



STUDY OF GENDER DIFFERENCES IN SLEEP PATTERN IN YOUNG ADULTS

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ABSTRACT

Introduction: Sleep is a vital indicator of physical and mental wellbeing. Modern lifestyle takes a heavy toll on sleep hygiene, and it is more so for medical students. Among the students, females have an increased prevalence of sleep related disorders which suggests that gender may have a role to play in the sleep patterns. **Aim:** To compare the sleep patterns of young males and females and to study the gender differences in various sleep parameters. **Methodology:** This is a cross sectional analytical online questionnaire-based study. 60 male and 60 female medical students were asked to answer the Pittsburgh Sleep Quality Index questionnaire {PSQI} and the responses were evaluated and scored. A statistical analysis was done using chi-square test. **Result:** Results showed that there was significant association of gender with sleep patterns. More number of females had poor sleep quality {13.3% vs males 6.6%}. Shorter sleep duration and day time sleepiness was more in females {56.6% vs 33.3% in males and 28.3% vs 8.33% in males respectively}. Poor sleep efficiency was more seen in females {21.6% vs 1.6% in males}, and lastly sleep disturbance was also more in females {13.3 vs 8.3 in males}. An overall PSQI score of good sleep quality {score <5} was scored by 68.3% of males compared to 50% of females. **Conclusion:** This study shows that female students have a higher prevalence of altered sleep patterns when compared with their male counterparts. Hence, further exploration of the biological mechanisms that underlie the gender differences in sleep patterns would open up new avenues in the gender specific management of sleep disorders.

KEYWORDS: PSQI – gender difference – sleep patterns – sleep quality.

INTRODUCTION

Sleep is a vital indicator of physical and mental wellbeing. Modern lifestyle takes a heavy toll on sleep hygiene, and it is more so for medical students.^[1] Although the extended study hours and hectic working schedule require a lot of sacrifice over sleep for all medical undergrads, sleep related disorders are found to be more common among female students. Gender differences may play a role in the generation of sleep patterns and also in sleep disorders. This study is aimed at observing the sleep quality of medical students while comparing the sleep patterns of the male and female students.

The association between sleep and affective disorders is also well established, and disturbed sleep is considered one of the main symptoms of clinical anxiety and depressive disorders.^[6] And it is to be noted that the high prevalence of affective disorders in females and other socioeconomic disparities have complicated the role of gender in sleep quality^[2], which makes this study even more relevant.

Aim: To compare the sleep patterns of young males and females and to study the gender differences in various sleep parameters.

MATERIALS AND METHODS

This is a cross sectional analytical online questionnaire-based study. 120 first year MBBS students (60 Males and 60 Females) studying in Madurai Medical College, Madurai, were enrolled in the study, which was conducted in September 2019. Boys and girls in the age group of 18 – 24 years were included in the study. Chronic insomniacs and those who were on any chronic drug intake, thyroid medicines or any previous oral contraceptive pill intake were excluded from the study.

Pittsburgh Sleep Quality Index questionnaire (PSQI) was given to all the subjects and responses were collected online. The PSQI yields seven components (i.e. subscale) scores: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, sleep medication, and daytime dysfunction. Component scores range from 0 to 3 and are summed to obtain a global score, which ranges from 0 to 21. Higher scores

suggest greater sleep disturbance; a global score more than 5 suggests a significant disturbance.

The components that we took for analysis in our study are sleep quality, sleep duration, sleep disturbance, sleep efficiency and daytime sleepiness. Statistical analyses was done using chi square test using SPSS software.

Subjective sleep quality was determined by asking how the sleep quality had been over the past month.^[3] Sleep duration was based on the usual number of hours of sleep per night and then categorized in four groups: sleep

duration > 7 hours (scored 0), 6-7 hours (scored 1), 5-6 hours (scored 2), and < 5 hours (scored 3). The sleep disturbance component was based on the reports for waking during the night, snoring, and restlessness in sleep. Daytime dysfunction was determined by asking questions about the ability to stay awake during the daytime and have enthusiasm for usual daytime activities. Sleep efficiency is the percentage of total time in bed spent in sleep. The scores of different components were summed to yield score (range of 0 to 15, where 0 indicates no difficulty and 15 indicated severe difficulty).^[3]

Analysis

Scoring the PSQI is done as follows

Table 1: PSQI scores.

Overall Score	0	1	2	3
Component 1 Subjective sleep quality	Very good	Fairly good	Fairly bad	Very bad
Component 2 Sleep duration	> 7 hours	6-7 hours	5-6 hours	<5 hours
Component 3 Sleep disturbance	Not during past month	Less than once a week	Once or twice a week	A very big problem
Component 4 Daytime dysfunction	No problem at all	Only a very slight problem	Somewhat of a problem	A very big problem
Component 5 Sleep efficiency	>85%	75-84%	65-74%	< 65%

RESULTS

Results were obtained using Pittsburgh Sleep Quality Index reports which is as follows:

Table 2: Comparison of sleep patterns percentage of male and female first year MBBS students.

VARIABLES	Males (n=60)	N in percentage	Females (n =60)	N in percentage	P value
1. Sleepquality					0.036001*
Very good, fair	56	93.3	52	86.6	
Fairly bad, bad	4	6.6	8	13.3	
	60		60		
2. Sleep Duration					0.009452*
>6hrs	40	66.6	26	43.3	
<6hrs	20	33.3	34	56.6	
	60		60		
3. Sleep Disturbance					0.229528
0,1 score	55	91.6	52	86.6	
2,3 score	5	8.3	8	13.3	
	60		60		
4. Day Time Dysfunction					0.000131*
No problem, slight problem	55	91.6	43	71.6	
Big problem	5	8.33	17	28.3	
	60		60		
5. Sleep Efficiency					0.000025*
0,1 Score	59	98.3	47	78.3	
2,3 Score	1	1.6	13	21.6	
	60		60		
6. Overall Score of PQSI					0.009658*
<5	41	68.30%	30	50%	
>5	19	31.60%	30	50%	
	60		60		

*Statistically significant at $p < 0.05$

The study shows significant association of gender difference with sleep patterns. Sleep quality is affected more in females {13.3% vs males 6.6%}, day time sleepiness is more in females {28.3% vs males 8.33%}, poor sleep efficiency was noted more in females {21.6% vs 1.6% in males}, sleep duration of <6hours was observed more in females{56.6% vs 33.3%in males}, sleep disturbance was also seen more in females{13.3 vs 8.3 in males}. An overall PSQI score of good sleep quality{score <5}was scored by 68.3% of males compared to 50% of females.

DISCUSSION

This study reveals that female students have a higher prevalence of altered sleep patterns when compared with their male counterparts, based on the PSQI scores. Various other studies on this topic showed that sex differences exist in sleep quality, duration, latency, and architecture in the general population.^[5] And they say discordance exists between subjective versus objective measures of sleep quality between men and women; women complain of poorer sleep quality and yet the quantitative analysis of their polysomnographic sleep does not support this claim. In addition, women have increased slow wave sleep (SWS) as compared with men at any given age, and SWS decreases with age in men but not in women.^[5] There are also sex differences in the prevalence of sleep disorders. Narcolepsy, RBD(rapid eye movement associated behavior disorder) and OSA are more common in men, while idiopathic hypersomnia has a more of female preponderance. Women are at twice the risk for RLS (restless leg syndrome) as compared with men. The risk of insomnia begins with the onset of menstruation and is associated with premenstrual syndrome.^[5] The prevalence of insomnia is increased from 33%–36% in premenopausal women to 44%–61% in postmenopausal women^[2] and insomnia is known to be associated with depression in females.^[6] Physical factors like overactive bladder (OAB) and pain—can also cause disrupted sleep in women. e.g fibromyalgia and has to be ruled out while investigating sleep disturbances.

The gender differences in sleep patterns and the resultant disorders enumerated above may be caused by the following mechanisms. 1. Sex hormones organize the sleep–wake patterns during early development by acting on the ventrolateral preoptic area, which is an established sleep promoting nucleus in the brain.^[4] Interestingly, the ventrolateral preoptic area in female rats, but not male rats, is sensitive to changes in sex hormones.

2. Another organized circuitry in the brain, called the orexin/hypocretin system, is modulated by gonadal hormones and is thought to have an important role in the regulation of sleep and arousal states. The hormonal modulation of the orexin/hypocretin system is greater in females than in male.^[6]

Normal sleep in women is impacted by hormonal effects^[2] during menses, pregnancy/lactation, perimenopause, menopause, and post menopause and often leads to sleep disturbances or sleep disorders during these periods.^[5] Among these, female participants of our study are likely to have had premenstrual disturbances as a major sleep disturbance, with symptoms such as cramps, bloating, and headaches disrupting sleep during the premenstrual week or during menses. Increases in estradiol and progesterone levels during the late luteal phase in women correlate with an increase in wakefulness.^[5]

3. Circadian rhythm is regulated by hypothalamus. Men's clocks tend to run a full 24-hour cycle or longer i.e. they may feel less tired in the evening. In women, the internal clock is more likely to be shorter than a full 24-hour cycle, making it more likely that they will awaken earlier, which may also increase their susceptibility to early-waking sleep disturbances like insomnia.^[6] Hormonal alterations may affect circadian regulation by inducing changes in 1) input pathways to the underlying circadian pacemaker, 2) the pacemaker itself or 3) output rhythms from the pacemaker.

Women were found to have a significantly higher melatonin amplitude and lower temperature amplitude than men. While sleep timing was the same between the 2 groups, the timing of the circadian rhythms of core body temperature and pineal melatonin secretion was earlier relative to sleep time in women as compared to men.

Lastly, in the management aspect also there are considerable differences in the way sleep disorders are treated in women when compared to men. Regular yogic practices have been beneficial in improving sleep quality in women. For premenstrual sleep disturbance, caused by serotonin deficiency, a short course of serotonin reuptake inhibitors (SSRIs) is administered during the late luteal phase of the menstrual cycle and has found to improve sleep.^[5] CBT (cognitive behavioral therapy) has also been effective in treating isolated premenstrual insomnia. Hormone replacement therapy (HRT) seems to alleviate some of the sleep disturbances and improve quality of life in postmenopausal women.^[5] Zolpidem, a benzodiazepine receptor agonist, is used for treating insomnia in women.^[5] It is administered at half the dose of what is given for men, as it takes a longer time to metabolize in women. Thus, understanding sex differences in sleep and sleep disorders will allow for better diagnosis, treatment, and eventually prevention of these disorders in women.

CONCLUSION

The high prevalence of sleep disruption in females as shown in this study has to be considered as a warning sign for the development of many sleep related problems in them. Lack of adequate sleep or the presence of sleep disorders can greatly impact a woman's daily life,

including her societal roles in the work force and as the primary caregiver in the family.^[5] Hence it cannot be overemphasized that further research in this field is needed to identify the exact biological mechanisms that underlie the gender differences in sleep patterns in order to improve the prevention and management of sleep related problems in both men and women.

Limitation

Small sample size and lack of correlation with polysomnographic findings are the major limitations of this study. Chronic sleep related problems were not included in the questionnaire.

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