

Effects of Sleep Quality on Different Obesity Indexes in College Students

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Abstract: At present, college students, due to factors such as high academic pressure, experience a decline in their sleep quality and varying degrees of obesity. Therefore, the purpose of this study was to explore the effects of sleep quality on different obesity indexes in college students. The Association of sleep duration, depth and continuity with body mass index (BMI), waist circumference and Body fat percentage was analyzed by quantitative analysis. The results show that different aspects of sleep quality have a significant impact on obesity indicators, and there are gender differences.

Keywords: College Students; Sleep Quality; Obesity Index

1. Introduction

In recent years, with the acceleration of the pace of life and the increase of learning pressure, the proportion of sleep problems among college students has gradually increased. At the same time, as a global health problem, the prevalence of obesity among college students has also aroused widespread concern. The link between sleep and obesity is becoming a hot topic in public health research.

Sleep is an indispensable physiological requirement for human beings, and plays a vital role in maintaining an individual's mental state and physical health. In-depth analysis, it can be found that lack of sleep or poor quality of human body hormone levels will have a significant impact [1]. In particular, imbalances in hormone levels could set off a chain reaction. This imbalance increases hunger and decreases satiety. This change will directly affect the individual's eating behavior, making it easier to eat too much food, increase energy intake. Changes in hormone levels also affect the process of energy metabolism. When the body's energy metabolism is affected, it reduces the efficiency of energy expenditure, resulting in energy being stored as fat rather than being used efficiently.

This accumulation of energy eventually leads to weight gain. Over time, continued weight gain can lead to obesity. Obesity affects an individual's appearance and can lead to a range of health problems, including heart disease, diabetes and high blood pressure. Therefore, it can be concluded that insufficient sleep or poor quality is an important factor contributing to obesity.

In order to further understand this relationship, the issue should be viewed from a different perspective. If a person's sleep quality is good, its hormone levels will remain in a state of balance. In this state, the individual's sense of hunger and satiety, will be effectively controlled to avoid overeating. At the same time, energy metabolism will also be maintained at an efficient level, ensuring that energy is used properly rather than being stored as fat. In this case, the individual's weight will remain stable, not prone to obesity. Therefore, we should fully realize the importance of sleep to health, and take appropriate measures to improve the quality of sleep, maintain the health of the body and prevent the occurrence of obesity^[2].

2. Status Quo of Sleep and Obesity Quality of College Students

2.1 Case Studies

In this study, 481 college students aged 18-25 were randomly selected from a university. The basic information is shown in Table 1.

Table 1. Basic Information Table of Subjects

| Sex | Number | Age | Height(cm) | Weight(kg) |
|--------|--------|----------|------------|------------|
| Male | 257 | 20.5±1.7 | 173.3±5.7 | 65.7±10.5 |
| Female | 224 | 20.3±1.7 | 162.5±5.9 | 55.0±8.3 |
| Total | 481 | 20.4±1.8 | 168.6±7.9 | 61.1±10.9 |

In the analysis and research, we collected the information about the sleep quality, physical activity, depression and anxiety of the college students, and compared the actual sleep situation of different students by using the targeted data processing method, the relationship between sleep and obesity of college students was

obtained.

2.2 Sleep Status

Among college students, common problems include poor sleep quality, decreased sleep time and increased daytime dysfunction scores. Together, these factors contribute to obesity. Among them, the increase of daytime dysfunction score, the promotion of obesity is particularly obvious. Gender differences play a moderating role in this process. Specifically, male college students in poor sleep quality, daytime dysfunction score higher and sleep disorders score increased, the indicators of central obesity also increased.

The survey found that moderate to high-intensity physical activity has a positive effect on alleviating these problems. In college students, a reasonable level of physical activity can reduce or completely offset the general risk of obesity caused by poor sleep habits and daytime dysfunction.

Anxiety and depression are another important psychological factors that affect the health of college students. According to the survey of college students without anxiety symptoms, the increase in Body fat percentage was less affected by poor sleep quality. Similarly, college students without depressive symptoms were able to resist the adverse effects of daytime dysfunction on increased Body fat percentage.

There are differences in physical activity among college students with different psychological states. For male college students with psychological symptoms, moderate-intensity physical activity helped reduce the risk of obesity; for female college students, high-intensity physical activity was needed to achieve the same effect. For students without depressive symptoms, individuals with better sleep quality can maintain Body fat percentage through low-intensity physical activity, poor sleep requires moderate physical activity to achieve this goal. It should be noted that high-intensity physical activity was also effective for those with depressive symptoms, regardless of sleep quality^[3].

3. The Relationship between Sleep Quality and Obesity Index

Key obesity indicators, such as body mass index (BMI), waist circumference and body fat percentage, are often considered when discussing the relationship between obesity and

sleep quality. Combined with the survey information, it was found that college students with poor sleep tended to have higher BMI and waist circumference. The main relationships are as follows:

Effects of insufficient sleep on hormone levels in the body. When a person doesn't get enough sleep, their leptin levels drop. Leptin is an important hormone that plays a key role in regulating appetite and weight. So when leptin levels drop, appetite increases, which naturally leads to more calories. At the same time, lack of sleep also triggers increased levels of insulin and ghrelin, both hormones that increase appetite and encourage the body to store more fat^[4].

Poor sleep affects energy expenditure and fat oxidation. Under normal circumstances, a good night's sleep helps maintain the body's energy balance, promote the oxidation of fat, help control weight. But a person who is chronically sleep-deprived may not be able to carry out energy expenditure and fat oxidation effectively, which will further promote the development of obesity.

4. Analysis of the Mechanism of the Effect of Sleep Quality on Obesity

4.1 Hormonal Regulation

Lack of sleep can interfere with the normal secretion of hormones. Leptin is a hormone produced by fat cells, whose main function is to send signals to the brain that the body has eaten enough food to suppress appetite. When sleep deprivation occurs, the production of leptin is inhibited, leading to a decrease in its concentration. This change can make the human body mistakenly believe that food intake is insufficient, need to increase appetite, the formation of excessive eating, and ultimately lead to weight gain. At the same time, ghrelin is another hormone that is affected during sleep deprivation. It is a hormone produced by the stomach, whose main effect is to stimulate appetite. Under normal circumstances, ghrelin levels rise before meals and fall after, helping to maintain a normal eating rhythm. However, lack of sleep can lead to increased secretion of ghrelin, making the body even when not hungry, will also have a strong appetite, will increase food intake, it may also lead to the selection of high-calorie, high-fat foods, further exacerbating the risk of obesity. In addition, lack of sleep affects the balance of many other hormones,

including cortisol and insulin, which play important roles in energy metabolism and appetite control^[5]. For example, cortisol is a stress hormone that increases in response to stress, but chronic sleep deprivation leads to sustained increases in its levels, which promote fat storage and increase the risk of abdominal obesity.

4.2 Energy Metabolism

Energy metabolism refers to the process by which the body expends energy at rest, namely metabolic rate, the minimum level of energy required to sustain life, including the basic physiological functions of heartbeat, respiration and cellular activity. A good night's sleep helps maintain normal metabolic rate, while poor sleep habits can interfere with this process. Lack of sleep or poor quality of sleep can interfere with the body's hormonal balance, especially the normal production of hunger hormones such as insulin and ghrelin. Imbalances in these hormones may lead to increased appetite and reduced energy expenditure, reducing metabolic rate. In addition, lack of adequate sleep can lead to physical fatigue, reducing the amount of daily activities, further reducing energy expenditure. The reduced energy expenditure prevents the body from effectively using the food it consumes to convert it into energy, instead storing it as fat. When the body uses less energy than it takes in, excess energy is stored as fat, leading to weight gain. In the long run, this energy buildup can lead to obesity and an increased risk of cardiovascular disease, diabetes and other health problems^[6].

4.3 Lifestyle Choices

Lack of sleep can have a variety of adverse effects on the body. Chronic lack of sleep can lead to daytime fatigue. When people feel tired during the day, they are often unable to maintain an efficient work and study state, seriously affecting the quality of life, but also has a negative impact on career development. At the same time, lack of sleep can lead to reduced participation in physical activity. When people feel tired, they don't want to do physical exercise. Instead, they choose to rest or do other relaxing activities. But physical exercise is crucial to maintaining good health and preventing obesity. Through exercise, people can burn excess calories, enhance muscle strength, improve metabolism, effective prevention of obesity.

Lack of sleep can also lead to increased sedentary time. When people feel tired, they often choose to sit down instead of doing activities. Sitting for long periods of time not only contributes to obesity, but also may cause other health problems, such as cervical and lumbar diseases^[7].

4.4 Psychological Factors

In analyzing the mechanism of the effect of sleep quality on obesity, the influence of psychological factors can not be ignored. Individuals who are sleep-deprived or of poor quality may experience increased mood swings and stress responses. Psychological changes can trigger so-called emotional eating behaviors, in which individuals tend to seek food as a form of comfort when their mood swings or stress increase, especially when it is high in calories or sugar. Emotional eating is a common coping strategy that allows individuals to experience negative emotions through eating for short-term pleasure and relief. This pattern of eating tends to lead to excessive energy intake, leading to weight gain and an increased risk of obesity. When people feel anxious, depressed or angry because of poor sleep, they are more likely to turn to food to regulate their emotions, which can lead to a vicious cycle: sleep problems lead to emotional problems, which in turn lead to overeating, overeating further affects the quality of sleep. In addition, poor sleep may affect an individual's diet choices and appetite-regulating hormones. For example, lack of sleep may lead to increased levels of hunger hormones, such as ghrelin, and lower levels of satiety hormones, such as leptin, which increase food cravings, especially cravings for high-energy foods. This biochemical change, coupled with changes in psychological status, works in concert to make individuals who are sleep-deprived more prone to overeating behaviors, increasing the risk of obesity^[8].

5. Strategies to Improve Sleep Quality

5.1 Establish a Regular Schedule

Staying up late can lead to confusion in the body clock of college students, making it difficult for the body to judge when to rest and when to be active. This can affect the quality of sleep at night and can lead to daytime fatigue and poor concentration. In the long term, irregular sleep patterns increase the risk of depression, anxiety

and other mental health problems. In addition, studies have shown that a lack of regular sleep can affect the functioning of the immune system, making people more susceptible to disease. To avoid these health problems, college students should avoid staying up late and establishing irregular sleep patterns. Efforts should be made to maintain the same sleep and wake up habits at the same time every day to improve the quality of sleep, increase energy and concentration during the day, and better manage their study and leisure time. This self-disciplined lifestyle contributes to her success in college and lays a solid foundation for her future career.

5.2 Create a Good Sleeping Environment

In order to ensure that college students can have a good quality of sleep, we need to create a suitable sleep environment. First of all, the bedroom is the most important quiet. In a noisy environment, it is often difficult to fall asleep or maintain a deep sleep, so reducing noise interference is the first task to improve the sleep environment. To this end, students can consider the use of earplugs, this simple tool can effectively block out external noise, help the brain into a relaxed state. In addition, white noise machines are also a good choice, it can produce a continuous and stable sound, to mask other noise, thus creating a more peaceful sleep space. In addition to sound control, light management is a key factor in creating the ideal sleep environment. The dark environment helps the body secrete melatonin, an important hormone that regulates the sleep cycle. Therefore, the use of shading curtains become a necessary step, can prevent outdoor light into the indoor, for college students to provide a completely dark sleep environment. Such an environment helps students fall asleep more quickly, and also ensures a good night's sleep, allowing students to be more energetic the next day. Temperature is also an important factor. Too Hot or too cold room temperature will affect the quality of sleep. The right temperature helps the body to relax, making it easier to fall into a deep sleep. Comfortable bedding is also an important part of a good night's sleep. High-quality mattresses, pillows, and sheets provide adequate support, increase comfort, and enhance the overall sleep experience^[9].

5.3 Increase Physical Activity

With the development of science and technology,

more and more activities in modern life become automated, people's daily activities reduced, for college students, regular physical exercise can burn extra calories, maintaining an energy balance helps control weight and has a direct positive effect on sleep quality. Good sleep is essential for students' cognitive function, emotional regulation and overall health. People who regularly participate in physical activity usually have better sleep quality than those who do not exercise. Exercise promotes deep sleep, helps individuals fall asleep faster, and reduces the number of times they wake during the night. Although physical exercise has many health benefits, it is important to note that the timing of exercise can also affect its effectiveness. Especially for college students who want to improve their sleep quality, they should avoid vigorous exercise before going to bed. Intense physical activity raises the body's metabolic rate, producing endorphins, which are stimulants and rejuvenators that affect the ability to fall asleep. Therefore, you should choose to do physical exercise at a time when you are far away from bedtime, so as to ensure that your body has enough time to cool down and enter a state suitable for rest^[10].

To sum up, the sleep quality of college students has an important impact on different obesity indicators. Therefore, improving sleep quality should become an important strategy to prevent and control obesity. The society, campus and family should pay more attention to the sleep condition of college students, and explore the correlation mechanism between sleep and obesity, and develop the corresponding intervention measures, to promote the health of college students.

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