, SD: 14.51) was significantly lower than “Good Sleepers” (64.96%, SD: 9.69), with significant P-value (0.002). Gender-wise comparison showed no significant difference between sleep quality of males and females (P>0.9).

**Conclusion:** Hostel dwellers had poor sleep quality with a significant relationship between the academic performance and good sleep. However, gender had no relationship with the sleep quality.

**Keywords:** Quality of Sleep, Medical students, Day Scholars, Hostel Dweller, Academic Performance, Patterns.

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### INTRODUCTION

Human life, health and sleep is crucial not only for learning and practice but also for physical as well as mental health. Sleep

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deprivation, excess of a short duration of night sleeps with early rising affect health, learning and mental capacity which impairs their behavior and compromises the academic performance in examinations<sup>1</sup>. The association of sleep with various cognitive functions has been a topic of interest among researchers for many years. Research studies have shown that good sleep is associated with overall higher cognitive function and better performance<sup>2,3</sup>. Sleep has been linked to many important physiological functions and one of them is memory consolidation. Although the exact mechanism for memory consolidation is not known, it has been proposed that certain synaptic connections are strengthened during sleep which leads to consolidation of memory and hence better academic performance is achieved. Sleep and academic performance is a complex relationship and with early schedule influence has a negative impact upon the performance. The related chronotype affected young males and overloaded stress levels altered sleep quality especially in medical schools<sup>4</sup>.

Lack of sleep is considered to be a public health issue among the student's community<sup>5</sup>. Medical students have high prevalence of sleep related problems and influence on their academics<sup>6</sup>. Sleep deprivation occurs when inadequate sleep leads to decreased performance, inadequate alertness, and

deterioration in health. Sleep deprivation and sleep disruptions may cause severe cognitive and emotional problems<sup>7</sup>. Sleep deprivation can impair the academic performance of students. Lack of sleep has been associated with poor attention in class while some studies do not show any association<sup>8-10</sup>.

One study revealed that 31% of the students suffered from morning tiredness because of sleep deprivation. Another important thing was the difference between the sleep of Hostel dweller and day scholars with relevance to their academic performance. According to another study, 41% of students had roommate wake up at night due to the noise of others. These challenges faced by students of hostels were associated with sleep disturbances<sup>11</sup>. It was common for students with insomnia to suffer from mental health problems such as chronic fatigue, depression, stress, lower optimism, anxiety and a lower quality of life<sup>12</sup>. Learning in medical school is a cumbersome, hard and stressful process. Appropriate amount of sleep as well as daily exercise for good physical and mental health is needed in these institutions<sup>13</sup>.

This study relates to the importance of measuring sleep quality in medical undergraduate students studying as day scholar and Hostel dwellers. Previous researches claimed that Hostel dweller had more impaired sleep habits than day scholars as they were being subjected to peer pressure, additional stress, home sickness and most importantly not being checked by their parents. Literature review revealed few studies of Pakistan however, in other provinces. So this paved the way for this study here in Khyber Pakhtoon Khwa to have a baseline regarding this important topic. The aim of the present study was to assess the sleep quality among the Hostel dweller and Day Scholar groups of undergraduate medical students with comparison among the groups and determine the effect of sleep quality upon their academic performance. This study will give us basic facts about the relationship between the two main variables and enable the students and teachers, especially of the hostels to ensure sound sleep and good mental health of the students residing there. So, this study was conducted with an objective to assess the sleep quality among the Hostel dweller and Day Scholar groups of undergraduate medical students with comparison among the groups and determine the effects of sleep quality upon their academic performance.

## METHODOLOGY

This comparative descriptive study, was conducted in Department of Community Health Sciences at Peshawar Medical College upon undergraduate medical students. The total duration of study was seven months from 1<sup>st</sup> December-2019 to 30<sup>th</sup> June-2020. Data collection was done in the month of February-2020. Sample size (232) was calculated with 6.41% margin of error, 95% confidence level and 50% response rate through online calculator<sup>14</sup>.

Ethical considerations were duly taken care of with volunteer induction of the students, and confidentiality of the data was ensured along with ethical approval taken from the Institutional Ethical Review Board (IRB).

All the students of Peshawar Medical College who had taken

their module exam, were included in the study. Whereas the students not willing to take part in the study, those absent, on leave, sick, and students who did not take their module exam were excluded from the study.

The data collection tool used was Pittsburgh Sleep Quality Index (PSQI)<sup>15</sup>. It is a practical and brief, returning a single score representing overall sleep quality. It is used extensively in clinical practice and research because of its high efficacy (high specificity and sensitivity). A global sum of "5" or greater is indicative of poor sleep quality. Pittsburgh Sleep Quality Index (PSQI), consisting of 7 components added to give a Global PSQI score, was used for data collection. The grading criteria differentiates "poor" from "good" sleep by measuring seven domains i. e, Subjective sleep quality, Sleep latency, Sleep duration, Habitual sleep efficiency, Sleep disturbances, Use of sleep medication, Day time dysfunction over the last month.

The students of 4<sup>th</sup> Year MBBS collected the data, by distributing the questionnaires among the students of 1<sup>st</sup> Year to Final Year MBBS at Peshawar Medical College, through convenience sampling technique. The variables assessed in this study were the sleep quality patterns according to PSQI, year of study, student's status (Hostel Dweller or Day Scholar) and academic scores of previous modules.

Academic performance of the students was gauged through the mean percentage scores in previous module along with the demographic profile of the students. Good Sleep was graded upon Global PSQI score <5 and Poor Sleep with Global PSQI score ≥ 5.

**Data Analysis:** SPSS Version-21 analyzed data through descriptive & inferential statistics with Chi-Square, P value with 0.05 limit). Categorical variables and their associations with similar variables with mean were calculated by student t-test with p-value setting at 0.05 for significance.

## RESULTS

The study was completed by 231 (57.75%) medical undergraduates, who filled the questionnaires. The mean age of the sample was  $21.65 \pm 1.05$  with a range of 19- 25 years. Majority of the respondents were females with total as (n= 158, 55.4%), out of which from 4<sup>th</sup> Year MBBS (n= 94, 40.7%) followed by 3<sup>rd</sup> Year MBBS (n= 69, 29.9%) and 2<sup>nd</sup> Year MBBS (n= 68, 29.4%) female students.

The descriptive statistics of the medical undergraduates, according to the research tool used is shown in Table- I with regard to trouble in sleep during the past month, once, twice and thrice per week. According to the responses of the Pittsburgh Sleep Quality Index (PSQI), only 30.7% (n= 71) of the students had Good Sleep (Global PSQI score <5) whereas 69.3% (n= 160) had a poor sleep (Global PSQI Score ≥ 5). The mean PSQI score of all the students was  $6.77 (\pm 3.62)$ . The sleep quality grading of the medical undergraduates, during the past month was categorized into very good sleep as 35.1%: (n= 81), fairly good sleep as 44.2% (n= 102), fairly bad was 15.6% (n= 36) and a very bad sleep was 5.2% (n= 12). Table- II shows the comparison of sleep patterns of medical undergraduates (Hostel Dwellers and

Day Scholars) i. e good and poor sleepers with their significant p values (0.011). The effect of good and poor sleep of medical undergraduates upon their academic performance with their significant p values (0.013 and .002) is shown in detail in Table- III. The academic performance of medical students was measured as participants' self-reported performance in the previous module. Mean module score was  $60.87\% \pm 13.48$  for the entire study sample. The mean module percentage of "Poor Sleepers" (59.05%) and SD of 14.51 was significantly lower than "Good Sleepers" (64.96%) SD of 9.69. Figure- 1 shows the medical students categorized as Hostel Dwellers and Day Scholars with their sleep patterns. The gender- wise responses of PSQI, came out to be 68.9% Males (n= 71) and 69.5% Females (n= 89) with poor sleep; whereas, good sleepers were 45.01% Males (n= 32) and 54.9% Females (n= 39) without any significance in their P-value 0.922.

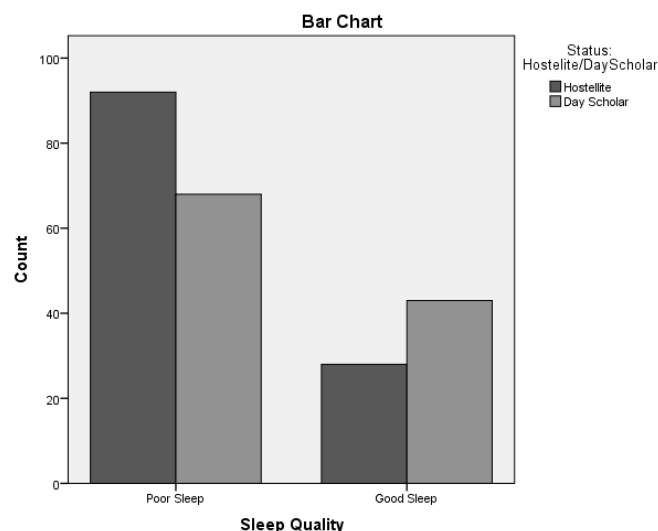


Fig- 1: Sleep Quality among Hostel Dwellers and Day Scholars

Table – I: Descriptive Statistics of Medical Undergraduates Sleep Patterns as per Questionnaire (N= 231).

| During the past month how often have you had trouble sleeping because you                              | Not during the past month (%) | Less than once a week (%) | Once or twice a week (%) | Three or more times a week (%) |
|--------------------------------------------------------------------------------------------------------|-------------------------------|---------------------------|--------------------------|--------------------------------|
| 1) Cannot get to sleep within 30 minutes                                                               | 94 (40.7)                     | 50 (21.6)                 | 40 (17.3)                | 47 (20.3)                      |
| 2) Wake up in the middle of night or early morning                                                     | 100 (43.3)                    | 44 (19.0)                 | 43 (18.6)                | 43 (18.6)                      |
| 3) Have to get up to use bathroom                                                                      | 146 (63.2)                    | 49 (21.2)                 | 22 (9.5)                 | 14 (6.1)                       |
| 4) Cannot breathe comfortably                                                                          | 168 (72.7)                    | 44 (19.0)                 | 16 (6.9)                 | 3 (1.3)                        |
| 5) Cough or snore loudly                                                                               | 181 (78.4)                    | 31 (13.4)                 | 14 (6.1)                 | 5 (2.2)                        |
| 6) Feel too cold                                                                                       | 137 (59.3)                    | 60 (26.0)                 | 25 (10.8)                | 9 (3.9)                        |
| 7) Feel too hot                                                                                        | 160 (69.3)                    | 49 (21.2)                 | 18 (7.8)                 | 4 (1.7)                        |
| 8) Have bad dreams                                                                                     | 115 (49.8)                    | 73 (31.6)                 | 31 (13.4)                | 12 (5.2)                       |
| 9) Have pain                                                                                           | 162 (70.1)                    | 54 (23.4)                 | 11 (4.8)                 | 4 (1.7)                        |
| 10) Other reasons                                                                                      | 189 (84.8)                    | 21 (9.1)                  | 13 (5.6)                 | 8 (3.5)                        |
| 11) How often have you taken medicine to help you sleep?                                               | 196 (84.8)                    | 18 (7.8)                  | 10 (4.3)                 | 7 (3.0)                        |
| 12) How often have you had trouble staying awake while driving, eating, or engaging in social activity | 134 (58.0)                    | 48 (20.8)                 | 33 (14.3)                | 16 (6.9)                       |
| 13) How much of a problem has it been to keep up enthusiasm to get things done?                        | 88 (38.1)                     | 54 (23.4)                 | 46 (19.9)                | 43 (18.6)                      |

Table – II: Comparison of Medical Undergraduates Sleep Patterns among the two Groups. (N=231)

|        |                 | Sleep Quality |            | Total | Chi Square |                  |
|--------|-----------------|---------------|------------|-------|------------|------------------|
|        |                 | Poor Sleep    | Good Sleep |       | P Value    | Likelihood Ratio |
| Status | Hostel Dwellers | 92            | 28         | 120   | 0.011*     | 0.011*           |
|        | Day Scholar     | 68            | 43         | 111   |            |                  |
| Total  |                 | 160           | 71         | 231   |            |                  |

Significant P- Value= \*

**Table – III: Association of Sleep Quality Patterns with Academic Performance (N= 231).**

| Medical Undergraduates [N= 231 (100%)] | Poor Sleepers                | Good Sleepers | Asymptomatic Significance (2 sided) |
|----------------------------------------|------------------------------|---------------|-------------------------------------|
| Academic Performance                   | 160                          | 71            |                                     |
| Chi Square Tests                       | Pearson Chi Square           |               | 0.342                               |
|                                        | Likelihood Ratio             |               | 0.013*                              |
|                                        | Linear by Linear Association |               | 0.002*                              |

\*Significant p-Value

## DISCUSSION

The present study was conducted to assess the sleep quality among the Hostel dweller and Day Scholar groups of undergraduate medical students with comparison among the groups and determine the effects of sleep quality upon their academic performance. Majority of the medical students in this study were found with poor sleep, hostel dweller had poor sleep as compared to the Day Scholars and there was no difference in sleep quality among the compared gender groups.

A study found no difference among quality of sleep with academic performance, with PSQI used on their Hostel Dwellers and Day Scholars. These findings do not comply with the present study<sup>1</sup>. Another study evaluated sleep with student's performance and proved a strong relation with sleep. Although average sleep time was seven hours but no gender difference seen. These results are consistent with the present study but the present research lacked the consistency and duration of sleep evaluated in the mentioned study<sup>2</sup>. Another study upon University student's academic performance of GPA scores was assessed with their sleeping hours. GPA scores of 3 and higher had 6.9 hours, 3- 3.49 GPA had 6.4 hours and less than 3 had 6.20 hours sleep. These findings correlate with this study but the present one lacked categorization of scores and enrollment into various courses<sup>3</sup>. A US based study determined behaviors using PSQI scale with sleep and associated length of sleep with them. One quarter of the students had poor quality sleep, slept less than seven hours and had negative eating attitudes. These findings are not in association with the present study as objectives were different<sup>5</sup>. A study among Saudi medical graduates used three tools i. e PSQI, Epworth Sleepiness Scale and Perceived stress scale to assess sleep quality and its association with the academic performance. The students had 30% poor sleep. Multivariate regression analysis revealed significant relationship among stress, poor sleep and excessive daytime sleep. Poor academic performance was related to stress<sup>6</sup>. These results are in accordance with this study however, only one scale was used in the present study and analysis used was also different.

Medical students of Pakistan had poor sleep quality with a negative influence on the academic performance. This was proved through PSQI index, with maximum students had poor sleep and mean GPA score of poor sleepers was lower than that of good ones (0.001). The sleep duration was less than 5- 7 hours. These results are comparable with the present study, with same research tool and target audiences<sup>7</sup>. Similar findings were reported by an Indian study with fairly bad sleep in

students, seven hours of average sleep duration and first year students had the worst sleep patterns using the same PSQI index, however no association with academic performance<sup>8</sup>. Another study upon medical undergraduates depicted 75.8% poor sleepers but average sleep duration was six hours and a negative correlation of GPA with the PSQI scores<sup>10</sup>. A Study among the Saudi medical students used PSQI and Depression Anxiety Stress Scale to evaluate sleep quality and its association with their mental health. The poor sleepers were the most inactive and lazy ones but had good academic scores and significant relationship (0.004). These findings are similar to the present study apart from the depression tool and astonishing association of good scores among poor sleepers<sup>11</sup>.

A Brazilian study evaluated 39.5% students with fairly bad sleep, 89% sleep efficiency and reported 6- 7 hours of sleep among the students which were divided into groups as per difficulty study status<sup>12</sup>. A Pakistani study divided into three groups on the basis of sleep patterns before and after admission concluded disturbed and decreased sleep affects academic performance<sup>13</sup>. Both these study results correlate with the present study in terms of objectives, target audiences and research tool however, group categorization was missing in the present study. A positive relationship between sleep and academic performance i. e good academic grades was reported by a study. These findings are consistent with this study however instead of correlations, the present study recorded only p values<sup>16</sup>. An Indian study, upon medical undergraduates and paramedical staff, found average sleep time as six hours, poor quality of sleep was reported by 20% students and travel time for the hostel dwellers were 40 minutes as compared to the day scholars which had 4 hours per day. These findings were consistent with this study however present study participants included only medical undergraduates and time taken by the hostel dweller and day scholar was never calculated<sup>17</sup>.

In a Norwegian survey poor sleep was associated with delayed study progress with significant p values (0.001) and less than five hours of sleep were correlated with failed examinations<sup>18</sup>. A prospective cohort study among nursing students showed shorter duration of sleep associated with higher risk of poor academic performance. It showed negative correlation between sleep habits and academic scores<sup>19</sup>. A cross sectional Omani study upon university students showed a significant association between low GPA scores and sleep disorders however no gender difference found<sup>20</sup>. A Malaysian study upon undergraduates revealed a relationship among sleep quality and academic performance through Select Sleep Quality Scale (SQS). A positive correlation ( $r = 0.342$ ,  $p < 0.05$ ) found between academic

performance and quality of sleep<sup>21</sup>. Another Pakistani study on medical undergraduates also proved the association of impaired sleep with academic performance<sup>22</sup>. All the results of these various studies are in association with the present study with same objectives and research tool.

**Limitations:** It was a comparative cross sectional study, not a diverse sample, with no established cause-effect relationship. In order to determine cause-effect relationship, experimental manipulations in the form of Randomized Control Trial are necessary but very challenging in context of real education where the students give grades and scores too much importance. In this study factors like Exam Difficulty Level and Stress Level of the students were not considered, which might be confounding factors in predicting the exam performance. Also, this study was conducted among medical undergraduates only and in one institute, so these results cannot be generalized.

## CONCLUSION

The Hostel dwellers had poor sleep quality as compared to the day scholars. There existed a significant relationship between the academic performances of medical students with their sleep. However, gender had no relationship with the sleep quality.

**RECOMMENDATIONS:** Researchers in future must consider this topic on a large sample size with representativeness so that it can be generalized as well.

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## AUTHOR'S CONTRIBUTION

**Khan MA:** Conceived the idea, literature search, Data collection, Manuscript writing, Data analysis.

**Malik FR:** Designed research methodology, Manuscript writing, Statistical Analysis, Final critical review of manuscript, Manuscript Writing

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