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Sleep Quality and Job Performance in Working Individuals

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Abstract: ***In today's technologically advanced world, everyone is striving for achievement in the workplace; especially the young adult population. As the organization's work requirements are increasing, the workload on the employees is also increasing. New research from the Brigham and Women's Hospital offers insights into how our poor sleep habits may be influencing our performance at work. India has a vast BPO sector and a majority of the young adult working population do graveyard and off-schedule shifts, to meet the ends in this inflation. Also with the globalization, many working personnel work on the day-time working schedules of other countries in order to achieve their set targets. The current study aimed to see the effect of quality of sleep on job performance in young adult working individuals. The study hypothesized a significant relationship between the two. It also aimed at identifying if gender had an effect on job performance. The study reported a significant correlation between sleep quality and job performance. However, no significant correlation was seen between gender and job performance. The busy off-schedule lifestyle disrupts certain patterns and seems to have physical, psychological, emotional, behavioral, and social effects on working individuals. Many young adults are also suffering from early heart attacks, depression, and severe mental stress. . Changing to a better lifestyle and keeping a track of one's sleep patterns and physical, psychological, and behavioral changes can aid an individual to lead a better life.***

Keywords: sleep –quality, work performance, depression, mental stress, working individuals

I. INRODUCTION

Sleep is a critical determinant of health and well-being, the way nutrition and physical activity are. Sleep is a minimal requirement for an infant, child, or adolescent's health and development. Lack of good sleep and untreated sleep disorders influence the basic behavior patterns that affect personal and interpersonal relationships and lead to poor health. Lack of proper sleep and fatigue can reduce the productivity of an individual. It could also increase the chances for mishaps such as medical errors in hospital setups and motor vehicle accidents or industrial or organizational accidents. (Centers for Disease Control and Prevention, 2008)

Sleep plays a vital role to help fight off infections and supports the metabolism of sugar to prevent diabetes. With proper sleep an individual can perform well both in school and at work ,Sleep also aids in working effectively and safely ,Sleep helps in focusing Sleep helps to maintain calm, reduces irritability ,It increases concentration levels .

If no attention is paid to the effectiveness of sleep, the sleep disorders and chronic short sleep are associated with an increased risk of Heart disease, High blood pressure, Obesity, Diabetes All-cause morality good sleep quality is associated with a wide range of positive outcomes such as better health, less daytime sleepiness, greater well-being and better psychological functioning (Harvey et.al.2008). Quality sleep is powerfully restorative and helps an individual to concentrate and focus better on various aspects.

II. SLEEP QUALITY AND JOB PERFORMANCE

People with demanding jobs are struggling hard to maintain a balance between their family lives and their corporate work environments. With long working hours and family expectations, they have reduced their sleep timings to fit in the bare minimum timings that they can afford after a stressful and long day. Julia Kirby (2001) at the Harvard Review points that dysfunctional sleep culture has alarming consequences; moderate fatigue (caused due to improper sleep) has a huge impact on performance, just like alcohol impairment. With the increase in the number of smartphones, people spend more time with their phones than with anything else. The emails and the messages are the last things they see when they are about to sleep and the first thing they see when they wake up. Researches show that these things make the brain very active and the brain is not enough relaxed to end up in sleep mode.

Evidently, sleep deprivation leads to serious problems in both personal and professional life.To illustrate further, sleep loss is also considered a primary or secondary cause of industrial and motor vehicle accidents. It also has been observed as a reason for unscheduled absenteeism.

Work and relationship problems, both at personal and professional levels can increase stress levels, leading to sleep problems. Thus stress and sleep deprivation fall prey to a vicious circle, one leading to another.

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III. REVIEW OF RELATED LITERATURE

During the last decade, the times have greatly changed. On one hand, we have witnessed many new technologies, new culture, latest developments, the opening of many corporates and industries, and also on the second hand, we have seen an increase in the array of diseases like sleep disorders, cardiac diseases, lifestyle disorders and so on. With more and more women being a part of the workforce, the gender differences affecting job performance have also been researched. Most of the researches indicates gender does not affect work performance. However, various researches have been done to see the effect of poor quality of sleep on the work performance of an individual.

Lawrence (2014) in her article in 'The Times of India' quotes that Snoring is one of the major causes of disturbed sleep in an individual. It hinders both the quality and quantity of sleep. The bariatric surgeon, Dr. Manish Motwani adds, "Snorers are normally not aware of the fact that they are snoring and most of the time they rely on the observations of their bed partners." He also highlighted the fact that obesity is the main cause of snoring. According to research done by Lia Steakley (2012), 30 percent of employed U.S. adults get less sleep than the recommended seven to nine hours of sleep a day, according to the data collected from the Centers for Disease Control and Prevention. The main causes are the organization's work requirements and workload on the employees. An article cited in Times of India (2013) 'Sleep disturbances linked to poor quality life' indicates that after the control group was set for age, sex, diabetes, and hypertension; sleep quality and sleepiness during the day, was significantly correlated with behavioral issues and poor quality of life. Julia Kirby (2001) at the Harvard Review points that dysfunctional sleep culture has alarming consequences; moderate fatigue (caused due to improper sleep) has a huge impact on performance, just like alcohol impairment.

A. Method

1) *Aim:* The present research aims to study the sleep quality and its relationship with job performance in working individuals

2) *Objectives*

a) To study how good quality sleep can enhance job performance in working individuals

b) To find the relationship between poor quality sleep and job performance in working individuals

c) To find the relationship between job performance and gender.

d) To evaluate the relationship between sleep quality and job performance

e) To find means to enhance better quality sleep amongst the young working adult population

B. Hypotheses

1) Good quality of sleep will be significantly related to the job performance of working individuals.

2) Poor quality of sleep will have a negative relationship with the job performance of working individuals.

3) Job performance will have a significant relationship with the gender in working individuals.

a) *Locale:* The present study was conducted in cooperate firms in Gurgaon and Noida

b) *Sample/Participants:* There were 50 working male and 50 working female personnel within the age group of 25-40 years. All these people were working in corporate units and headed managerial level posts.

C. Tools/Instrumentation

Brief Introduction About Tools And Scoring

1) *Pittsburgh Sleep Quality Index:* Pittsburgh Sleep quality index is an assessment tool that was developed by Dr. Buysse in the year 1989. The statements are framed in simple English language but the test has been translated into 56 different languages. It measures sleep disturbance and usual sleep habits for a period of the prior month only. There are a total of 10 items with question numbers 5 and 10, which are subdivided into various parts, making it a total of 19 items. It observes seven clinically derived domains of sleep difficulties. These domains are as follows: Sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbances, use of sleep medications, and daytime dysfunction. The scaling of the items is on a 0-3 Likert scale with 0 being better sleep quality and 3 meaning poor sleep quality. The test-retest reliability exists with a correlation coefficient of 0.85. The Cronbach's Alpha internal consistency is 0.83. The test is self-administered and a score >5 has a diagnostic sensitivity of 89% associated with poor sleep quality and the scores 5 are associated with good sleep quality.

2) *Performance Rating Scale:* This scale was developed and standardized by Pestonjee and Singh in the year 1978. This scale consists of 14 criteria statements in simple Hindi and English languages. Each statement has five response alternatives which are very poor, poor, average, well, and very well covering 1 to 5 ranks respectively. The supervisors or the seniors are required

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to rate how well a particular individual was doing his job. The reliability of the performance rating scale was determined by computing the Cronbach's (1951) alpha coefficient and it was found to be 0.99. The reliability was also determined by the split-half method and it was found to be 0.92 indicating satisfactory levels of reliability. The performance score is determined by the arithmetic summation of the scores endorsed to all the fourteen statements. Thus the individual performance will range from 14 to 70. The lower scores indicate a lower level of performance and vice versa.

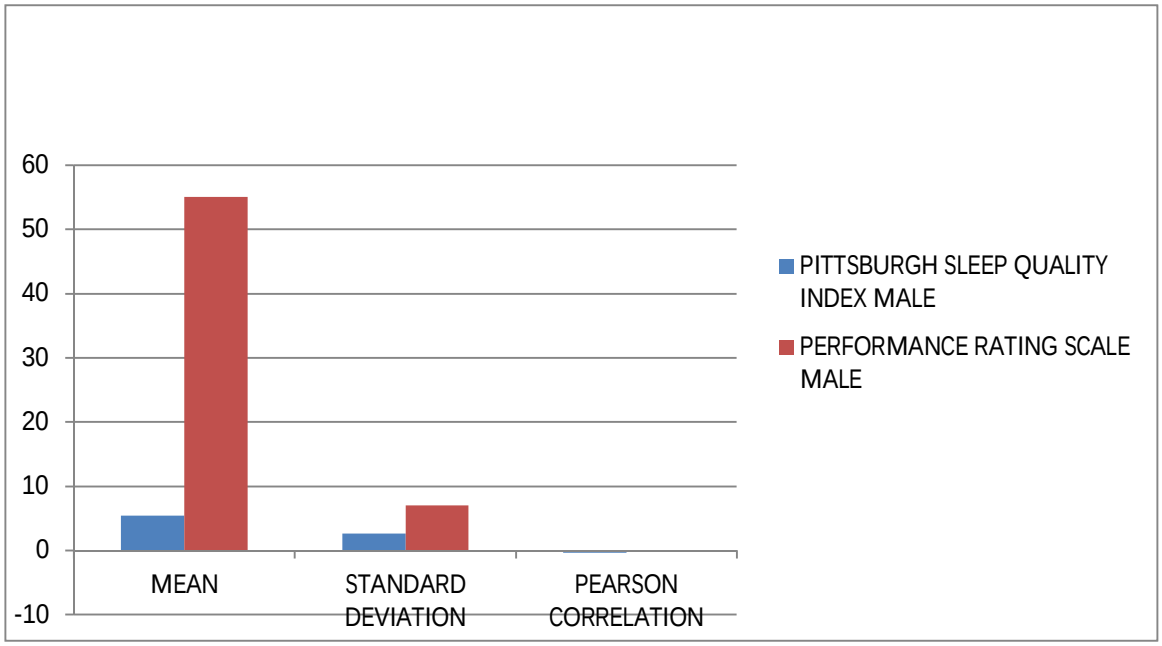
IV. RESULTS

Table 1 Shows The Mean, Standard Deviation, And Correlation Between Sleep Quality Index And Performance Rating Scale Of 50 Working Male Between Sleep Quality Index And Performance Rating Scale Of 50 Working Males

	PITTSBURGH SLEEP QUALITY INDEX MALE	PERFORMANCE RATING SCALE MALE	CORRELATION
SUM	272	2756	
MEAN	5.44	55.12	
STANDARD DEVIATION	2.673834	7.064253	
PEARSON CORRELATION			-0.36696 (significant at .01 level)

The mean for the Pittsburgh Sleep Quality Index for males was calculated to be 5.44 and the standard deviation was 2.67. Similarly, the mean of the Performance Rating Scale for the males is found to be 55.12 and a Standard deviation of 7.06 is observed. The Pearson Product Moment correlation is found to be -0.366 indicating that Pittsburgh Sleep Quality Index and Job performance are negatively correlated and it is significant at 0.01 levels.

BAR CHART 1 Shows The Mean, Standard Deviation, And Correlation Between Sleep Quality Index And Performance Rating Scale Of 50 Working Males



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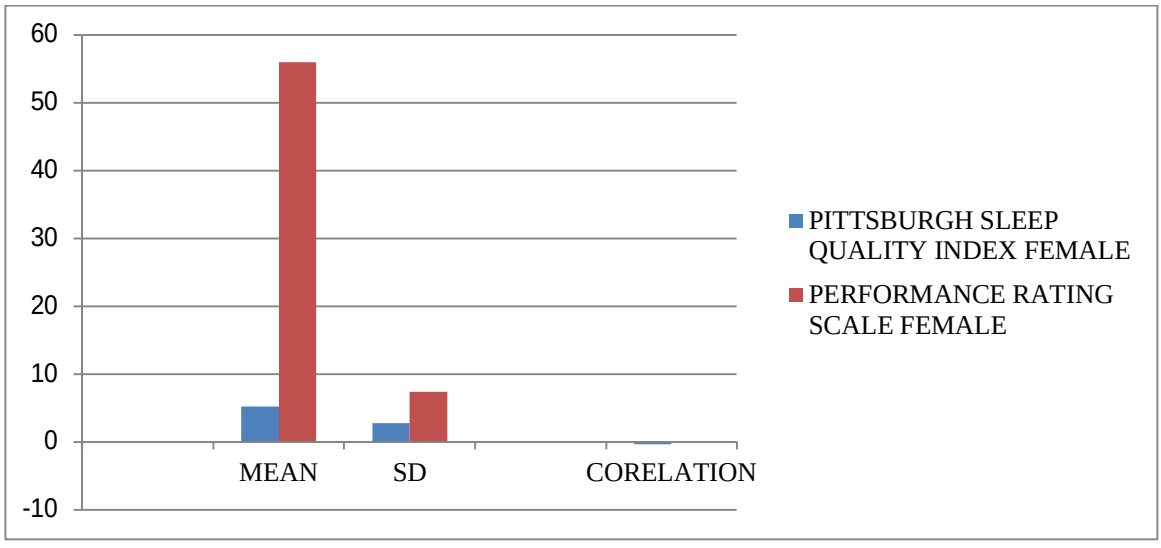
Bar chart 1 shows the mean for the Pittsburgh Sleep Quality Index for males was calculated to be 5.44 and the standard deviation was 2.67. Similarly, the mean of PERFORMANCE RATING SCALE for the males is found to be 55.12 and a Standard deviation of 7.06 is observed. The Pearson Product Moment correlation is found to be -0.366 indicating that the lower the mean and standard deviation of the Pittsburgh Sleep Quality Index of the sample male personnel, the better will be the sleep quality and the higher is the job performance.

TABLE 2 Shows The Sum, Mean, Standard Deviation, And Pearson Correlation Coefficient Between Sleep Quality Index And Performance Rating Scale Of 50 Working Females

	PITTSBURGH SLEEP QUALITY INDEX FEMALE	PERFORMANCE RATING SCALE FEMALE	CORRELATION
SUM	262	2798	
MEAN	5.24	55.96	
STANDARD DEVIATION	2.788899	7.411959	
PEARSON CORRELATION			-0.33026 (significant at .01 level)

The mean for the Pittsburgh Sleep Quality Index for females was calculated to be 5.24 and the standard deviation was 2.79. Similarly, the mean of the Performance Rating Scale for the females is found to be 55.96 and a Standard deviation of 7.41 is observed. The Pearson Product Moment correlation is found to be -0.33 indicating that Pittsburgh Sleep Quality Index and Job performance are negatively correlated and it is significant at 0.01 levels.

BAR CHART 2 Shows The Mean, Standard Deviation, And Pearson Correlation Coefficient Between Sleep Quality Index And Performance Rating Scale Of 50 Working Females



Bar chart 2 depicts the results from Table 2. The mean for the Pittsburgh Sleep Quality Index for females was calculated to be 5.24 and the standard deviation was 2.79. Similarly, the mean of the Performance Rating Scale for the females is found to be 55.96 and a Standard deviation of 7.41 is observed. The Pearson Product Moment correlation is found to be -0.33 indicating that Pittsburgh Sleep Quality Index and Job performance are negatively correlated and it is significant at 0.01 levels. The chart indicates that the lower the mean and standard deviation of the Pittsburgh Sleep Quality Index of the sample female personnel, the higher is the job performance. The lower the mean and standard deviation of the Pittsburgh Sleep Quality Index of the sample female personnel, the better will be the sleep quality and the higher is the job performance.

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TABLE 3 Depicts The Effect Of Gender On Job Performance On Working Individuals

	PERFORMANCE RATING SCALE MALE	PERFORMANCE RATING SCALE FEMALE
MEAN	55.12	55.96
STANDARD DEVIATION	7.06425	7.41196
CORELATION	-0.36696	-0.33026

Table 3 indicates the difference in the performance (i.e. mean (0.84), standard deviation (0.35), and Pearson correlation (-0.33)) is the bare minimum, both male and female personnel perform equally well irrespective of the circumstances. Gender differences have minuscule or no effect on the work performance of an individual.

V. DISCUSSION

The research study is conducted to see the effect of the poor quality of sleep on job performance and also to see whether gender difference plays a role in job performance. India has a vast BPO sector and the majority of the young adult working population do graveyard shifts, to meet the ends in this inflation. Also with the globalization, many working personnel work on the day-time working schedules of other countries to achieve their set targets. Many multinational companies have made their hub in Gurgaon and Noida, two of the most developing places, industry-wise, near Delhi or NCR. The companies offer high packages to the employees and to meet the exorbitant demands, people are also willing to put their health and relationships at stake. This off-schedule seems to have a physical, psychological, and social effect on working individuals. Many young adults are suffering from early heart attacks, depression, and severe mental stress. Clearly, money is not everything that keeps these people hale and hearty.

A trade association, Assocham, conducted a survey and quoted in Times of India (2012). The organization substantiates the hypothesis stated earlier, by the research on long working hours and high levels of stress. Both cause sleep loss among employees which in turn affects their performance at the workplace. The survey was conducted on people working in corporate sectors in major cities, including Mumbai, Kolkata, Delhi, Hyderabad, and Chennai and findings indicated that 78 percent of employees working in corporate sectors suffer from sleep disorders.

Other factors are responsible for good health and the ability to perform well. Instead of those factors, the effects of poor sleep quality on the Subjective Well-Being of an individual cannot be ignored. Performing better at work is just a part of it. Poor sleep affects the individual on all five fronts – Physical (causing fatigue, body ache, low stamina, increased chances of heart attacks, etc.), Mental (causing stress, anxiety, reduced logical reasoning), Social (interpersonal relationships at the workplace are hampered, a person may lose touch with friends, etc. because of behavioral issues), Emotional (leads to depression, sadness, feeling of dissatisfaction), Behavioral(anger, irritability, frustration). Thus if lack of proper sleep affects an individual on all five fronts, needless to say, the importance of good quality sleep leads to their betterment. An article (2013, Dec5) Times of India 'Sleep disturbances linked to poor quality life' cited that after the control group was set for age, sex, diabetes, and hypertension, sleep quality and sleepiness during the day, was significantly correlated with behavioral issues and poor quality of life.

The subjects investigated are 50 young adult males and 50 young adult females making a sample of a total of 100. The individuals chosen are young adults who are in managerial posts incorporates. The tools used for assessment are the Pittsburgh Sleep Quality Index to assess the quality of sleep. The scores for the Pittsburgh Sleep Quality Index range from 0to 3, with 0 being the lowest index indicating better sleep quality and 3 being the highest Pittsburgh Sleep Quality Index, indicating poor sleep quality. The second tool used to assess job performance is the Performance Rating Scale. The performance criteria have 14 statements which have five response alternatives which are as very poor, poor, average, well, and very well covering 1 to 5 ranks respectively. The supervisors or the seniors are required to rate how well a particular individual was doing his job. The performance scores of the individuals range from 14 to 70, with 14 being the lowest score and 70 being the highest score.

Table 1 and Bar chart 1 show the mean, standard deviation, and Pearson correlation coefficient between sleep quality index and performance rating scale of 50 working males. The mean for the Pittsburgh Sleep Quality Index for males was calculated to be 5.44 and the standard deviation was 2.67. Similarly, the mean of the Performance Rating Scale for the males is found to be 55.12 and a Standard deviation of 7.06 is observed. The Pearson Product Moment correlation is found to be -0.366 indicating that Pittsburgh Sleep Quality Index and Job performance are negatively correlated and it is significant at 0.01 levels.

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The lower value of the index, the better will be the sleep quality, and hence better will be the job performance. Another research conducted by Nebes, et al (2009) using the Pittsburgh Sleep Quality Index tool indicated that poor sleep quality, duration of sleep, and sleep medication use were associated with diminished attention and executive functions even after control groups for other factors were set. These results added to the validity of the Pittsburgh Sleep Quality Index and provided evidence for the cognitive distortions related to insufficient sleep even in healthy young adults.

Similarly, Table 2 and bar chart 2 shows the mean, standard deviation, and Pearson Correlation coefficient between sleep quality index and performance rating scale of 50 working females. The mean for the Pittsburgh Sleep Quality Index for females was calculated to be 5.24 and the standard deviation was 2.79. Similarly, the mean of the Performance Rating Scale for the females is found to be 55.96 and a Standard deviation of 7.41 is observed. The Pearson Product Moment correlation is found to be -0.33 indicating that Pittsburgh Sleep Quality Index and Job performance are negatively correlated and it is significant at 0.01 levels. The results have been validated by other researchers in the year 2012, Benitez and Gunstad, indicated that a sufficient amount of sleep is very important for the optimum functioning of cognitive and psychological skills. Poor quality of sleep has a relationship with depression and anxiety. The results indicated that even the small cognitive dysfunction was related to an inadequate amount of sleep.

The sleep quality these days are affected by many factors like excessive use of technology, a lot of work or family-related stress, and trying to maintain the balance between personal and professional life. Other factors include lack of time to sleep and the lifestyle that people follow. Even alcohol usage by individuals has alarming effects and one of the effects is poor sleep quality. The ability to perform well in a particular job depends a lot on the cognitive functioning of an individual. As stated above, lack of proper sleep may result in cognitive inability and reduced fine and gross motor abilities. Therefore, a higher Pittsburgh Sleep Quality Index score indicates poor quality sleep and hence poor performance.

The findings done are substantiated by a research study performed by Kruger in the year 2007, stating that many factors affect the performance of an individual. Some of the physical and psychological stressors affecting them are associated with fatigue, sleep loss, and sustained work. This in turn affects job performance. The researcher examines deterioration in the performance as a result of fatigue, mainly during one or more nights of complete sleep loss or longer periods of deprived, reduced, or disturbed sleep. Sleep loss has an adverse effect and even results in reduced fine motor and gross motor responses of an individual. The reaction time of the individual, his/her vigilance, perceptions, and cognitive abilities are affected. Sleep deprivation and extensive workload interact with circadian rhythms in produce long-lasting effects. . Hence as evident from the researches, poor sleep schedules not only have an adverse effect but lasting damages on the performance of an individual which become nonrecoverable gradually.

Table 3 indicates the effect of gender on job performance. As bar chart 3 indicates the difference in the performance (i.e. mean (0.84), standard deviation (0.35), and Pearson correlation (-0.33)) is a bare minimum, both male and female personnel perform equally well irrespective of the circumstances. Gender differences have minuscule or no effect on the performance of an individual. This indicates that levels of accuracy and other factors like motivation, ability, and will to perform a task in both male and female personnel are equal. Gender is insignificant when it comes to the execution of the task. It is the determination and commitment of the person that motivates people to perform their job well. This hypothesis is supported by the research study performed by Gneezy et.al (2003). The study indicates that in competitive environments, males and females perform equally and no statistically significant difference is observed in either of the gender performances.

Thus, from tables 1, 2, and 3, it is inferred that the low Pittsburgh sleep quality index indicates better sleep quality which in turn is positively correlated with job performance. Better the sleep quality better will be the job performance of the individual and vice versa and gender difference doesn't affect the performance of an individual.

VI. CONCLUSION

The present research aimed to study sleep quality and its relationship with job performance in working individuals. Good quality sleep can enhance job performance in individuals. Poor quality sleep harms job performance in individuals, irrespective of gender. Sleep quality and job performance are positively correlated. Bad sleep may lead to many problems in the population, especially in young adults. These problems may be both psychological like stress, anxiety, restlessness, etc., and physiological problems like heart attack, body aches, low stamina, etc. Loss of sleep affects attention, executive function and mood, working memory, quantitative and qualitative skills, logical reasoning, and even motor dexterity. The social relationships of the people also get affected because of lack of sleep. Scientists have observed behavioral changes in individuals with low sleep quality. Some of these changes include irritability, anger, frustration, mood swings, etc. Keeping this in mind, we see that all these factors lead to poor performance at work.

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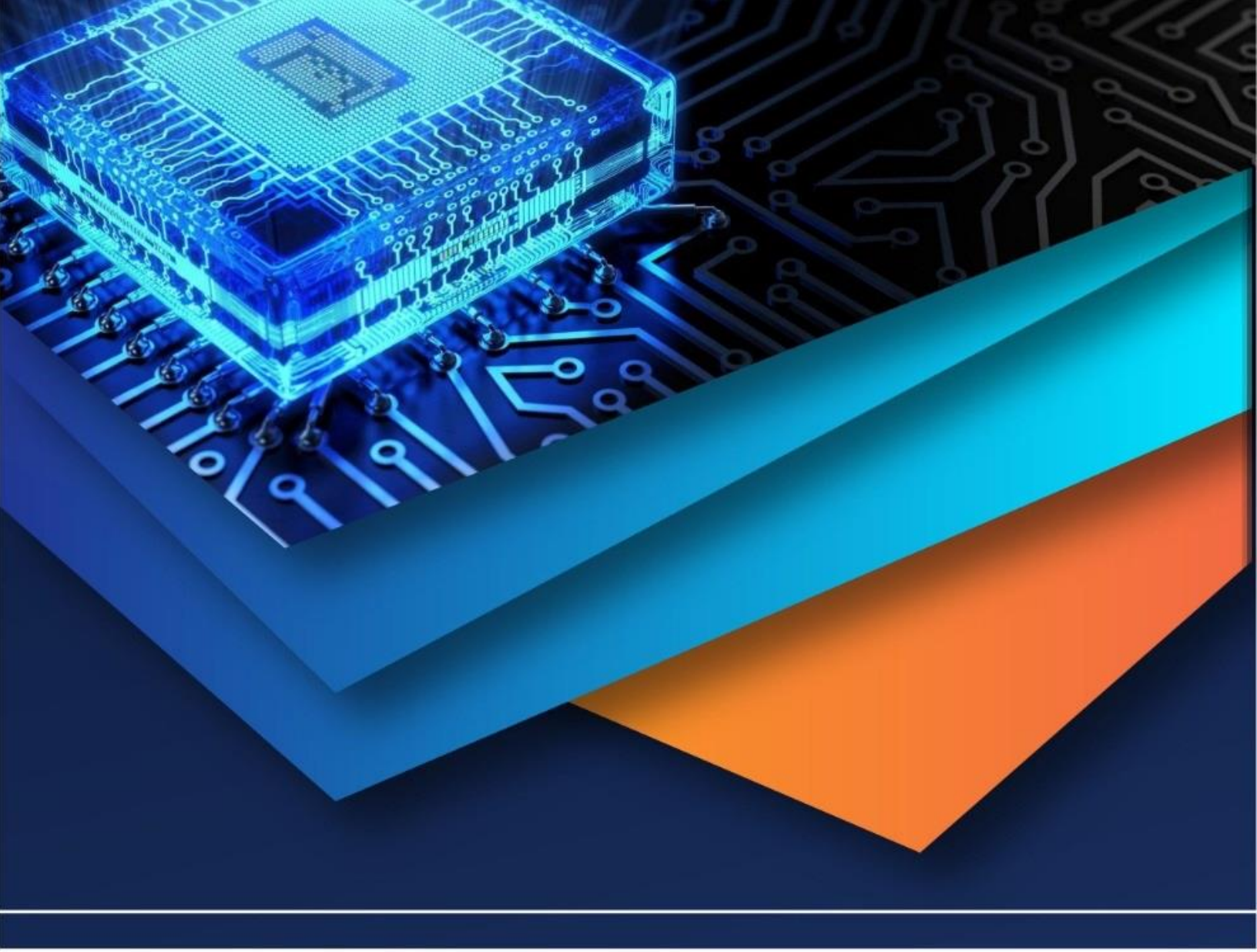
To avoid that, certain Recommendations are given, to help the person get a grip of their sleep patterns and hence their life.

A. Introspect and be aware of any adverse physical or psychological changes in the body. Assess the cause of the underlying problem and try and eliminate it. A stress-free mind leads to better sleep
B. Seeking help and support from family and friends can help in bond-building and leads to satisfaction and happiness. Positive emotions eliminate the negative emotions and relax the mind
C. Time Management and maintaining a healthy lifestyle and having a proper daily schedule can help in enhancing better sleep conditions
D. Avoiding the use of smartphones, to check emails or play brain games right before sleeping
E. Researches have proven that an average sleep of 7 hours is very important for effective physical and mental health.
F. Yoga and meditation are great ways to enhance quality sleep
G. A regular exercise or work-out schedule or even a walk for half an hour can help increase the body's appetite for a good sleep
H. Sorting cognitive distortions of the mind and keeping positivity can help eliminate bad thoughts and prepare the mind for a better quality of sleep
I. Practicing muscle relaxation techniques can help in reducing physical and mental stress and aid in sleep
J. Taking sleep medicines can have various side effects on the body. Training one's mind to lead a happy, healthy, and stress-free life can generate the urge to be healthy and maintain a quality of life
K. Individual and group therapy sessions can help an individual understand the underlying cause of sleep loss and hence work towards preventing it and focus on better quality of sleep
L. Avoid drinking lots of water right before sleeping as the person has to go to the restroom, in the middle of the night and this interferes with sleep.
M. The fluid intake should be balanced to avoid waking up at night.
N. If a person listens to good music or whatever soothes the senses right before sleeping, the sleep quality enhances. This will also prevent bad dreams which cause hindrance in a good nights' sleep.
O. Having a light dinner before sleep also helps in enhancing quality sleep.
P. Caffeinated products should be avoided before sleep as they keep the brain in an active state and hence cause sleeping problems.
Q. An individual can set the body's "internal clock" by sleeping and waking up at the same time. Exposing the body to natural light can help to maintain these cycle
R. Changing the bedroom environment to dim lights and using comfortable sleep mattresses and pillows can also aid in better sleep

REFERENCES

[1] Assocham (2012) Lack of sleep affects employees' performance: Study (2012, April 6). The Times of India.
[2] Assocham (2012, April 9): CSR India, (pp.5806) Seventy-eight percent of corporate employees afflicted with the sleep disorder
[3] Harvey AG; Stinson K; Whitaker KL; Moskovitz D; Virk H. The subjective meaning of sleep quality: a comparison of individuals with and without insomnia. SLEEP 2008; 31(3):383-393.
[4] Lawrence R (2014). Sleeping with a snorer. The Times of India. Retrieved on March 21, 2014, from http://timesofindia.indiatimes.com/life-style/health-fitness/health/Sleeping-with-a-snorer/articleshow/27462578.cms
[5] Nebes, Buysse, Halligan, Houck, & Monk (2009) Self-reported sleep quality predicts poor cognitive performance in healthy older adults. 64(2): 180-7
[6] Porcu S, Bellatreccia A, Ferrara M, Casagrande M. (1998) Sleepiness, alertness and performance during a laboratory simulation of an acute shift of the wake-sleep cycle. Ergonomics; 41(8):1192-202.
[7] Sleep disturbances are linked to poor quality of life. 2013, Dec 5. Times of India
[8] Thorne, D.R., Genser, S.G., Sing, H.C. Hegge, F.W. (1983) Plumbing human performance limits during 72 hours of high task load. pp 17-40 .In Proceedings of the 24th DRG Seminar on the Human as a Limiting Element in Military Systems (pp. 17-40), Toronto: Defense and Civil Institute of Environmental Medicine
[9] http://www.businessdictionary.com/definition/job-performance.html#ixzz2oDAkEmgj
[10] http://www.drugdevelopment-technology.com/projects/gaboxadol/
[11] http://www.stanford.edu/~dement
[12] http://blog.makingitclear.com/2010/08/10/jobperformance/http://gawker.com/5741490/ant-to-memorize-something-take-a-nap/all

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