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SLEEP PATTERNS OF MEDICAL STUDENTS; THEIR RELATIONSHIP WITH ACADEMIC PERFORMANCE: A CROSS SECTIONAL SURVEY.

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ABSTRACT… Objectives: To identify sleep patterns of medical students and determine the relationship between sleep habits and academic performance. **Background:** Human beings adopt three different sleeping patterns; monophasic, biphasic and polyphasic. Sleep allows synaptic molding to return by developing faster memory union. When such memory processing is not present, memory keeping is reduced which can have an adverse effect on the academic performance of students. Professional education in the field of medicine requires learning a greater amount and variety of syllabi to practice as a satisfactory medical graduate. Among medical students, the burden of the extensive curriculum often results in the development of non-recuperative sleeping patterns, which can, in turn, affect their overall academic performance. This study strives to deduce the sleeping patterns of students and the connection between those sleeping patterns and academic performance. **Study Design:** A cross-sectional questionnaire based survey. **Setting:** Jinnah Medical & Dental College, Karachi. **Period:** 2013. **Methods:** Sleep patterns of 347 medical students from year 1 -4. The results of the midterm examinations were cross-tabulated with the sleep patterns to determine the relationship between them. **Results:** Our study showed that out of 347 medical students, 38.9% (n=135) had monophasic, 46.7% (n=162) had biphasic and 14.4% (n=50) had a polyphasic sleep pattern. 67.4% of monophasics, 87.0% of biphasics and 66.0% of polyphasics passed their midterm examination. **Conclusion:** Biphasic students performed the best in their midterm examinations. This is in agreement with scientific proof that sleeping in two phases matches the body's instinctive circadian rhythm, hormonal regulation and memory creation. These two phases are sleeping once at night and having one shorter period during the day. Professional colleges should advise and educate students in order to encourage them to acquire adequate sleep through appropriate sleeping patterns by which they may support their academic learning.

Key words: Sleep patterns, medical students, academic performance

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INTRODUCTION

Sleep is an important, reversible and involuntary action coupled with repeated periods of time when the person will be awake. It is a source of diversion from day to day stress and a state of mind denoted by a temporary lack of consciousness as well as reduced vigilance and responsiveness.[1,2]

There is a large variety of duration of sleep between species, but for humans, eight hours of good quality sleep at night is important. There are three different types of sleep patterns; monophasic (sleeping once for more than 6 hours every 24 hours), biphasic (sleeping twice every 24 hours) and polyphasic (taking multiple naps per day). Szymanski (1920) happened to be one of the first to describe "polyphasic" sleep activity. Sleeping for eight hours a day is considered adequate by experts with a biphasic pattern being the healthiest.

Most human beings experience anger, lethargy and inability to concentrate when in need of sleep.[3,4] Partial sleep impecunious (less than 6 hours of sleep per night) can lead to lack of attention, attentiveness, rememberance, and judgemental thinking in a person's day to day life. Even students who regularly obtain 8 hours of sleep per night but shift their sleep schedule by more than 2 hours may experience attention,

concentration, rationalizing and psychomotor difficulties, as well as increased touchiness, apprehension, and sadness.[5] The sleep-wake cycle follows a pattern and works in coordination with other patterns in the human body, for example, deep body temperature and cellular mitosis.[6] Therefore, we inclined to maintain comparatively non fluctuating rourines and sudden changes in sleep-wake schedules may cause internal separation among these patterns, which in turn may cause adverse effects such as dullness or lethargy, lack of attention, problems in focusing , and low performance caliber.

Research in the neurosciences continues to provide proof that sleep plays a role in the processes of learning and memory. Combining evidence, from the molecular to the phenomenological, undoubtedly confirms that subconscious memory reprocessing during sleep is an essential part of how our memories are formed and ultimately molded.[7,8] Therefore sleep has a relevant part to play in academic learning and memorization. Alternatively, inadequate sleep and/or irregular sleeping patterns usually hamper these functions.

Current studies have shown that the type of sleeping pattern an individual follows has a substantial impact on the academic performance of students and their learning abilities. First of all, poor or inconsistent sleep is often associated with behavioral and thinking or mental processing difficulties. Secondly, these impairments often reduce academic achievement and retention. Finally, this fall in neurocognitive functioning can easily be reversed by adopting healthy sleep schedules (fixed bedtimes and waking times, no extended periods of sleep deprivation, etc.)

With regards to the sleep-wake patterns of the student, the admission of a student at an institute of higher education is dependant on many factors that may cause changes in sleep habits, such as stress of better academic performance, socialintegrations, and change in sleeping situations, decrease in parental supervision, and restless college/university timetables. It is then easy to understand that, across the years atinstitution, a lot of students may develop unhealthy sleep patterns.[9] As indicated by the *International Classification of Sleep Disorders* (DCSC, 2001), sleep-wake patterns are usually followed by unpleasant outcomes during daytime: reduced levels of motivation, achievement, ability to focus, awareness and humor, as well as increase restlessness and lethargy. Hence it is reasonable to assume that those university students that develop such sleep patterns may suffer adverse outcomes in their academic advancement. However, literature regarding this particular subject among university students is hard to find.[10]

This study was conducted to ascertain the sleep pattern of medical students. Furthermore, it determined the connection between the sleep patterns and academic performance in a collective examination conducted within three months of survey.

MATERIALS AND METHODS

We conducted a questionnaire-based survey of undergraduate medical students at Jinnah Medical & Dental College, Karachi, across a timespan of two months. Students from first to fourth year MBBS were included using convenience sampling. Final year students were excluded due to their study break. A questionnaire was constructed which included questions on sleeping pattern, duration of sleep, problems with recalling and ability to focus on studies. The questionnaire was distributed to all 397 enrolled students of these batches. 347 responders submitted completed questionnaires through the Student Affairs Department. Academic performance of students was evaluated in terms of their performance in midterm examination which was held within one month of this survey. Students performance was measured as Pass (>50% aggregate marks) or Fail (<50% aggregate marks). Permission to conduct the study was obtained from the college administration and Departmental Heads before the start of study. The participants consent was obtained and confidentiality was assured. Data was analyzed using SPSS version 16.0 to obtain descriptive frequencies and cross tabulation of

sleep patterns with academic performance.

RESULTS

Mean age of the participants was 20±6 months; male to female ratio was 1:3. Distribution of sleep patterns is shown in Fig. 1. 50% of the monophasic, 58.2% of biphasic and 32% in polyphasic had sufficient sleep. 20.4% of monophasic overslept as compared to 32% of biphasic and 58% polyphasic, respectively.

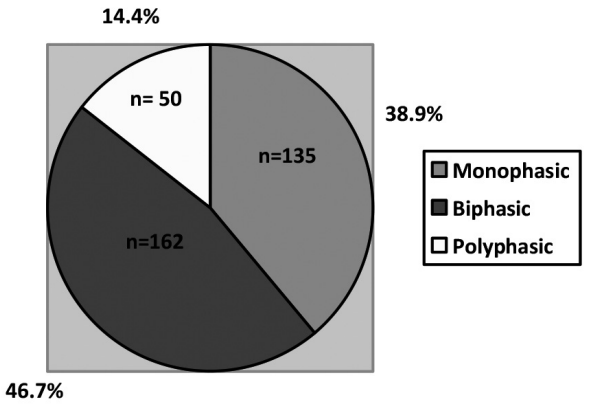

Fig-I. Frequency of sleeping patterns

Sleep Pattern	Academic Performance	
	Pass	Fail
Monophasic	67.4%	32.6%
Biphasic	87.0%	13.0%
Polyphasic	66%	34%

Table-I. Relationship of sleep patterns with academic performance.

DISCUSSION

Our results show that most students had a biphasic sleep pattern and most students with adequate sleep duration had this pattern. However, they are inclined to oversleep more than monophasics, but not as much as polyphasics. Biphasic pattern was also linked with increased pass percentage, meaning that there were higher chances of academic improvement. The second most common pattern happened to be monophasic; half of the students with this pattern had sufficient sleep and held the least probability of oversleeping. The least common pattern was polyphasic, but these students overslept the most, which was consistent with insufficient restful sleep. There was no notable difference in academic performance between mono and polyphasic students.

Sufficient sleep duration is necessary for the best possible performance as it enables medical students to hold on to information during the learning process.[11] In comparison to other studies, we observed that the standard requirement for sleep (6-8hrs) was attained among majority of our students, indicating difference with other studies where problems with sleep duration were reported among medical students.[12] Our results were in line with the research on students in which the mean sleep duration came out to be 7.7 hours.[13] We found that biphasics were able to continue with ample sleep duration most effectively.

We found that students who sleep enough are more likely to be biphasics, as compared to monophasics and polyphasics. Most possible cause might be recurrent naps among polyphasics which cause a hurdle in forming a uniform method and schedule of study. This fact is also evident in another study conducted with university students.[5] Moreover, our study agreed with the hypothesis about the importance of rapid eye movement (REM) sleep and its importance in memory collection.[14] Previous studies showed that a continuous sleep allows a person to get the most of REM sleep, therefore a better ability to remember events. We were able to notice the same outcome in our students: biphasics had the most amount of recalling ability. Monophasics do get a part of REM sleep, but definitely not as much as biphasics.

As far as polyphasics are concerned, although they had the highest amount of sleep duration, however their ability to remember events was very low, mainly because of absences of constant REM sleep. In regards to study patterns, it was noted that a regular study method is beneficial for students as constant reinforcements help in remembering the events.[15]

The sleeping pattern of students was not different

on the level of sleepiness they have during study, a finding already proven by a study conducted in Pakistan, where most of the students reported day time sleepiness.[16,17] We found that students having a greater amount of recall actually scored higher in exams in comparision to those who had a lower level of recall. This finding is idicative of a direct link of sleeping patterns with academics.

Depending on the findings of our study we believe that the knowledge about sleeping patterns may be essential for a better understanding of the academic recall at medical colleges, and may be used to enhance greater success in academics. For example, information about sufficient sleeping methods may help student to learn efficiently and with less wastage of resources including time, effort, energy and motivation.

As a connection between sleep and academic performance, it was shown[18] that students with more uniform sleep-wake patterns (shorter sleep inconsistencies, fewer night awakenings, later school rise times, earlier rise times on weekends) reported higher GPA, whereas students with lower grades reported increased daytime drowsiness, also as a result of shorter sleeping nights.

Some studies in undergraduates pointed out that non uniformities of 2-4 hours in the sleep-wake schedules are linked with greater tiredness, moodiness and lower level of performance, and that[18,19] students with irregular sleeping schedules had increased daytime lethargy in comparison to regular class mates .

It is also necessary that students should have same timings either for going to bed and rising up in the morning to avoid disturbance of the patterns inside the body, as this particular pattern stability leads to better sleep. Good quality of sleep is therefore important to enable university students to understand, resolve and retain huge amounts of knowledge and information during study.[5]

However, researchers who have studied relationships between sleep hygiene and applications in nonclinical sub groups and overall sleep standard have produced variable findings, may be because of controversial methods.

CONCLUSION

It is concluded from our study that students following biphasic sleeping pattern have adequate sleep and improved academic performance than students following monophasic and polyphasic sleeping patterns.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Dr. Zeba Saeed	Principal investigator, conception of design, data collection and authorship	
2	Dr. Zainab Hasan	Data analysis & results, manuscript preparation and intellectual review.	
3	Dr. Maria Atif	Literature review and discussion.