

Investigation and Analysis of Sleeping Behavior Disorder and Related Stress and Sleeping Environment of College Students

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Abstract: Sleeping behavior of undergraduates is worrying, and the first-hand data of sleeping behavior disorders and related stress and sleeping environment factors are still lacking, and no systematic analysis has been formed. This study focuses on the investigation and analysis of the sleeping behavior disorder, stress and sleeping environment of college students. 1,305 undergraduates were investigated by using the method of online questionnaire and sleeping behavior disorders and related stress and sleeping environment were analyzed. The gender ratio and grade distribution of the respondents were balanced. The body mass index (BMI) was within the normal range (57.4), and only 45.9% of the participants reported being in good health. College students generally experience significant psychological stress. Among them, 60.66% of the respondents reported frequently feeling sad or irritable recently. 43.43% of the students reported that these pressures led to irregular sleeping patterns, and 74.42% of the students reported that snoring was common. 68.19% of the students reported that they occasionally or often felt sleeping during the daytime. In terms of noise disturbance, 40.99% of the students reported that they occasionally or frequently had difficulty falling asleep or maintaining sleeping due to environmental noise. A significant correlation exists between psychological stress, bedroom environment, and sleeping disorders among college students, which highlights the necessity of developing comprehensive intervention strategies.

Keywords: Sleeping Behavior Disorder; Stress; Sleeping Environment; College Students

1. Introduction

In modern society, the pace of study and life of

college students is accelerating, and they are facing academic pressure, social needs and employment confusion, and their sleeping conditions are facing severe challenges. Sleeping behavior disorders are more common in college students, which seriously affect their study, life and physical and mental health [1]. The sleeping behavior disorder of college students is influenced by many factors, among which stress and sleeping environment are two very important factors [2,3]. Stress, originating from various sources like academic pressure, career prospects, and interpersonal relationships, can cause heightened mental arousal and anxiety among college students. This elevated state of alertness makes it challenging for them to relax and fall asleep, frequently leading to extended sleeping onset latency, frequent nocturnal awakenings, or early - morning awakenings. For example, the continuous worry about upcoming exams, assignments with strict deadlines, and the uncertainty of future employment can create a persistent state of psychological tension that disrupts the natural sleeping - wake cycle. On the other hand, the sleeping environment plays a crucial role in determining the quality and duration of sleeping. Factors in the sleeping environment, such as noise levels, light exposure, temperature, mattress and pillow comfort, and even the overall atmosphere of the dormitory or living space, can significantly impact a student's ability to achieve restful sleeping. Excessive noise from roommates, outside traffic, or nearby social activities can easily disrupt sleeping, especially during light sleeping stages. Inadequate or excessive light, particularly the blue light emitted by electronic devices used before bedtime, can inhibit the secretion of melatonin, a hormone that regulates sleeping. Additionally, uncomfortable bedding or an improperly adjusted room temperature can cause physical discomfort, making it difficult for students to remain asleep throughout the night.

Understanding the intricate relationship between these two factors and sleeping - behavior disorders is essential for developing effective intervention strategies to improve the sleeping health of college students.

The types of sleeping behavior disorder generally include insomnia, circadian rhythm disorder, sleeping apnea syndrome and so on[4,5]. Among these, insomnia is the most prevalent sleeping - behavior disorder reported among college students. It is characterized by persistent difficulty in falling asleep, maintaining sleeping, or experiencing non - restorative sleeping despite adequate opportunity and circumstances for sleeping. This often leads to daytime impairments such as fatigue, inattention, and mood disturbances. Circadian rhythm disorder, another common type in this population, typically manifests as a misalignment between an individual's internal biological clock and the external 24 - hour environment. It is frequently observed as delayed sleeping - wake phase disorder, where students struggle to fall asleep until late at night and face great difficulty waking up in the morning. This disorder is closely associated with irregular sleeping schedules, excessive use of electronic devices before bedtime, and the demands of academic and social activities. sleeping apnea syndrome, though less prevalent than the two conditions mentioned earlier, should not be ignored. It involves repeated breathing pauses during sleeping, caused by upper airway obstruction (obstructive sleeping apnea) or insufficient respiratory effort (central sleeping apnea). These pauses result in disrupted sleeping, loud snoring, and daytime drowsiness. If left untreated, sleeping apnea syndrome can have severe long - term impacts on cardiovascular health and cognitive function. Each of these sleeping - related behavior disorders not only impacts the immediate quality of life and academic performance of college students but also may lead to the development of various physical and mental health problems in the long term, highlighting the significance of further investigating their prevalence, correlates, and underlying mechanisms within this particular demographic. The stress factors that affect sleeping behavior include: academic stress, social and financial stress, depression, anxiety and fear of the future, and the vicious cycle between sleeping and stress[6]. The sleeping environment mainly refers to the physical

environment of sleeping, including noise disturbance, light pollution, temperature and comfort, dependence on electronic devices and space limitation [7].Noise pollution and optical pollution are also seriously affected by the same dormitory classmates [8-10].

The above analysis shows that the sleeping behavior disorder of college students is closely related to stress and sleeping environment, and has a significant impact on physical and mental health and academic performance.

2. Material and Methods

2.1 Respondent

The research targets full-time undergraduate and graduate students across various academic years and disciplines. Through online surveys, we aim to ensure data representativeness and broad coverage, gaining comprehensive insights into current sleeping environments and quality among college students. This study ultimately provides evidence-based recommendations for optimizing sleeping conditions and enhancing sleeping quality.

Table 1. Distribution of Samples by Gender, Grade, BMI, and Health Status (n = 1,305, %)

Gender	Male		Female	
	47.2		52.8	
Grade	1	2	3	4
	33.4	34.7	16.6	9.5
BMI	<18.5	BMI18.5–24.9	BMI25–29.9	BMI>30
	16.4	57.4	23.6	2.6
Health condition	health	sub-health state	precursor state of disease	morbid state
	45.9	47.9	4.6	1.6

BMI = weight (kg) / height (m)², to determine if weight may be at risk for health problems.

Health status: The physiological and psychological functions of the body are normal, and the body can adapt to the environment without obvious discomfort.

Sub-health: a state between health and disease, with mild discomfort but not reaching the criteria for disease.

The prodromal state of the disease: abnormal physiological or biochemical indicators, with risk of developing into disease.

Disease status: The abnormal body function affects normal life and meets the medical diagnostic criteria.

2.2 Test of Validity and Reliability

1305 questionnaires were distributed, and 1305 valid questionnaires were obtained after data cleaning. In order to find out the problems and improve the validity, the paper adopted the test of reliability and validity to check the quality of the survey results, and ensured the validity of the survey results.

2.3 Questionnaire Content

The investigation of sleeping environment includes the frequency of disturbance factors and the proportion of influencing elements in the sleeping environment.

2.4 Application of Statistics

The Cronbach's alpha and KMO tests were used to evaluate the reliability and validity of the scale. The overall Cronbach's alpha was 0.942, with sub-item reliability coefficients consistently above 0.70, indicating strong internal consistency. The overall KMO value was 0.927, and all sub-item KMO values were above 0.70. All Bartlett's test results for sphericity across all dimensions showed $p < 0.001$, indicating statistically significant correlations among the variables.

The contents of sleeping behavior survey include the distribution of stress feeling and emotional state, the frequency of sleeping disorder caused by academic pressure, and the occurrence of special behavior.

3. Results

3.1 Sample Basic Information

As shown in Table 1, the demographic profile of the sample indicates: males constitute 47.2% of the total, with approximately 68% being freshmen or sophomores. The BMI falls within the normal range (57.4), while only 45.9% of participants report good health status.

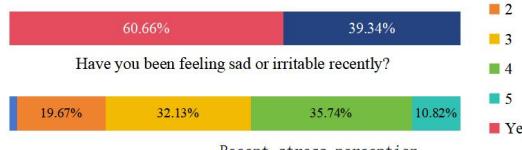


Figure 1. Psychological Stress among College Students (n = 1,305)

3.2 Stress Level

Survey data reveals that college students generally experience significant psychological stress. In a 1-5 stress scale, the average score is

3.34, with 46.56% of students rated as high stress (4-5 points), while only 1.64% reported minimal stress. This stress level is closely linked to emotional issues, as 60.66% of respondents frequently feel sad or irritable recently (Figure 1).

3.3 Sleeping Behavior

Regarding sleeping behavior, study/work schedules significantly disrupt regular sleeping patterns: 43.43% of students reported irregular sleeping schedules due to these commitments. sleeping quality surveys indicate that 73.77% experience varying degrees of leg instability, while 27.87% exhibit abnormal sleeping behaviors (e.g., sleepingwalking or talking in sleeping). Snoring is prevalent, affecting 74.42% of students (occasionally 37.38%, sometimes 31.15%, frequently/always 7.54%). Notably, 33.11% have experienced sleeping breathing abnormalities (occasionally 25.25%, sometimes 5.9%, frequently 1.97%), and 68.19% occasionally or frequently experience daytime drowsiness. These findings (see Figure 2.) demonstrate a strong correlation between psychological stress and sleeping disorders among college students, highlighting the need for comprehensive intervention strategies.

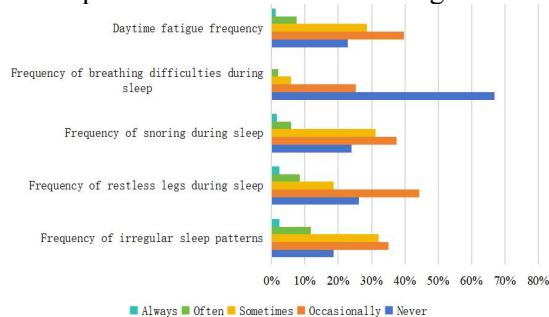


Figure 2. Sleeping Behavior Disorders

3.4 The Influence of Environmental Factors on Sleeping Behavior

The survey results (Figure 3.) reveal that college students' sleeping quality is significantly affected by multiple environmental factors. Regarding noise disturbance, 40.99% of students reported occasional or frequent difficulty falling asleep or maintaining sleeping due to ambient noise, while only 19.67% were never affected. Light disturbance was equally prevalent, with 45.9% experiencing occasional issues and 29.18% reporting occasional or frequent disruptions. Temperature discomfort emerged as another critical factor: 47.21% occasionally, 26.67% occasionally or frequently, and 32.14%

occasionally or frequently reported sleeping disturbances due to cold or heat. Additionally, 44.26% occasionally and 28.54% occasionally or frequently experienced physical discomfort (e.g., neck or back pain) related to sleeping.

The multi-element analysis of the sleeping environment shows that 63.93% of the students are affected by the cohabitants, 62.62% are faced with the environmental noise, 61.64% are disturbed by the electronic products, 55.41% are affected by the light, and 36.39% are troubled by the temperature and humidity (Figure 4.). This indicates that the disturbance of the sleeping environment of most people is in urgent need of improvement.

4. Discussion

Academic pressure affects college students' sleeping quality by altering sleeping duration, bedtime, and sleeping depth, while excessive mobile phone use and lack of exercise may exacerbate these negative effects. These findings align with previous research that highlights academic stress as a primary disruptor of college students' sleeping patterns. The pressure to meet academic deadlines, perform well on exams, and maintain high grades often leads to irregular sleeping schedules and reduced total sleeping time.

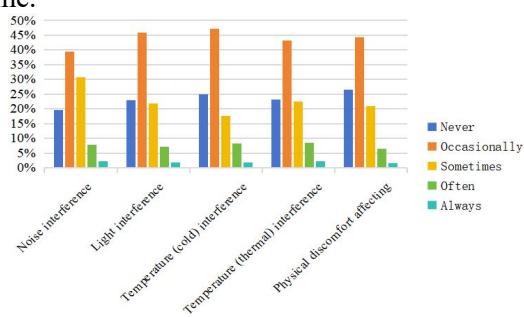


Figure 3. Influence of Environmental Factors on Sleeping Behavior Disorders (n = 1,305)

Specifically, the mental arousal associated with academic stress can delay sleeping onset and fragment sleeping cycles, thereby decreasing sleeping depth and the overall restorative quality of sleeping. Furthermore, the current study underscores the compounding role of excessive mobile phone use, which may serve as both a direct and indirect contributor to poor sleeping. Directly, the blue light emitted by mobile phone screens can suppress the secretion of melatonin, a hormone critical for regulating the sleeping - wake cycle, thus delaying bedtime and reducing sleeping efficiency. Indirectly, mobile phone use, particularly for social media or entertainment,

can further extend wakefulness during hours that should be dedicated to sleeping. This is especially true when students use these devices as a coping mechanism to alleviate academic stress, creating a vicious cycle of delayed sleeping and increased daytime fatigue. Additionally, the lack of exercise identified in this study may exacerbate sleeping disturbances by reducing physical fatigue and lowering the threshold for stress - induced sleeping problems. Regular physical exercise is known to promote better sleeping by increasing sleeping duration and depth. However, when college students do not exercise enough, they may have higher levels of pent - up energy and stress, which makes it harder for them to fall asleep and stay asleep. The bad behavior of dormitory classmates is a significant factor that affects the sleeping - related behavioral disorders of college students. Roommates' late - night activities, such as excessive noise from chatting, gaming, or watching videos without headphones, can severely disrupt the sleeping environment. For example, the continuous clicking of keyboards, loud laughter, or the sound of music can make it difficult for students attempting to fall asleep to relax their minds and bodies. Even if a student manages to fall asleep at first, sudden noises or ongoing disturbances during the night can lead to frequent awakenings, thereby reducing the overall quality of sleeping. Additionally, differences in sleeping schedules among roommates, where some may prefer to stay up very late while others need to wake up early for classes or other commitments, often lead to conflicts. The student with an earlier schedule may struggle to fall asleep on time because of the roommate's activities, and the one staying up late may feel pressured to be quiet, creating a tense atmosphere that further exacerbates sleeping problems. Moreover, some roommates may have habits such as leaving the lights on all night. This can interfere with the body's natural circadian rhythm by suppressing the production of melatonin, a hormone that regulates sleeping. This artificial light exposure deceives the brain into thinking it is still daytime, making it more difficult to initiate and maintain sleeping. These collective bad behaviors within the dormitory not only directly impact an individual student's sleeping duration and quality but also lead to increased stress and irritability. This creates a vicious cycle where poor sleeping results in lower tolerance for roommate conflicts, and

unresolved conflicts further worsen sleeping disturbances. Collectively, these factors—academic pressure, excessive mobile phone use, and lack of exercise—interact to pose a multifaceted challenge to college students' sleeping health, highlighting the need for targeted interventions that address both the psychological and behavioral aspects of sleeping regulation in this population. It is recommended to establish a healthy "stress-sleeping" regulation mechanism through time management, digital detox, and regular exercise.

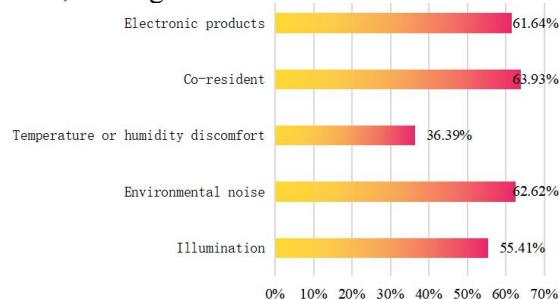


Figure 4. Sleeping Environment Elements Interfere with Sleeping Behavior (n = 1,305)

In the face of many sleeping behavior disorder dilemmas, we have to put forward the following suggestions. First, sleeping behavior education should be integrated into health curricula with a focus on disseminating scientific sleeping knowledge. Second, behavioral interventions should be implemented through a three-pronged sleeping improvement strategy combining "digital detox, regular exercise, and stress management". Third, universities should optimize campus environments by upgrading dormitory facilities such as soundproofing and lighting systems, while establishing reasonable blackout schedules. Finally, AI-powered personalized sleeping guidance tools should be developed to address specific issues like sleeping difficulties. This study reveals that contemporary college students' sleeping behavior problems stem from complex factors including cognitive deficits, environmental disturbances, and academic pressure. Solving this issue requires coordinated efforts from individuals, schools, and society, combining enhanced sleeping health literacy with supportive environments. Notably, college students demonstrate strong self-improvement motivation, laying a solid foundation for sleeping health promotion. Future efforts should focus on transforming this voluntary commitment into sustainable healthy behaviors, ultimately achieving a virtuous cycle between

sleeping quality and academic performance.

The limitation of this study is that it is a cross-sectional study and lacks longitudinal follow-up. Future studies should further investigate the temporal quadrants to establish the logical relationships among various factors. The cross-sectional study and longitudinal study should be alternated in time series, which is more conducive to reveal the essence of the complex problems. Specifically, a cross-sectional study can capture the current state of the relationships among variables such as sleep quality, academic stress, and learning performance at a particular point in time, offering a snapshot of the overall situation. However, it is challenging to determine the direction of causality and the dynamic changes over time. In contrast, a longitudinal study, by following the same group of participants over an extended period, can track the development trajectories of these variables and observe how changes in one variable may lead to changes in others. For example, it can help clarify whether poor sleep quality precedes increased academic stress or if high academic stress leads to subsequent sleep problems, and further explore how these changes collectively impact academic performance over semesters or even academic years. By combining the strengths of both study designs, alternating between cross-sectional data collection at different time points and long-term longitudinal tracking, researchers can more comprehensively and accurately uncover the intricate temporal dynamics and underlying mechanisms among the various factors involved in the relationship between sleep quality and academic performance. This approach would allow for a more in-depth understanding of not only the current associations but also the potential causal pathways and how they evolve over time, thereby providing more targeted and effective intervention strategies for improving students' sleep and academic outcomes. These factors might interact with stress and sleeping behavior, and their exclusion could affect the accuracy and depth of the observed associations.

5. Conclusion

The survey shows that the current situation of college students' sleeping behavior disorder is very serious. These results show that there is a significant correlation between psychological stress, sleeping environment and sleeping disorders in college students, which highlights

the necessity of developing comprehensive intervention strategies.

Acknowledgments

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