

Effect of Sleep-Wake Cycles on Academic Performances and Behavioural Changes among Undergraduate Medical Students

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Abstract:

Introduction: Sleep wake cycles form major part in the life of every student, starting from the school ages itself. This cycle has a major relationship in ensuring the proper functioning and day to day activities of the individual in all walks of life. **Objectives:** To assess the quality of sleep wake cycle among undergraduate medical students and to find out the association of sleep wake cycle with academic performances and behavioural changes among undergraduate medical students **Results:** In a cross sectional study among 300 participants, 35.3 % of the participants had good sleep-wake cycle. There was a positive association between sleep-wake cycles and academic performances. (χ^2 value 5.24 with p value <0.05). Age, gender, residence, socioeconomic status and year of study showed statistically significant association with behavioural patterns (p value <0.05) **Conclusion:** Good quality of sleep wake cycle was present among one third of participants. There was a positive association between sleep-wake cycles and academic performance, but no significant association between behavioral patterns and sleep-wake cycles.

Keywords: Academic Performances, Behavioural Changes, Sleep Wake Cycles, Undergraduates

Introduction:


For medical students, it is important to know the "if's and 'buts" involved in health care. For this, one of the key factors is sound sleep that revitalizes the memory.^[1] This helps medical students to perform academically better. During the transition phase of higher secondary to undergraduate programme, the students are stressed with academic pressure.^[2]

Research studies suggest that a number of factors, such as social and academic demands, affect the pattern of the sleep-wake cycle of healthy medical students.^[1,3-5] Other factors, including study schedules, influence sleep length and regularity of sleep wake cycle. With inadequate sleep, the

psychosocial well-being of students is affected leaving them confused and stressed.^[6]

The relationship between the sleep/wake habits and the academic performance and behaviour of medical students in the Southern states of India is insufficiently addressed in the literature. Hence this research work has been planned with the aim to examine the effects of sleep-wake cycles on academic performances and behavioural changes among medical students of a tertiary care centre in Tamil Nadu, South India.

Understanding the magnitude of the problem and the factors related to it, preventive measures can be taken enabling the medical students become competent medical graduates.

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Objectives:

To assess the quality of sleep wake cycle among undergraduate medical students and to find out the association of sleep wake cycle with academic performances and behavioural changes among undergraduate medical students

Method:

A Cross sectional study was conducted at Sree Mookambika Institute of Medical Sciences, Kulasekharam, Kanyakumari District, Tamil Nadu, South India during two months from 1st May 2021 to 31st July 2021 among the medical students from the first medical year through to the final year belonging to the batches 2016, 2017, 2018 and 2019, through random sampling. The sleep quality, academic performances and behavioural changes were assessed through a self-descriptive questionnaire. The students absent on the day of data collection or not willing to give consent and those on psychiatric drug treatments were excluded.

Sample Size calculation:

Using the formula $Z(1-\alpha)^2pq/l^2$ where,

p = prevalence^[7] of average performance taken as 72%

q = $100 - P = 28$

d = 7% of p

Sample size = 305

Study Tool: Semi-structured Questionnaire in English containing 2 sections.^[8]

Section A: Socio-demographic details of the participants.

Section B: Details on sleep-wake cycle using Modified Pittsburgh Sleep Quality Index (PSQI) questionnaire^[8] and behavioural patterns were assessed by a self-scoring questionnaire.^[3]

Data collection:

Data were collected after obtaining approval from the Institutional Human Ethics Committee (Ethics Certificate Number: SMIMS/IHEC No:

1/Protocol no: 29/2021) and Informed consent from the participants. They were instructed to fill in the questionnaire keeping in mind the pre COVID period of time as they had no regular classes during the period of Covid 19.

Sleep quality^[8] was considered poor for participants who obtain a score less than the mean. The behaviour patterns were assessed through a self-marking scoring system by the participants. Components like irritability, depressed, nervousness, happy, motivated, efficient, difficulty in concentration, attentive, active, alert were considered during assessment. A score above the mean was considered to be good behavioural pattern after analysis of the results. The score of behavioural patterns^[6] above the mean and below the mean were categorized into good and poor respectively.

The marks obtained for an examination conducted during the period of data collection was used to analyse the students' academic performance, an overall score of more than 60 was considered as Good performance.

Data analysis:

Data were entered in Microsoft Office Excel 2019 and analysed using statistical software, SPSS .25.0. All quantitative variables were analysed for mean and standard deviation. All qualitative variables were analysed for proportions. Chi-Square test was used as test of significance, to find the association between the variables. A p value less than 0.05 or a confidence interval of 95% was considered statistically significant.

Results:

The present study aimed at identifying the relationship between sleep-wake cycles and academic performances as well as behavioural pattern among 305 medical students. Five of the participants withdrew from the study.

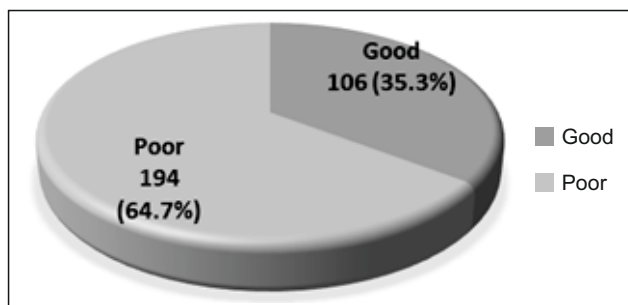
Majority (71.3%) of the participants were of age 20-22 years with 200 (66.7%) females. Mean age 21.15 ± 1.33 years and 202 (67.3%) belonged to

Hindu religion. Majority (76%) were second and third year MBBS students, (74%) from Urban area and (56.7%) belonged to Upper Socio economic status.

SLEEP -WAKE CYCLE

The score above the mean and below the mean were categorized into good and poor sleep-wake cycle status respectively.^[8]

Figure 1: Quality of Sleep-wake cycle among study participants (N=300)



Only 35.3 % of the participants had good sleep-wake cycle. (Figure1) Total 194 (64.7%) participants showed poor sleep-wake cycle, 34% needed 7 hours of sleep to feel fresh, 90.7% believed their sleep habits changed after MBBS admission, 63.7% slept for 5-7 hours on working days, 26.7% woke up by 6 AM, 79% slept late on weekends and 86.7% woke up late and 38.7% had trouble falling asleep.

ACADEMIC PERFORMANCE

Overall marks ≥ 60 and below 60 in an examination conducted, were categorized into good and poor performance respectively. Results showed that 45.7% spent 5-10 hours on academics, 62% attended all classes, 43.7% felt tired during lectures, 91.3% rated academic performance good after good sleep, 81% stayed awake late to complete records or study, 87.7% were easily distracted by electronic devices. 34.7% believed sleep wake cycles negatively influenced academic performance. There was an association between sleep-wake cycles and academic performances. (χ^2 value 5.24; p value <0.05) (Table 1)

BEHAVIOURAL PATTERNS

The score of behavioural patterns above the mean and below the mean were categorized into good and poor respectively^[6]; 165 (55%) showed good behavioural pattern After a normal sound sleep, 34.7% felt energetic, 53.3% tired, and 32.3% alert, 44.3% reported no difficulty in concentration.

Age, gender, residence, socioeconomic status and year of study showed statistically significant association with behavioural patterns (p value <0.05), while religion showed no association to the behavioural patterns (p value > 0.05). There was no positive association between sleep-wake cycles and behavioural patterns.(χ^2 value 3.14 ; p value >0.05) (Tale 2)

Table 1: Association between sleep wake cycles and academic performances (N=300)

Academic performance	Sleep wake cycle		Total	χ^2 value	p value
	Good	Poor			
Good	48 (43.63%)	62 (56.36%)	110	5.24	0.022
Poor	58 (30.52%)	132 (69.47%)	190		
Total	106	194	300		

Table 2: Association between sleep wake cycles and behavioural patterns (N=300)

Behavioural pattern	Sleep wake cycle		Total	χ^2 value	p value
	Good	Poor			
Good	51 (30.9%)	114 (69.09%)	165	3.14	0.072
Poor	55 (40.74%)	80 (59.25%)	135		
Total	106	194	300		

Discussion:

The present study examined the effect of sleep-wake cycles on academic performances and behavioural changes, among the undergraduate medical students. Other parameters studied were Age, Academic Habits, Attention in class, Mood variations, Behavioural changes. The Sleep aspects considered were Quantity, Quality, Regularity and with Schedule Changes.

The mean age of the study participants was 21.15 ± 1.33 years, which is comparable with the previous studies done in Saudi Arabia, United States and Brazil, among undergraduate medical and high school students.^[1,2,4,7] The current study clearly demonstrated a statistically significant association between sleep-wake cycles and academic performances among the medical students. The influence of various parameters and certain sleep habit patterns including the late bed time during examinations was seen to be associated with poor academic performances. Experimental studies done in the United States and Colombia, among undergraduate and high school students, previously have shown that sleep and changes in academic performance and behavioural changes are all inter-related.^[5,9,10]

The changes in schedules and years of the study associated with the need in achievement of marks have shown an association with the changes in sleep pattern. Similar findings were shown by A. A Gomes et al.^[3] The present study showed that age or gender or other demographic variables do not account for the erratic sleep wake pattern, which stands relevant with the previous studies conducted in Saudi Arabia.^[2,7]

There was no significant association between the sleep-wake cycles and behavioural changes among the medical students. The previous study conducted among Italian high school students, showed that there is an effect of the sleep-wake cycle on the behavioural pattern that in turn affects the academic performances.^[11] Another study reported a

significant variation in mood with circadian phase, such that the pattern and position of sleep counts as an influencing factor for the control of mood.^[12]

The present study further showed that, there is an influence of change in behavioural pattern by other parameters such as the age, gender, and year of study, which are similar to the findings by Flavia Giannotti et al.^[11] The self-reporting of the sleep wake habits relies on the students' subjective accounts which was validated by Wolfson et al.^[4]

Limitation of study:

The reliability of responses in view of the COVID pandemic has been identified as one of the limitations of the study.

Conclusion and recommendations:

The present study investigated the relationship between sleep-wake cycles and academic performance among undergraduate medical students. Results show a positive association between sleep-wake cycles and academic performance, but no significant association between behavioral patterns and sleep-wake cycles. The subjective feeling of better sleep pattern has a positive influence and is an independent predictor of excellent academic performance. There is a strong need for presence of peer groups and Mentors, who need to take an active role to educate about the needs of a better sleep pattern and sleep hygiene to bring the best in every medical student.

Declaration:

Funding: Nil

Conflict of Interest: Nil

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