

Early to Bed and Early to Rise: Impact of Sleep Patterns on Psychological Health and Concentration

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Abstract—Sleep is of vital importance and students often burn the midnight oil without realizing that with limited hours of sleep they limit their capacity to give their best to academics and general well-being. In today's fast paced life and everyday challenges the students struggle to get enough sleep so that their mind and body can recuperate and rejuvenate, this leaves them sleep deprived. This study aims to understand the relationship between quality and patterns of sleep and psychological health with a focus on 'concentration', 'productivity' and 'everyday challenges'. A sample of 93 female college students was taken for the study in order to get deeper insights with the help of tools like the Pittsburg Sleep Quality Index (PSQI) and General Health Questionnaire-12 (GHQ-12). Significant correlation was found between the quality and patterns of sleep and overall health as a whole as well as quality of sleep and concentration; quality of sleep and facing everyday challenges and actual hours of sleep and productivity. The results indicated that poor quality and pattern of sleep has a negative impact on health. Hence, to maintain a healthy life, quality sleep is important.

1. INTRODUCTION

Are you forgetting way too often, find it difficult to concentrate, feel tired all day long - all these are signs that must be attended to. It is all indicative of you being sleep deprived! Sleep is a vital necessity and not a luxury. In the daily hassles of life and the demands of the society, one is often pressed for time juggling between personal life, professional life and academic life. And sleep is compromised in order to meet the everyday demands and challenges that are thrown to us without realizing that one has not only compromised on one's sleep but one's ability to meet the challenges of life. Sleep helps the body to repair, relax and rejuvenate itself. It helps alleviating stress, improving memory and making one healthy and influences our well-being. Sleep plays a fundamental role in our lives. The pattern of sleep and wakefulness changes with age and various environmental and psycho-social factors [1]. The sleep wake cycle is a circadian rhythm which in the adult, is of about one day [2]. The circadian system (internal clock) helps to regulate sleep/wake cycles and hormonal secretions while the homeostatic sleep drive increases the need for sleep as the

period of wakefulness lengthens. The interaction of these two systems is described by the Two-Process Model of Sleep Regulation [3]. Sleep deprivation refers to a condition of lacking the necessary amount of sleep. It can negatively impact people's health not only physically, but also mentally and socially [4 - 5]. Unfortunately, this issue is often neglected due to the high expectations and enormous demands of today's society [6]. Typically, an adult needs seven to nine hours of sleep a night to be fully rested. Lack of sleep impairs one ability to think clearly and functions at an optimal level. Sleep deprivation can have many short term and long term physiological and psychological effects like decreased performance, lower levels of alertness, memory loss. For students the sleep is important for cognitive restitution. It influences information processing, learning and memory consolidation [7]. In other words, Sleep deprivation impacts many aspects of cognitive and behavioral functioning in adults. Sleep time reduction showed that even small changes of sleep length could lead to cognitive and non-cognitive deficits for the student[8].

Sleep is of vital importance and neglected by students today, resulting the students in being sleep- deprived. This may be due to the irregularity of their sleeping. 55% of young adults of ages 18-29 years wakeup "unrefreshed". 33% of young adults report daytime sleepiness which is similar to the twenty-nine percent of shift workers reporting daytime sleepiness [9]. Sleep is the body's way of rejuvenating itself. This process helps replenish the energy stores we have depleted throughout the day, as well as give our organs the opportunity to rest. Sleep relaxes us and helps with the overall health of the central nervous system. Lack of sleep can lead to deficiencies in concentration, reaction time and overall alertness. Looking at the importance of sleep and its impact, we undertook a study addressing the same and linking it with psychological health in the adolescents of today.

2. RATIONALE

To understand the sleep patterns and its impact on psychological health among the college students today.

The research questions were as following:

1. To investigate the relationship between sleep quality and patterns and psychological health
2. To investigate if there is a significant difference between quality and patterns of sleep and psychological health
3. To investigate relationship between quality of sleep and concentration
4. To investigate relationship between hours of actual sleep and productivity
5. To investigate relationship between quality and pattern of sleep and solving everyday challenge

3. METHOD

3.1. Sample

The sample consisted of 93 female college students of Daulat Ram College, aged between 17-21 years, from the middle socio-economic status/background. Convenient sampling method was used to select the participants for the study.

3.2. Tools

In order to assess the sleep quality and pattern and the psychological health of the participants the following tools were utilized:

1. Pittsburg Sleep Quality Index (Buysse, Reynolds, Monk, Berman, & Kupfer, 1988)

A self-administered measure of the quality and patterns of sleep in the older adult. It differentiates “poor” from “good” sleep by measuring seven domains: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction over the last month. Scoring of the answers is based on a 0 to 3 scale, whereby 3 reflects the negative extreme on the Likert scale. A global sum of “5” or greater indicates a “poor” sleeper. The PSQI has internal consistency and a reliability coefficient (Cronbach’s alpha) of 0.83 for its seven components. Numerous studies using the PSQI in a variety of older adult populations internationally have supported high validity and reliability.

2. General Health Questionnaire (GHQ) – 12 (Goldberg,1970)

It is a self-report measure of psychological distress. It can be self-administered and is widely used with the student population. It has been translated in more than 40 languages. There are four versions of the test with 12, 28, 30 and 60 questions. It is considered valid for use on adults and

adolescents. Reliability coefficients have ranged from 0.78 to 0.95 in various studies.

4. RESULTS AND ANALYSIS

Data was analyzed using descriptive and inferential statistics. A significant correlation was observed between quality of sleep and psychological health.

Table 4.1

	Quality and patterns of sleep (PSQI)
Psychological Health (GHQ-12)	0.463**

** Correlation is significant at the 0.01 level (2-tailed)

4.1.2 Does sleep quality and pattern have an impact on our overall psychological health?

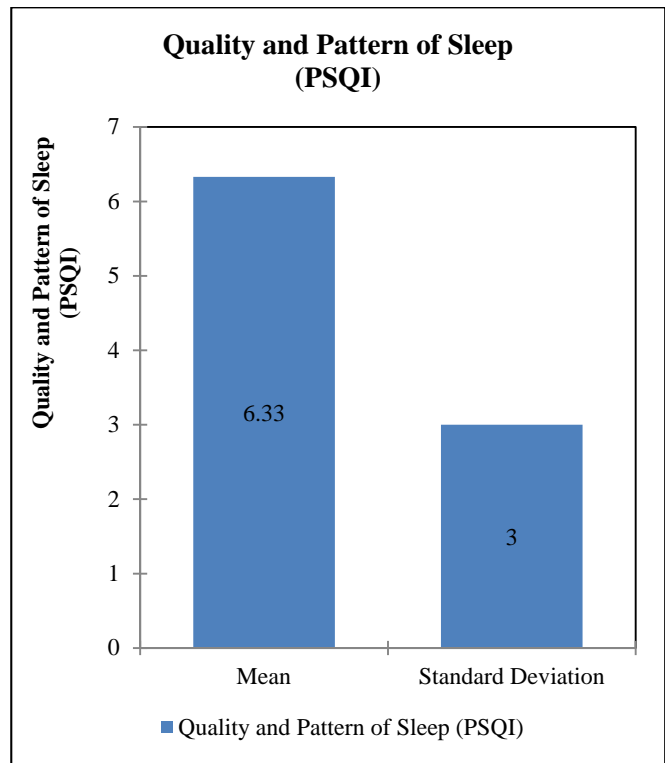


Fig. 4.1.3

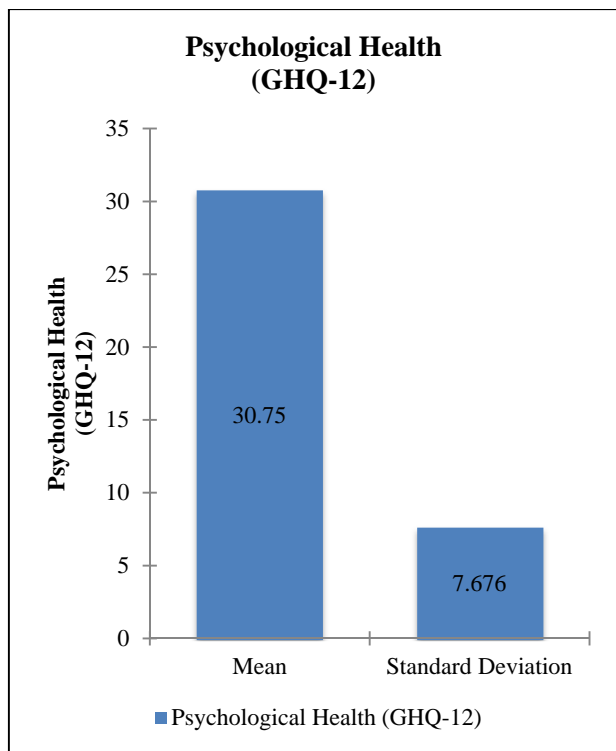


Fig. 4.1.2 and 4.1.3 reveal a lower quality of sleep and lower psychological health of the students, as higher values indicate poor sleep and health.

4.2. To investigate if there is a significant difference between quality and patterns of sleep and health

Table 4.2.1 ANOVA of three groups based on health scores

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	983.172	2	491.586	9.969	.01
Within Groups	4438.140	90	49.313		
Total	5421.312	92			

Table 4.2.2 Posthoc analysis between the three groups

Quartile	N	Subset for alpha = 0.01	
		1	2
Below P25	27	27.48	
Average	43	29.93	
Above P75	23		36.13

Note: Higher score reflects poor quality sleep

Sample was divided into three group based on quartile divisions of P25, P50 and P75 and ANOVA was calculated which was found to be significant and was followed by post hoc analysis (Table 4.2.1 and 4.2.2). Results indicated no

difference between the good and average sleepers but obtained a difference for very poor sleepers.

4.3. Is there a relationship between quality of sleep and concentration?

Table 4.3.1

	Been able to concentrate on what you're doing? (1-5)	During the past month, how would you rate your sleep quality? (0-3)
Mean	2.72	0.97
Standard Deviation	1.087	0.744

The next few tables (Table 4.3.1 to Table 4.5.2) shows the descriptive values of the sample and relationship between quality of sleep with level of concentration, productivity, and, solving everyday challenges. Results indicate a positive relationship between quality of sleep and specific psychological health aspects. Hence lowered quality of sleep is closely related to psychological health.

Table 4.3.2

	Been able to concentrate on what you're doing?
During the past month, how would you rate your sleep quality?	0.258*

* Correlation is significant at the 0.05 level (2-tailed)

4.4 Is there a relationship between hours of actual sleep and productivity?

Table 4.4.1

	Felt that you are playing a useful part in things? (1-5)	Hours of actual sleep
Mean	2.89	6.7
Standard Deviation	1.088	1.9

4.5. Is there a relationship between quality of sleep and solving everyday challenges?

Table 4.5.1

	Been able to face up to your problems? (1-5)	During the past month, how would you rate your sleep quality? (0-3)
Mean	2.56	0.97
Standard Deviation	1.156	0.744

Table 4.5.2

	Been able to face up to your problems?
During the past month, how would you rate your sleep quality?	0.312**

** Correlation is significant at the 0.01 level (2-tailed)

5. DISCUSSION

The aim of the present study was to understand the impact of sleep patterns on psychological health. Psychological health was assessed in terms of concentration, productivity and ability to face everyday challenges. College students are sleep-deprived due to a number of challenges that they face every day. They compromise on sleep to complete assignments, prepare projects without realizing that it would hamper their psychological, physiological and emotional abilities.

5.1. Does sleep quality and pattern have an impact on our overall psychological health?

Referring to the results section, Fig. 4.1.1, it can be noted that the mean for the sample on PSQI is 6.33, which is higher than 5, indicative of poor quality and pattern of sleep. Next, looking at the Fig. 4.1.2, it can be noted that the mean is 30.75, on the higher side of the continuum, also indicative of the poor psychological health.

The correlation between quality and pattern of sleep and psychological health, was obtained to be 0.463, which was significant at 0.01 level. Thus, indicating that poor quality and pattern of sleep is related to poor psychological health. It further reflects the importance of sleep in the lives of the students. Good quality sleep helps the students avoid psychological health issues like, anxiety. This is supported by the studies that showed Sleep deprivation results in sleepiness and impaired neurocognitive and psychomotor performance [10]. Hence deprivation of sleep influence the development of cognition, language, attention and neurological functioning remains poorly understood [11].

5.2. To investigate if there is a significant difference between quality and patterns of sleep and health

Referring to table 4.2.1, in the result section, it can be noted that there was a significant effect of quality and pattern of sleep on psychological health at $p < 0.01$ level [$F(2, 90) = 9.969, p = .01$]. The post-hoc analysis further helped us understand what contributed to the difference. As we look at, table 4.2.2, we can note that, there is difference between the two sleep groups: good quality of sleep and poor quality of sleep group and average quality of sleep and poor quality of sleep group.

Little difference was noted between good quality of sleep and average quality of sleep group.

This means that if one sleeps well or moderately well, it does not have that great an impact on the psychological health but if the sleep pattern is irregular and disturbed it has a considerable effect on psychological health. Altered sleep patterns lead to a marked increase in sleepiness that usually facilitates cognitive, emotional, behavioural and academic failure [12]. This further reiterates that the students get quality sleep as that is the ‘real’ key to their success.

5.3. Is there a relationship between quality of sleep and concentration?

Referring to the table 4.3.1, it can be seen that the mean is 2.72 and 0.97 on ‘Been able to concentrate on what you’re doing?’ and ‘During the past month, how would you rate your sleep quality?’ respectively. So, looking at the table 4.3.2, the correlation was obtained to be 0.258, significant at 0.05 level. So this indicates that how essential quality sleep is in order to enhance concentration level. And concentration is something that is valuable in the student’s life be it attending classes attentively, writing assignments or making important decisions in personal life.

Irregular sleep patterns negatively impact learning, memory, and performance. The dual process theory maintains that certain types of memory are dependent on specific sleep states, such that procedural memory (knowing how) may be dependent on REM (rapid eye movement) sleep and declarative memory (knowing what) on NREM (non-REM) sleep. The sequential processing theory suggests that memories require an orderly succession of sleep stages, i.e., memory formation may be prompted by slow-wave sleep and consolidated by REM sleep [13].

5.4. Is there a relationship between hours of actual sleep and productivity?

Referring to the table 4.4.1, it can be seen that the mean is 2.89 and 6.7 on ‘Felt that you are playing a useful part in things?’ and ‘hours of actual sleep’ respectively. Looking at the table 4.4.2, the correlation was obtained to be 0.334, significant at 0.01 level. So this indicates that greater number of hours slept is related to higher level of contribution to work. So, adequate amount of sleep is related to productivity. Looking at the mean of 6.7 hours it is less than a standard of 8-9 hours that is required as noted in studies. According to the National Sleep Foundation (NSF, 2006), a minimum of 9 hours of sleep per night is vital for the physical and mental development of adolescents. To remain healthy, one must go to bed at regular hours because the good which sleep does depends upon keeping up a regular rhythm of sleep and wakefulness. Correlations between sleep patterns and academic performance have been reported in studies; it was also found that the difference between weekday and weekend nighttime sleeping hours, timing of sleep and the difference between weekday and weekend bedtimes to be directly correlated with general performance achievement [14].

5.5 Is there a relationship between quality of sleep and solving everyday challenges?

Referring to the table 4.5.1, it can be seen that the mean is 2.56 and 0.97 on ‘Been able to face up to your problems?’ and ‘During the past month, how would you rate your sleep quality?’ respectively. Looking at the table 4.5.2, the correlation was obtained to be 0.312, significant at 0.01 level. It indicates that better quality of sleep is related to better ability to face challenges. So quality sleep equips the students to face the challenges of life be it academic, social or personal.

6. CONCLUSION

Quality sleep is necessary as it has consequences in every aspect of life. Students are pressed for time and due to their academic pressures and challenges, they compromise on their sleep without realizing that they are also compromising with their abilities to work at an optimal level. Given the importance of the issue, the present study attempted to understand the relation between quality and pattern of sleep and psychological health. The results obtained also highlighted role of sleep and its impact. Researchers have also investigated the relationship between sleep deprivation, task performance and individual productivity [15-16]. One study showed that sleep-deprived students performed worse on attention, memory, and problem-solving tasks and this adversely affected their academic performance [17]. These studies, highlighted the relationship between sleep and performance, productivity as indicated in the results in this case. So its sleep that needs to be taken seriously as a good quality sleep will ensure a good morning!

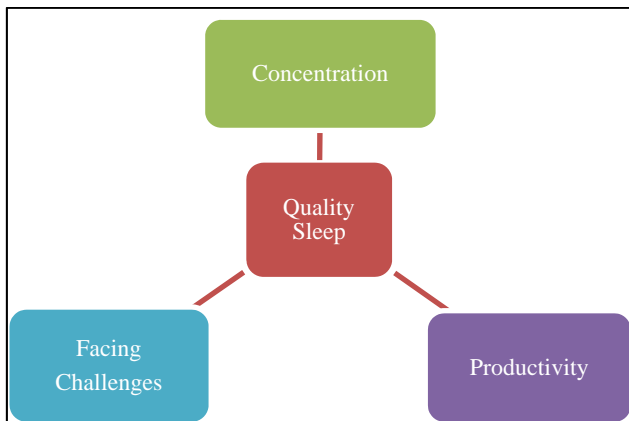


Fig. 6.1.: Impact of quality sleep on concentration, facing challenges and productivity.

7. LIMITATIONS OF THE STUDY AND SUGGESTIONS FOR FUTURE RESEARCH

In the present study the focus was on the sleep patterns and psychological health of college students. But, in the future the study can be extended, by adding in participants from different age levels, both males and females and people from different

socio-economic classes can be taken for a more holistic approach to the study. Also, physiological aspects like BMI, body age can be taken up as variables in relation with sleeping pattern. As, sleep is of vital importance, the linkages can also be studied with respect to stress, resilience, job performance and other factors that are of significance in the lives of people today. We can also identify the reasons for sleep disturbances, identify ways used to overcome it and its role in enhancing performance at various level. Thus, quality sleep makes ground for a happy and healthy life!

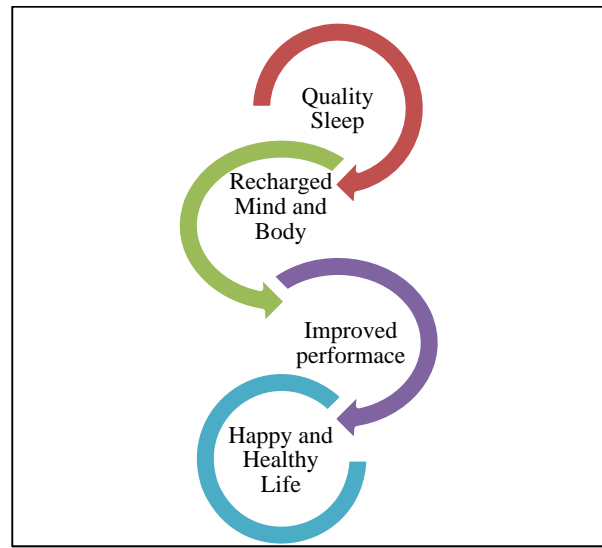


Fig. 6.2.: Model depicting quality of sleep and cycle of healthy life

8. ACKNOWLEDGEMENTS

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