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Research Paper

A Cross-Sectional Study on The Effects of Sleep Hygiene Practices on Adults' Mental Health and Functional Performance

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ABSTRACT

Background: Anything that raises alertness or throws off the regular sleep-wake cycle balance is considered poor or unsatisfactory sleep hygiene. The connection between a person's mental health and their sleep hygiene practices needs to be made clear. This could facilitate a deeper comprehension of the issue and aid in the creation of successful awareness campaigns regarding proper sleep hygiene techniques to lessen the grave consequences of this problem. Thus, the goal of the current study was to analyze sleep hygiene behaviors and determine how they affected the adult population, in terms of both sleep quality and mental health. **Methodology:** The cross-sectional study was carried out. Participation was open to all adults living in City. The study did not include participants with incomplete data. The researchers created a self-administered questionnaire to evaluate study participants' sleep hygiene habits and their effects on their mental and physical well-being. **Results:** There were 384 adults in the research. Poor sleep hygiene habits and the frequency of sleep issues were significantly correlated ($p < 0.001$). Compared to those with poor sleep hygiene habits (56.1%), a considerably larger percentage of individuals (76.5%) reported having trouble sleeping during the previous three months. Those with inadequate hygiene practices had considerably greater rates of excessive or severe daytime sleepiness (22.5% compared 11.7% and 5.2% versus 1.2%, $p = 0.001$). The percentage of participants with depression was substantially greater in the group with poor hygiene practices (75.8%) compared to the group with good hygiene practices (59.6%) ($p = 0.001$). **Conclusion:** The results of this study show that among adult residents of city, poor sleep hygiene habits are significantly associated with depression, daytime sleepiness, and sleep issues.

Keywords: *Sleep Hygiene Practices, Mental Health, Functional Performance*

Humans need sleep to maintain their physical and mental well-being. It is also necessary to preserve cognitive capacities like memory, learning, and the ability to carry out challenging mental tasks [1]. Hygiene is becoming a bigger public health concern [2]. The collection of environmental and behavioral factors that promote sound sleep patterns is known as sleep hygiene [3]. Anything that raises alertness or throws off the regular sleep-wake cycle balance is considered poor or unsatisfactory sleep hygiene. These include a number of variables related to irregular sleep patterns and frequent stimulant use,

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particularly right before bed [4]. Poor sleep hygiene habits have been shown to significantly affect the length and quality of sleep in earlier studies. A person's health may suffer from insomnia, and a number of mental and physical illnesses have been connected to irregular sleep patterns [5]. These results highlight the significance of assessing sleep hygiene behaviors in the general population in order to elucidate their connection to an individual's mental health and ability to operate [6]. This could facilitate a deeper comprehension of the issue and aid in the creation of successful awareness campaigns regarding proper sleep hygiene techniques to lessen the severe consequences of this issue [7]. Thus, the purpose of this study was to analyze sleep hygiene behaviors and determine how they affect the adult population in terms of both their mental and physical health.

MATERIALS AND METHODS

Study design, date, and setting

This cross-sectional, survey-based study was conducted in 2022.

Sample size and sampling technique

Using an online sample size calculator (Raosoft, http://www.raosoft.com/samplesize.html) with a 5% margin of error and a 95% confidence interval, the sample size was estimated based on the average population size of 372,021 adults in city, assuming an average response of 50% to the majority of the questions. A sample size of 384 was needed. A practical sampling technique was used to find the participants.

Inclusion and exclusion criteria

All adult residents were invited to participate. Participants with incomplete data were excluded from the study.

Data collection tool

The researchers created a self-administered questionnaire to evaluate study participants' sleep hygiene habits and their effects on their mental health. There were five pieces in this tool.

Participants' sociodemographic information, such as age, height, weight, education, marital status, employment, place of residence, and nationality, was evaluated in Section A. The purpose of Section B was to gauge the individuals' sleep hygiene habits. An previous study served as the basis for the sleep hygiene items [8]. The guidelines for the sleep hygiene products were A list of situations and activities that illustrate what people might do during the day, evening, or night is provided below. Please rate your agreement with the statements on a scale of 1 (strongly disagree) to 5 (strongly agree) to indicate how much you have engaged in these activities and situations during the past month. "I have been taking naps during the day," was one of the nine sleep hygiene elements. "I've used varying set times for going to bed and getting out of bed, resulting in an irregular sleep schedule," "I've been consuming alcohol late at night," "Late in the evening, I have been using nicotine," "Late in the evening, I have been consuming caffeinated beverages," "I have been drinking liquids late in the evening, or I went to bed too full or hungry." "I have been working out in the late hours of the night," "I have experienced light or noise disturbances in my bed," and "I have experienced an uncomfortable sleeping environment in my bedroom, such as an uncomfortable bed or temperature." Additionally, the sum of the recorded values for each item was used to determine the overall score for sleep hygiene habits. The median score for overall sleep hygiene was 25.0 (IQR = 22.0-28.0), with a range of 9.0 to 44.0. Individuals

were deemed to have poor sleep hygiene practices if their overall score was 25.0 or higher. The existence and severity of sleep issues were evaluated in Section C. The Basic Nordic Sleep Questionnaire (BNSQ) [9], which uses a five-point rating system to emphasize how many nights or days a week something occurs, was used after the initial question, "Have you had problems sleeping during the past three months?" was answered with a "yes" or "no." One represents "never or less than once per month," two represents "less than once per week," three represents "on 1-2 nights per week," four represents "on 3-5 nights per week," and five represents "every night or almost every night." The questions "how many minutes are you awake before you fall asleep?" and "if you wake up at night, how many minutes are you awake?" were also included in the assessment.

The Epworth Sleepiness Scale (ESS) [10], which measures daytime sleepiness and has eight items with a four-point rating system, was used in Section D to evaluate the sleepiness criteria. "How likely are you to doze off or fall asleep in the following situations, compared to feeling just tired?" was the instruction.

Choose the number that best fits each scenario using the following scale: 0 indicates that you would never fall asleep, 1 indicates that you have a tiny chance of falling asleep, 2 indicates that you have a considerable probability of falling asleep, and 3 indicates that you have a high chance of falling asleep. ESS <10 implies no sleepiness, ESS 11–15 shows excessive daytime sleepiness, and ESS >16 indicates severe sleepiness [10]. This is how the overall ESS score was determined and evaluated. The 10-item Center for Epidemiologic Studies Short Depression Scale (CES-D10), a valid instrument for assessing depression, was employed in Section E [11]. The CES-D-10 evaluates symptoms of depression during the previous seven days. There are two items on positive affect, five on somatic symptoms, and three on sad affect. Each item has options ranging from "rarely or never" (score of 0) to "always" (score of 3). Items five and eight are positive affect statements, and their scores are inverted. The overall score may be between 0 and 30. Higher ratings indicate more severe symptoms. Fu et al. [12] determined that the ideal cutoff value for the CES-D-10 scale was ≥10. Individuals were diagnosed with depression if their scores were higher than the cutoff point.

Ethical considerations

The Research Ethics Committee of the Directorate of Health Affairs granted ethical permission for the study (TU-077/022/119). The goals, procedures, dangers, and advantages of the study were explained to the participants. Participants in the study are implied to have consented to participate if they agreed to complete the questionnaire. The data will not be utilized for any other reason outside of this study, and the confidentiality of the participants was maintained.

Statistical Analysis

The statistical software SPSS version 22 (IBM Corp., Armonk, NY, USA) was used to tabulate and analyze the data. Frequencies and percentages were used to describe categorical data, and chi-square tests (Pearson's chi-square for independence or Fisher exact tests as appropriate) were used to examine the relationships between the variables. The Shapiro-Wilk test was used to check for normality in continuous data. Data with a normal distribution were shown as mean ± SD. The non-parametric Mann-Whitney U test was used to compare the skewed data, which were represented as the median and IQR (25th-75th percentiles). Statistical significance was defined as a p-value of less than 0.05.

RESULTS

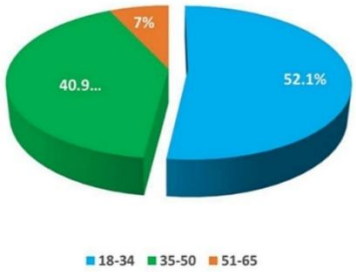

FIGURE 1: Distribution of the age groups of the study participants.

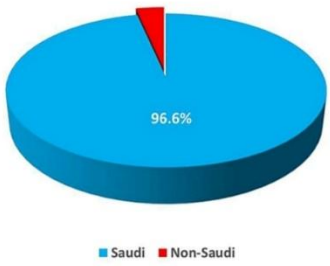

FIGURE 2: Distribution of the nationality of the study participants.

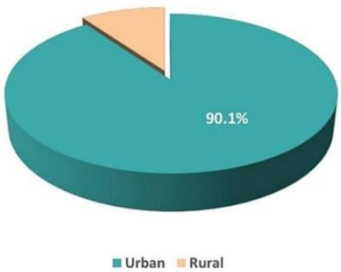

FIGURE 3: Distribution of the residence of the study participants.

		N	%
Level of education	University	282	73.4
	Preuniversity	68	17.7
	Postgraduate	19	4.9
	Read and write	15	3.9
Marital status	Married	197	51.3
	Single	160	41.7
	Widow	17	4.4
	Divorced	10	2.6
Occupation	Employed	160	41.7
	Student	127	33.1
	Non-employed	75	19.5
	Sick leave or pension	22	5.7%
BMI, kg/m^2	Minimum-Maximum	14.57-68.49	
	Mean ± SD	27.23 ± 6.39	

TABLE 1: Sociodemographic characteristics of the study participants (N = 384).

BMI: body mass index

The participants' responses to sleep hygiene practices items are shown in Table 2. The calculated total sleep hygiene score ranged from 9.0 to 44.0, with a median score of 25.0 (IQR = 22.0-28.0) and a mean score of 24.9 ± 5.3. Participants who had a total sleep hygiene score of 25.0 or more were considered to have poor sleep hygiene practices (N = 213, 55.5%), while a score less than 25 reflected good sleep hygiene practices (N = 171, 44.5%).

		N	%
I have been taking naps during the day	Strongly disagree	35	9.1
	Disagree	36	9.4
	Neutral	71	18.5
	Agree	155	40.4
	Strongly agree	87	22.7
I have had an irregular sleep schedule	Strongly disagree	38	9.9
	Disagree	83	21.6
	Neutral	49	12.8
	Agree	149	38.8
	Strongly agree	65	16.9
I have been drinking alcohol late in the evening	Strongly disagree	57	14.8
	Disagree	88	22.9
	Neutral	59	15.4
	Agree	129	33.6
	Strongly agree	51	13.3

I have been using nicotine late in the evening	Strongly disagree	279	72.7
	Disagree	39	10.2
	Neutral	20	5.2
	Agree	32	8.3
	Strongly agree	14	3.6
I have been drinking caffeinated drinks late in the evening	Strongly disagree	269	70.1
	Disagree	53	13.8
	Neutral	22	5.7
	Agree	23	6.0
	Strongly agree	17	4.4
I have gone to bed hungry or too full, or I have been drinking liquids late in the evening	Strongly disagree	69	18.0
	Disagree	58	15.1
	Neutral	82	21.4
	Agree	135	35.2
	Strongly agree	40	10.4
I have been exercising late in the evening	Strongly disagree	100	26.0
	Disagree	132	34.4
	Neutral	75	19.5
	Agree	64	16.7
	Strongly agree	13	3.4
I have been disturbed by light or noise while in bed	Strongly disagree	30	7.8
	Disagree	51	13.3
	Neutral	41	10.7
	Agree	128	33.3
	Strongly agree	134	34.9
I have had an uncomfortable sleep environment in my bedroom	Strongly disagree	93	24.2
	Disagree	114	29.7
	Neutral	59	15.4
	Agree	91	23.7
	Strongly agree	27	7.0

TABLE 2: Sleep hygiene practices among the study participants (N = 384).

		Sleep hygiene practices		P-Vvalue
		Good, N = 171 (44.5%)	Poor, N = 213 (55.5%)	
Have you had problems sleeping during the past three months?	No	75	50	<0.001*
		43.9%	23.5%	
	Yes	96	163	
		56.1%	76.5%	
How often have you experienced problems sleeping during the past three months?	Never or less than once per month	66	54	0.001*
		38.6%	25.4%	
	One or two days per week	52	64	
		30.4%	30.0%	
	More than two days per week	41	65	
		24.0%	30.5%	
	Every day	12	30	
		7.0%	14.1%	
On average, how many minutes are you awake before you fall asleep?	Minimum	1.0	2.0	<0.001*
	Maximum	120.0	180.0	
	Median	20.0	30.0	
	IQR	10.0–30.0	15.0–45.0	
On average, if you wake up at night, how many minutes are you awake?	Minimum	0.0	0.0	0.010*
	Maximum	120.0	120.0	
	Median	10.0	11.0	
	IQR	5.0–20.0	5.0–30.0	

TABLE 3: Associations between sleep hygiene practices and the frequency and magnitude of sleep problems.

IQR: interquartile range

*: Significant at $p < 0.05$.

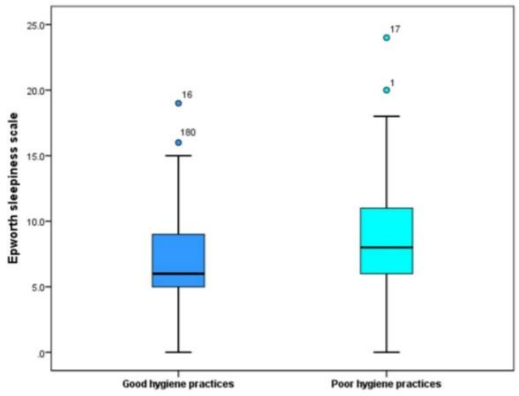

FIGURE 4: Comparison of Epworth Sleepiness Scale between subjects with good or poor sleep hygiene practices.

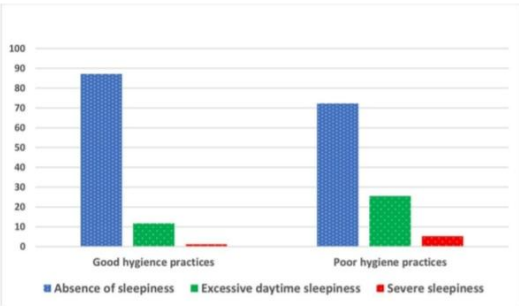

FIGURE 5: Association between sleep hygiene practices and daytime sleepiness.

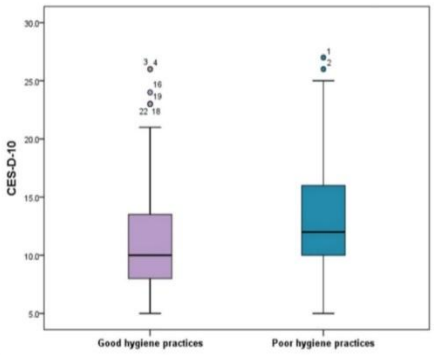

FIGURE 6: Comparison of CES-D-10 screening score for depression between subjects with good or poor sleep hygiene practices.

CES-D-10: 10-item version of the Center for Epidemiologic Studies Short Depression Scale

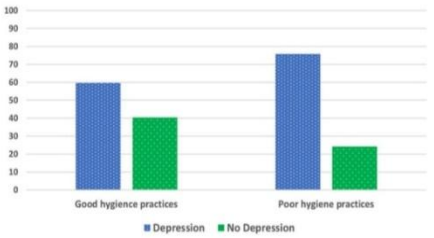

FIGURE 7: Association between participant's mental health and sleep hygiene practices.

In this survey-based study, 384 adults who live in City were included. According to Figure 1, the age groups that participated the most were 18–34 and 35–50 years old (52.1% and 40.9%, respectively). Figures 2 and 3 show that the majority of participants were (96.6%) and urban (90.1%). Additionally, Table 1 reveals that the majority (73.4%) had a university degree, and that the subjects' marital status varied, with 51.3% married and 41.7%, 4.4%, and 2.6%, respectively, single, widowed, and divorced. Students (33.1%) and employed people (41.7%) had the highest percentages. They had an average BMI of 27.23 ± 6.39 kg/m2.

DISCUSSION

Due to their increasing prevalence and possibly harmful consequences, sleep disorders such as insomnia, daytime drowsiness, and inadequate sleep are considered significant public health concerns. Impaired mental and physical health, lower productivity, an increased chance of accidents, increased use of medical services, and a higher risk of psychiatric disorders are some of these impacts [13].

Poor sleep and insomnia have been linked to a number of conditions, including inadequate sleep hygiene. The purpose of this survey-based study was to look into the connection between adult residents, and their mental health and their sleep hygiene habits and sleep issues. 55.5% of study participants reported not practicing good sleep hygiene, and there were noteworthy correlations between the incidence of sleep issues and poor sleep hygiene. Furthermore, the percentage of respondents who reported having regular sleep issues was considerably greater for bad sleepers (14.1%) compared to excellent sleepers (7%). Regarding this issue, a previous population-based study discovered that patients with insomnia had considerably greater rates of poor sleep hygiene behaviors, such as smoking, drinking alcohol, napping, and sleeping on the weekends, than the age- and sex-matched control group of well-sleepers [14]. Additionally, Gellis et al. [15] found a strong correlation between college students' levels of insomnia and irregular sleep patterns as well as actions that promote arousal close to bedtime. In a more recent study, a sample of young adults reported improved sleep quality and efficiency when they practiced excellent sleep hygiene, which includes sleeping in a comfortable setting, limiting naps to 30 minutes, and keeping a regular wake time [16]. Additionally, Carrión-Pantoja et al. [17] found a substantial correlation between university students' academic performance and sleep hygiene, sadness, and symptoms of insomnia. Thus, it makes perfect sense to include sleep hygiene in multicomponent intervention therapies in order to achieve effective treatments for insomnia. According to this survey, people with poor hygiene practices had higher rates of excessive or severe daytime sleepiness (22.5% compared 11.7% and 5.2% versus 1.2%, p = 0.001). This result is consistent with past research [6,18] that found that poor sleep hygiene is a significant factor to both insomnia and excessive daytime drowsiness. Participants with symptoms of insomnia and excessive daytime drowsiness also had poorer sleep hygiene practices, according to a related survey conducted [19]. According to a different study, erratic and unsanitary sleeping habits lead to sleep deprivation and excessive daytime sleepiness [20]. It is important to note that excessive daytime sleepiness lowers overall productivity, raises the risk of injury at work or home, influences neuropsychiatric disorders, and causes auto accidents [21]. In all, 963 college students who had poor sleep quality (OR = 4.76; 95% CI = 3.11-7.29) and excessive daytime drowsiness (odds ratio (OR) = 3.65; 95% CI = 2.56-4.91) had a significantly higher chance of developing chronic mental disorders [22]. Sleep hygiene is regarded as a behavior that can be changed to enhance people's quality of life. Because poor sleep hygiene may increase the risk of mental illnesses

like depression [24], intervention programs aimed at improving sleep hygiene practices are essential to reducing the risk of sleep issues and the disorders they are associated with [23]. Thus, this study looked into the connection between depression prevalence and sleep hygiene. People who had poor sleep hygiene practices had a much greater prevalence of depression (75.8%). This is in line with Çelik et al. [25], who discovered that students who had poor sleep quality had a 3.28-fold higher likelihood of experiencing depressed symptoms. In a similar vein, Gupta et al. [24] found a strong correlation between teenage depression and shorter sleep duration, longer sleep onset latency, and worse sleep quality. Numerous longitudinal studies have demonstrated that sleep disturbance has a detrimental impact on the progression of the illness and is associated with higher rates of suicide, in addition to being a prodromal symptom of depression and an independent risk factor for later depression [26]. Additionally, there was a strong correlation between the severity of depression and the quality of sleep [24]. After adjusting for demographic and clinical factors, a recent study found that among 100 student and graduate young adults, a large daily irregularity in sleep patterns significantly predicted greater levels of depression severity [27]. The inflammation hypothesis, which emphasizes a connection between depression, elevated levels of inflammatory cytokines including interleukin-6 and C-reactive protein, and poor sleep quality, may help to explain the relationship between sleep disturbance and depression. The precise way in which they interact, nevertheless, is still unknown. Furthermore, it has been proposed that circadian rhythm disruptions, which have also been noted in patients with significant depressive disorders, are linked to sleep disorders [28]. In certain situations, depression may be avoided by implementing sleep hygiene regulations and providing education [29].

Limitations

When interpreting the results of this study, it is important to keep in mind certain limitations. First, because it is cross-sectional, it is challenging to identify the direction of a specific link and support causality. Furthermore, biases may become more likely as a result of subjective variability measures. Nonetheless, this danger might be decreased by using reliable data gathering scales.

CONCLUSION

The results of this study show that among adult residents of poor sleep hygiene habits are significantly associated with depression, daytime sleepiness, and sleep issues. These results highlight the need for developing successful awareness and intervention campaigns aimed at promoting good sleep hygiene and raising the standard of sleep for citizens. Without a doubt, these actions will enhance psychological health, increase physical performance, and improve quality of life. Education about good sleep hygiene has to be a component of more comprehensive primary prevention plans for mental illnesses. It is also advised to conduct prospective cohort and intervention studies to look at the potential influence that poor sleep hygiene may play in the emergence of depression and insomnia.

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Conflict of Interest
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