

The Role of Stress and Health Care Patterns in Predicting Sleep Quality of College Students in 3 Regions

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Abstract

This study aims to investigate the effect of stress and health care patterns on sleep quality of college students in three regions. The data was collected from September 7 to December 8, 2023, and 454 samples of data were used for analysis. Data was analyzed by descriptive statistics, Pearson's correlation, and multiple regression analysis. The results of this study are as follows; Firstly, 42.3% of the subjects spent an average of 30 minutes to less than 1 hour in sunbathing, 37.7% of the subjects walked more than 7,000 steps a day on average, 35.5% of the subjects did not do moderate aerobic exercise at all, 63.9% of the subjects had more than 1 hour of blue light exposure before going to sleep, and the majority of subjects' sleep quality was 'not sleeping well' (74.0%). Secondly, factors that affect the quality of sleep were found to be grade, average daily walking steps and stress. Through this results, it is necessary to make efforts to increase walking and manage stress which affect the quality of sleep for college students.

Keywords: Sleep, Quality, Stress, Health, Care, Patter

1. INTRODUCTION

College life is a period of time following adolescence, promoting academic exploration and character maturity, establishing life and values, and growing into psychologically and socially healthy and independent beings, and having an important impact on people [1, 2]. College students face difficulties such as interpersonal relationships, academic achievement, mental stress, and job preparation in a transitional period from adolescence to adulthood [3]. During this period, college students must strive to adapt themselves to a new social environment in the process of life transition to adulthood. In the mean time, college students suffer from a lot of stress which stems from worries about future, academic achievement, values in life, economic problems and so on [4]. Stress is anxiety or a physical reaction that occurs when an individual is unable to solve problems. Because it is an inevitable part of modern life, the degree of stress varies from person to person, and moderate stress helps individual growth and development. However, excessive stress is known to break down the body and cause disease, and it reduces sleep quality, interfering with not only the process of falling asleep but also the state of sleep, causing frequent awakenings [5-7]. Moreover, sleep problems weaken physical recovery and mental integration, and cause problems with memory and learning, which can lead to increased anxiety or stress [8].

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For humans, sleep is the most basic and core activity in maintaining health. Sufficient sleep is an essential element for maintaining physical and mental health and plays an important role in maintaining homeostasis and mental and emotional well-being of the human body [9]. In contrast with sufficient sleep, insufficient sleep negatively affects daily life by causing poor concentration, excessive daytime fatigue, low work ability, and increased accident rates [10]. Sleep quality, which refers to a qualitative indicator of sleep, is a comprehensive evaluation of sleep time, degree of insomnia and number of awakenings during sleep, and sleep efficiency (Park et al., 2012), and is deeply related to physical and mental health [11].

Problems caused by sleep have a negative impact on the body and psychology of students' academical performance. Short sleep time causes obesity and overweight problems, sleep problems such as nightmares and insomnia cause psychological problems such as depression and anxiety, and lack of sleep impairs academic performance by interfering with memory strengthening or learning processes [12, 13]. Additionally, insufficient sleep or drowsiness is associated with hazardous behaviors such as smoking, drinking, or drug use [14, 15]. In this way, sleep problems are closely related to the mental health of adolescents. In a study by Coulombe et al. [16], it was showed that sleep problems cause psychobehavioral problems such as irritability, depression, anxiety, and withdrawal [16].

Previous studies have shown that college students have a short average sleep time and tend to wake up late and go to bed late. Additionally, sleep stress that causes sleep disorders has been identified as living alone, residential noise, dissatisfaction with school life, poor health, stress in life, worries about future, and values in life [17, 18]. It is no exaggeration to say that modern life is a nocturnal life, so many students have nocturnal lifestyle habits and often do not get enough sleep. Particularly, continuous lack of sleep can affect growth and cognitive development during the period of adolescence. Moreover, lack of sleep causes daytime drowsiness, which can lead to traffic accidents, low academic achievement, and attention deficit. The sleep disorder including insomnia and daytime sleepiness accounts for 56.4% of all college students and sleep problems were found to be related to the stress of academic achievement, highlighting the need to consider sleep in these subjects [19, 20].

Therefore, it can be seen that for college students, sleep quality is an important issue for health and learning. Accordingly, this study was conducted to investigate the quality of sleep of college students and to identify the factors which affect sleep's quality.

2. RESEARCH METHODS

2.1 Research Design

This study is a descriptive research study to understand the stress and sleep quality of subjects and the factors that affect sleep quality.

2.2 Data Source and Participants

In this study, among students enrolled in three universities located in two cities, students who understood the purpose and method of the study and agreed to participate in the study were selected as subjects. Data collection was conducted from September 7 to December 8, 2023, and face-to-face and online surveys were conducted through Google. A total of 454 data were used for the final study analysis, excluding missing or uncertain data.

Multiple regression analysis was conducted using the G Power program 3.1, and at least 215 samples were calculated with 6 predictors, effect size .10, significance level .05, and power .95. In this study, the number of samples was calculated as 454 in consideration of the dropout rate such as omission or rejection.

2.3 Research Tools

2.3.1 Perceived Stress Scale (PSS)

The PSS is a 14-item questionnaire developed by Cohen et al. in 1983, and was revised to and 10 items by Cohen et al. In this study, the Korean version of PSS, adapted by Lee Jong-ha et al. was used for the 10-item PSS revised in 1988 [21, 22]. Nos. 1, 2, 3, 6, 9, 10 were evaluated as positive questions and 4, 5, 7, and 8 were negative questions, with a 5-point Likert scale (0-4), and it consists of questions about what you have felt and thought in the last month. The range of the total score is 0-40 points, and the higher the total score, the more severe the level of stress perceived by the subject. The reliability (Cronbach's α) in this study is .82.

2.3.2 Sleep Quality

To evaluate sleep quality, we used the PSQI-K, a Korean version of the Pittsburgh Sleep Quality Index (PSQI) developed by Buysse et al. was used and translated into Korean by Sohn et al [23, 24]. It consists of 7 questions measuring subjective sleep quality, sleep duration, sleep disturbance, and use of sleep medications, and is evaluated by giving 0 to 3 points for each item and adding up the scores. A total score of 0 to 5 points indicates no problem with sleep quality, and a score of 6 to 21 indicates poor sleep quality. The reliability (Cronbach's α) of sleep quality was .84.

2.4 Statistical Analysis

The collected data were analyzed using the SPSS/WIN 29.0 program. The mean and standard deviation of the study subjects' general characteristics, stress, and sleep quality were calculated. Pearson correlation coefficient was used to analyze the relationship between stress and sleep quality. Lastly, multiple linear regression analysis was used to determine the effect of stress and related variables on sleep quality.

3. RESULTS & DISCUSSION

3.1 Health Care Patterns of the Subjects

The general characteristics of the subjects were 35.7% in the fourth year of university, 42.3% of the average daily sunlight time was less than 30-60 minutes, and 26.9% of the average daily steps were less than 5,000-7,000 steps. 35.5% of the respondents said they did not do any aerobic exercise per day, and 63.9% of the respondents said they had more than an hour of blue light exposure before going to sleep (Table 1).

Table 1. Health care patterns of the subjects (N= 454)

| Variables | Characteristics | N | % |
|------------------------|---------------------------------|-----|-------|
| Grade | 1 st | 80 | 17.6% |
| | 2 nd | 83 | 18.3% |
| | 3 rd | 129 | 28.4% |
| | 4 th | 162 | 35.7% |
| Average daily sunlight | None | 0 | 0% |
| | less than half an hour | 79 | 17.4% |
| | 30 minutes to less than an hour | 192 | 42.3% |

| | | | |
|---|---------------------------------|-----|-------|
| | 1 hour to less than 2 hours | 107 | 23.6% |
| | More than 2 hours | 76 | 16.7% |
| Average daily walking | less than 3000 steps | 41 | 9% |
| | 3000-5000 steps or less | 120 | 26.4% |
| | 5000-7000 steps or less | 122 | 26.9% |
| | More than 7000 steps | 171 | 37.7% |
| Average daily moderate aerobic exercise | None | 161 | 35.5% |
| | less than half an hour | 157 | 34.6% |
| | 30 minutes to less than an hour | 90 | 19.8% |
| | 1 hour to less than 2 hours | 34 | 7.5% |
| | More than 2 hours | 12 | 2.6% |
| Blue light exposure just before sleep | None | 6 | 1.3% |
| | less than half an hour | 37 | 8.1% |
| | 1 hour to less than 2 hours | 121 | 26.7% |
| | More than an hour | 290 | 63.9% |

3.2 Stress and Sleep Quality

The subject's stress score (0 to 40 points) was 18.18 ± 6.331 points, and as for the quality of sleep, the majority of subjects' sleep quality was 'not sleeping well' (74.0%). (Table 2). Considering that if the PSQI value exceeds 5 points, poor sleep quality or accompanying insomnia may be suspected, it can be seen that the overall sleep quality of college students is poor and special care for management of sleep is necessary[23].

Table 2. Stress and sleep quality

| Items | M \pm SD | N | % |
|---------------|-------------------|-----|-------|
| Stress | 18.18 \pm 6,331 | | |
| Sleep quality | 0-4 | 56 | 12.3% |
| | 5-10 | 336 | 74.0% |
| | 11-21 | 62 | 13.7% |

3.3 Correlations Between Related Variables and Sleep Quality

The higher the grade, the more walks per day, less exposure to blue light right before going to sleep, and less stress, the better sleep quality (Table 3).

Table 3. Correlations between related variables and sleep quality

| | sleep quality | |
|---|---------------|-------|
| | r | p |
| Grade | -.235** | <.001 |
| Average daily sunlight | .084 | .074 |
| Average daily walking | -.114* | .015 |
| Average daily moderate aerobic exercise | .027 | .563 |
| Average blue light exposure just before sleep | .104* | .027 |
| stress | .346** | .000 |

3.4 Factors Affecting Sleep Quality

Factors that affects subject's sleep quality were found to be grade, average daily walking, and stress. The higher the grade, the more average daily walking, and the less stress, the better the quality of sleep (Table 4). This can be considered in connection with the fact that first graders who enter college after graduating from high school are often exposed to irregular lifestyle habits.

A study showing that sleep quality improved after 8 weeks of walking exercise for 30 minutes a day in elderly people over 65 years of age and experiencing back pain, and a study on the high quality of sleep among male college students who exercise more than once a week are similar to the results of this study for college students [25, 26].

The results of this study support some of the previous studies that the lower the quality of sleep of residents, the higher the physical, psychological, and job stress, and lack of sleep causes daytime sleepiness, stress, and distraction, and has negative consequences on social activities [27, 28].

Table 4. Factors affecting sleep quality

| Variables | B | S.E | β | t | p |
|--------------------------------|-------|------|---------|--------|-------|
| Constant | 1.346 | .169 | | 7.981 | .000 |
| Grade | -.089 | .021 | -.192 | -4.311 | <.001 |
| Average daily sunlight | .017 | .026 | .032 | .653 | .514 |
| Average daily walking | -.054 | .025 | -.105 | -2.147 | .032 |
| Average daily moderate aerobic | .035 | .024 | .072 | 1.475 | .141 |

| | | | | | |
|--|------|------|------|-------|-------|
| exercise | | | | | |
| Blue light exposure just before sleep | .034 | .031 | .047 | 1.085 | .279 |
| stress | .028 | .004 | .348 | 7.920 | <.001 |

R²=.187

Adj R²=.176

F=17.147 ($p<.001$)

4. CONCLUSION

We found that factors affecting sleep quality were stress and the average amount of walking per day. Also, it was found that first-year college students did not have a good quality of sleep in contrast with their seniors. This can be explained because the quality of sleep in first-year college students decreased due to excessive academic burn out and decreased density of daily life after graduating from high school. However, even without special aerobic exercise, the quality of sleep could be improved through proper walking exercise and stress management. Through the results of this study, universities are needed to induce students to have the appropriate walking time during their academic schedules and develop ways to relieve stress on their own. It is judged necessary to verify the moderating or mediating effect of walking exercise on stress in the future.

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