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Biochemistry of Sleep Quality and Daytime Sleepiness for Employees and University Students

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Abstract. Background: In the brain, neurotransmitters and hormones interact intricately to control sleep. While adenosine builds up over time to cause tiredness, neurotransmitters like serotonin and norepinephrine encourage wakefulness. Objectives: Measuring the impact of a lack of sleep on daytime sleepiness and daily performance and identifying factors affecting sleep, such as psychological stress, working hours, and daily habits. Methods: This study employs a descriptive, analytical, cross-sectional design. To measure daytime sleepiness and sleep quality, 150 college students were given a self-administered questionnaire. Data on sleep habits and their relationships can be gathered at a single point in time according to the study's cross-sectional design. Descriptive and inferential statistics were utilized to examine the replies, and convenience sampling was employed. Results: Based on the overall statistical results, which include the descriptive statistics for the mean score of 1.52 and a standard deviation of 0.175, the final assessment of sleep quality for individuals is classified as "Bad" This indicates that the majority of participants are experiencing poor sleep quality, as reflected by the mean score falling within the "Bad" range. Conclusion: This indicates that the majority of participants are experiencing poor sleep quality, as reflected by the mean score falling within the Bad range.

Highlights:

1. Neurotransmitters and hormones regulate sleep and wakefulness in the brain.
2. Cross-sectional survey of 150 students using descriptive, inferential statistics.
3. Most participants showed poor sleep quality with high daytime sleepiness.

Keywords: Biochemistry, Sleep Quality, Daytime Sleepiness, Employees, University Students

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Introduction

The university years characterize significant changes in living conditions, academic duties, social responsibilities, and newly discovered independence [1,2]. Public concern is raised by the frequency of increased psychological distress and decreased

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psychological well-being that follow these transitional challenges [3], and college students are far more likely to have them than their professional counterparts [4]. Therefore, it should come as no surprise that dangerous choices and behaviors are prevalent throughout this stage of life, such as a bad diet, weight gain, and decreased drug abuse, alcohol use, smoking, and physical exercise [5, 6].

Unfortunately, getting too little sleep is another aspect of going to university [7,8]. Twenty to forty percent of college students [7-10] are sleeping fewer hours than what is advised for that age group (7 to 9 hours) [11]. Many students say that one of the first health habits they give up when attending college is sleep [12]. Additionally, lack of sleep is a common occurrence in higher education [13,14]. It is thought to be a wise choice for students to balance the demands of their education [12] and social obligations [2]. Implying that sleep is not facilitated by university social norms. The majority of college students' inability to prioritize sleep results in a decline in their academic performance and ability to learn [15,16].

Additionally, too Lack of sleep can negatively affect students' physical health, leading to obesity [17], elevated blood pressure [18], and type two diabetes mellitus [19]. Sleep deprivation has been linked to the development of mental health problems in students, such as anxiety and depression, and the impacts on mental health can be just as severe [20-23] as well as stress and burnout [23,24].

"Factor S," one of the earliest sleep aids, was discovered and refined at Harvard Medical School. During sleep deprivation, this chemical gradually increased in the cerebrospinal fluid. Factor S was identified chemically in the 1980s as a muramyl peptide, a class of substances that were formerly thought to be immunological adjuvants and parts of microbial cell walls [25].

Methods

This study employs a descriptive, analytical, cross-sectional design. To measure daytime sleepiness and sleep quality, 150 college students were given a selfadministered questionnaire. Data on sleep habits and their relationships can be gathered at a single point in time according to the study's cross-sectional design. Descriptive and inferential statistics were utilized to examine the replies, and convenience sampling was employed.

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Setting Study

The study was conducted with a sample of 150 participants, consisting of both students and staff members of the University of Basra's College of Al-Zubair. Their level of tiredness during the day and the quality of their sleep were to be evaluated. A standardized sleep quality questionnaire was used to gather data, and a random selection technique was used to choose individuals in order to guarantee sample diversity.

Sample's Study

A group of staff members and students from the University of Basra's College of Bab-Al-Zubair participated in the current study. The 150 participants in the sample were drawn from a variety of departments and included both male and female employees and students. Following approval by the university's administration, the participants were briefed on the study's objectives and given their verbal assent. The study focused on adult university students and employees.

The Study Instrument

The project questionnaire was developed based on scientific sources relevant to the research topic and was approved by specialized professors. It consisted of two parts. The first part included eight questions addressing demographic characteristics such as age, sex, social status, whether they have children or not, housing, profession, site of work, nature of work, and economic status.

The second section contained 21 questions focusing on sleep quality, sleep duration, pre-sleep practices, and related health conditions. The questions cover topics such as difficulty waking up, heart palpitations during sleep, the impact of environmental factors like temperature on sleep, and the effects of insufficient sleep on mental and physical health, such as increased anxiety or weight gain. The questions also address habits like using a mobile phone before sleep, caffeine consumption, and other health symptoms associated with sleep problems.

Results and Discussion

Result

Table 4.1: Distribution of demographic information for students and employees in Basrah College. (N=150)

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Demographic variables	Variables	Frequency	precent
Sex	Male	66	44.0
	Female	84	56.0
	Total	150	100.0
Social statue	Marred	44	29.3
	Single	106	70.7
	Total	150	100.0
Do you have Children	Yes	38	25.3
	No	112	74.7
	Total	150	100.0
professional	Employee	47	31.3
	Student	103	68.7
	Total	150	100.0
Housing	Center	92	61.3
	Districts	58	38.7
	Total	150	100.0
Workplace	Close of housing	101	67.3
	Faraway of	49	32.7
	housing		
	Total	150	100.0
Nature House	Owner	114	76.0
	Rent	25	16.7
	Exceed	11	7.3
	Total	150	100.0
Family Statue	Alone	8	5.3
	with family	131	87.3
	with parents	8	5.3
	With grandpa and	3	2.0
	Total	150	100.0
Physical situation	Weak	9	6.0
	Middle	88	58.7
	Good	50	33.3
	Very Good	3	2.0
	Total	150	100.0

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The results indicated that 56.0% of the present study were female. Concerning social status, 70.7% of the participants were single. Concerning parenthood, 74.7% of the participants reported that they did not have children.

Regarding occupational status, 68.7% of the sample were students. The findings also showed that 61.3% of the participants resided in the city center. Additionally, 67.3% of the participants worked or studied near their residences.

Concerning housing status, 76.0% of the participants owned their homes. Furthermore, 87.3% of the participants lived with their families.

As for the economic status, 58.7% of the participants described their financial situation as moderate.

Descriptive Statistics

	N	Min	Max	Mean score	Sd	Ass
Q1	150	1	2	1.69	0.463	Bad
Q2	150	1	2	1.33	0.471	Good
Q3	150	1	2	1.52	0.501	Bad
Q4	150	1	2	1.37	0.485	Good
Q5	150	1	2	1.57	0.497	Bad
Q6	150	1	2	1.78	0.416	Bad
Q7	150	1	2	1.31	0.465	Good
Q8	150	1	2	1.43	0.497	Good
Q9	150	1	2	1.65	0.491	Bad
Q10	150	1	2	1.59	0.507	Bad
Q11	150	1	2	1.63	0.499	Bad
Q12	150	1	2	1.75	0.448	Bad
Q13	150	1	2	1.57	0.497	Bad

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Q14	150	1	2	1.81	0.396	Bad
Q15	150	1	2	1.54	0.500	Bad
Q16	150	1	2	1.59	0.493	Bad
Q17	150	1	2	1.20	0.401	Good
Q18	150	1	2	1.72	0.451	Bad
Q19	150	1	2	1.25	0.433	Good
Q20	150	1	2	1.21	0.406	Good
Q21	150	1	2	1.57	0.496	Bad

Table (4.3)

Descriptive Statistics

Statistics	**N**	**Min**	**Max**	**Mean**	**Std. Deviation**	**Ass**
mean score	**150**	**1.14**	**1.90**	**1.52**	**0.175**	**Bad**

Based on the overall statistical results, which include the descriptive statistics for the mean score of 1.52 and a standard deviation of 0.175, the final assessment of sleep quality for individuals is classified as "Bad" This indicates that the majority of participants are experiencing poor sleep quality, as reflected by the mean score falling within the "Bad" range. The data support the conclusion that the general sleep quality of the participants is suboptimal.

Table 4

		T – indented sample				**Significant**	
Statistics	**sex**	**N**	**Mean**	**Std. Deviation**	**df**	**T – value**	**P – value**	**Sig**

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mean score		**66**	**1.5541**	**0.15529**	**14**	**1.66**	**0.047**	**S**
	male	**84**	**1.5059**	**0.18734**				
	female				**8**			

S= significant. p – value < 0.05 and df = n – 2

Table 4 presents a comparison between male and female participants based on their mean scores for sleep quality. Since the p-value is less than 0.05, the difference between male and female participants' mean scores for sleep quality is statistically significant. As a result, we can say that the sample's male and female participants' sleep quality differs significantly.

Discussion

In light of this study's findings, the discussion will be divided into two parts.

According to the study's findings, women made up the majority of the sample. These findings are consistent with a number of research [26–30] that found that women made up the majority of the study group.

According to the study's findings, the majority of the sample was unmarried. These findings are consistent with several studies [31–35] that found the majority of the research population was unmarried.

The results of this study, most of the study sample does not have children. These results agree with several studies [36-40] according to which the majority of the study sample is childless.

According to the study's findings, the majority of the sample lived in the center. These findings are consistent with a number of studies [41–45] that found the majority of the research sample resided in the center.

For instance, in question five, 67% of participants reported experiencing weight gain or difficulty losing weight due to changes in sleep patterns. This aligns with existing research indicating that inadequate sleep disrupts hormonal balance, influencing hormones that control appetite, specifically ghrelin and leptin, which causes people to eat more and reduces energy levels for physical activity [46].

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Regarding mental and emotional health, question six highlights a strong connection between inadequate sleep and increased emotional and psychological issues, such as anxiety and depression. Research suggests that sleep deprivation alters neurotransmitter levels, such as serotonin and dopamine, which are crucial in regulating mood and emotions [47].

Question nine addresses dizziness or imbalance upon waking, and responses indicate that many participants experience these symptoms. Research has indicated that a lack of sleep can affect the brain's capacity to regulate balance and blood pressure, leading to dizziness upon waking [48].

In question twelve, participants reported a negative impact of insufficient sleep on their body's response to illness. Sleep is essential for immune system performance, facilitating the release of cytokines necessary for immune responses [49].

Muscle pain and numbness in the limbs after sleep, as addressed in question fifteen, also appear to be linked to insufficient sleep. Research indicates that sleep is essential for muscle repair and circulation, and Reduced blood flow can result from inadequate sleep and increased inflammation, contributing to muscle pain and numbness [50].

Question twenty-one examines frequent awakenings due to breathing problems, urination, sweating, snoring, or nightmares. Studies suggest that fragmented Sleep is linked to a higher risk of metabolic and cardiovascular problems [51].

Respiratory problems have also been connected to poor sleep quality. According to research, lack of sleep may make respiratory diseases like asthma and chronic obstructive pulmonary disease (COPD) worse by impairing lung function and causing inflammation [52].

Conclusion

This indicates that the majority of participants are experiencing poor sleep quality, as reflected by the mean score falling within the Bad range.

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