FACTORS RELATED SLEEP QUALITY AMONG FIRST-YEAR STUDENTS AT HAINAN VOCATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY IN YUNLONG CAMPUS

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The Independents Submitted to Chiang Rai Rajabhat University

for the Degree of Master of Public Health (Public Health)

July 2025

摘要

题目： 海南科技职业大学云龙校区大一新生睡眠质量相关因素分析

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本论文的研究目的是研究海南科技职业大学大一学生睡眠质量和健康状况的影响，以及评估影响睡眠质量的相关因素，根据云龙校区专业的设置，研究对象为海南科技职业大学 5 个专业刚入学的大一学生，本研究采用了分层抽样的方法，共抽取样本量为 410 人，收集的数据使用统计软件进行分析，采用描述性统计、卡方检验等方法进行数据处理。

研究结果显示：海南科技职业大学大一学生中只有 16.1%的睡眠质量较好，整体睡眠质量令人担忧，影响睡眠的主要因素是生活习惯和环境因素，尤其是电子设备的使用和干扰，关于健康状况，近一半的学生经历了身心不适，也表明睡眠问题对身心健康有负面影响。在统计分析中，所有变量均未达到显著水平，且没有单一变量对睡眠质量有显著影响。

结论与假设相同的地方在于健康状况与睡眠质量有一定的关联，但是根据统计分析所有变量未达到显著水平，这一结果表明，大学一年级学生的睡眠质量并非由单一因素决定，而更可能是多种因素共同作用的结果。

关键词:因素，睡眠质量，一年级学生，匹兹堡睡眠质量指数（PSQI）

ABSTRACT

Title : Factors Related Sleep Quality among First-year Students at Hainan Vocational
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The purposes of this study were to study the health conditions and factors related to the sleep quality of the first-year students in a university at Hainan Vocational University of Science and Technology, and to assess factors related to sleep quality of first- year students in a university in Hainan Vocational University of Science and Technology. Based on the program offerings at Yunlong Campus, the subjects of this study were the first-year students from five majors at Hainan Vocational University for Science and Technology. The study employed stratified sampling, with a total sample size of 410 participants. Data collection was conducted using statistical software, and data analysis used descriptive statistics, chi-square tests, and other data processing.

The research findings showed that only 16.1% of first-year students at Hainan Vocational University for Science and Technology had good sleep quality, with overall sleep quality being a cause for concern. The main factors affecting sleep were lifestyle

habits and environmental factors, particularly the use and interference of electronic devices. Regarding health conditions, nearly half of the students had experienced physical and mental discomfort, indicating that sleep issues had a negative impact on both physical and mental health. In the statistical analysis, none of the variables reached a significant level, and no single variable had a significant effect on sleep quality.

The conclusion is the same as the hypothesis that there is a certain correlation between health conditions and sleep quality. However, according to statistical analysis, not all variables reach the significant level, which indicates that the sleep quality of first- year students is not determined by a single factor, but more likely to be the result of multiple factors.

ACKNOWLEDGMENTS

As the thesis is about to be completed, I look back with gratitude at every step along the way. First of all, I would like to express my sincere gratitude to my supervisor, Asst. Prof. Dr. Phatcharin Winyangkul, for not only patiently guiding me academically, but also firmly supporting and encouraging me in my confusion and anxiety. Your trust has given me the courage to keep moving forward.

Thank you to my family who have accompanied me along the way. It is your silent dedication and understanding that have enabled me to stick to my dream even when I was most tired.

At the same time, I would also like to thank my classmates and friends. In countless nights, we encouraged and cheered each other up. It is you who made this journey full of warmth and strength. I will always remember all these bits of kindness and companionship. Thank you!

Yu Xueting

July 2025

CONTENTS

CONTENTS (Continued)

CONTENTS (Continued)

LIST OF TABLES

LIST OF TABLES (Contiuned)

LIST OF FIGURES

CHAPTER I

INTRODUCTION

Background and rationale

According to the statistics of the World Health Organization, about 27% of people in the world have sleep quality problems, and insomnia in China accounts for 38.2% The relevant data of the "2020 Chinese Sleep Quality Report" shows that about 300 million people in China have sleep quality problems, and 67.24% of the surveyed people have insomnia symptoms. Due to the lack of understanding of sleep quality assessment in many patients with insomnia, and dismissal of corresponding attention to daily life, most have long-term intractable insomnia and rely heavily on medicine when they visit clinic, which has a great impact on the physical and mental health of patients (Wang xiaokang, 2023).

According to the "2024 Chinese Residents' Sleep Health White Paper", only 29% of the surveyed people fall asleep before 23:00, 47% fall asleep after midnight, and 13% fall asleep after 2:00 in the morning. Among them, the average time for people born after the year 2000 to fall asleep is 00:33, and the time for people born before the year 1970 to fall asleep is 23:02. Retired people born before 1970 and after 1970 are often troubled by waking up at night/early and going to the toilet at night, while young people born after 1900 and after 1990 are troubled by difficulty falling asleep. For college students, the survey shows that 56% of college students use their mobile phones for more than 8 hours a day, and 51% fall asleep after midnight, and 19% fall asleep after 2:00 in the morning.

In addition, office workers tend to sleep more fully on non‑working nights, sleeping 33 minutes more than on weekdays on average, and falling asleep and waking up later than on weekdays, while college students fall asleep and wake up later than office workers on non-working days.

As a tropical tourist destination in China, Hainan's unique geographical environment and climatic conditions may have an impact on the sleep quality of residents(Zhang wei,2021) The climate in Hainan is hot and humid, and some residents have difficulty adapting to the high temperature and humidity environment, resulting in poor sleep quality. In addition, environmental factors such as noise pollution and light pollution also have a certain impact on sleep quality. Psychological factors such as work pressure and life stress are important factors affecting sleep quality. The rapid economic development of Hainan and the gradual increase in competitive pressure have caused some residents to face greater psychological pressure, which in turn affects the quality of sleep. Poor sleep habits such as staying up late and overusing electronic devices such as mobile phones can also affect sleep quality. Surveys show that some young people in Hainan stay up late, resulting in insufficient sleep time and reduced sleep quality (Wangmin,2022).

In recent years, surveys have shown that sleep quality problems are common among college students and are more severe than the general population. In the current fast-paced, high-stress state, the number of people with low sleep quality has increased significantly, college students are in an important stage of life development, and the sleep structure has also undergone corresponding adjustments during this period(Liu, X., & Zhang, J. 2020). Relevant studies have shown that the sleep quality of college students is generally average, and 36.1% of college students have sleep quality

problems. Relevant studies have shown that the sleep quality of college students is generally average, and 36.1% of college students have sleep quality problems. (Wang xiaokang,2023)

As a first-year students on Sleep is an important part of human life activities, it is not only the process of the body to repair and restore energy, but also an important moment for the brain to consolidate memories and organize information. Sleep is one of the most important forms of rest, which is related to the life and learning status of each student, the recovery of physical strength and physical strength, in addition, the quality of sleep is also very important for maintaining physical health and promoting metabolism.(Zheng jinge,2023)

In addition to facing the pressure of basic course learning, transfer student exams, English Level 4 certificate exams and interpersonal communication, first-year students are also facing the pressure of playing games, being anchors and online sales as the Internet enters all aspects of life, which leads to compressed sleep time and reduced sleep quality. Among the 497 first-year students surveyed, the data showed that factors affecting college students staying up late include playing online games, chasing dramas, watching short videos on Douyin and dormitory relationships, which is consistent with the results of Huang Xiaojing's survey on "factors affecting college students staying up late". The phenomenon of first-year students staying up late is common, and staying up late is an important factor that harms the physical and mental health of college students (He Yun, 2021).

In January 2020, a study on the sleep status of 12,117 students from 40 colleges and universities across the country showed that 77% of college students had sleep problems. Studies have shown that factors such as sleep patterns, eating habits,

lack of exercise, and smartphone dependence can affect college students' sleep. Sleep problems can lead to a series of health and social problems such as daytime dysfunction, emotional instability, anxiety, excessive behavior and poor academic performance. First-year students, especially those in medical schools, find that they are under great pressure to study and are prone to problems in learning and adapting to life. The survey shows that the insomnia rate is as high as 35.7%, and many students also have other sleep problems of varying degrees (Han Lixin, 2020).

As a first-year students on campus, you are easily tempted by the internet and immersed in the online world. Taking up part of the rest time of first-year students not only affects the quality of sleep, but also leads to a variety of diseases. Therefore, in order to understand the quality of sleep in first-year students, we should systematically promote the importance of sleep to the health of first-year students.

Objective

1. To study the sleep quality and impact of health status of first-year students in a university in Hainan Vocational University of Science and Technology.

2. To assess factors related to sleep quality of first-year students students in a university in Hainan Vocational University of Science and Technology.

Research question

1. How about the sleep quality and health status of sleep quality among in Hainan Vocational University of Science and Technology?

2. What are the main factors that associate first-year students's sleep quality in Hainan Vocational University of Science and Technology?

Hypothesis

Health status related with sleep quality among first- year students in a university in Hainan province.

Operational definition

1. Sleep quality: Sleep quality refers to whether a person gets enough, deep and continuous sleep during sleep. People with good sleep quality usually feel energetic when they wake up in the morning and have good response to external stimuli. On the contrary, people with poor sleep quality may feel exhausted, irritable and inattentive during the day.

2. Sleep disorders: the main clinical manifestations are difficulty in falling asleep, sleep maintenance difficulties, early waking sleep and decreased sleep satisfaction. Can be caused by the unpleasant psychological events, the uncomfortable external environment.

3. First-year students: A first-year students who has just entered university and is known as a first-year students.

4. Health standards for sleep: Sleep volume: generally 7-9 hours. The human body's requirements for sleep are generally 7-9 hours of sleep per night for young adults, 1-3 hours more for young children, and 1-3 hours less for the elderly. These are the requirements for sleep volume (time) in different age groups. Sleep quality: falling asleep within half an hour, basically staying up all night. You can fall asleep within half an hour of going to bed, staying awake all night or waking up once, not intermittently waking up or waking up early; Dream less, not many or nightmares; Deep sleep is not like sleeping or being easily disturbed or awakened by the environment, which is a requirement for sleep quality. Best sleep time: 12pm to 8am. The best sleep time for humans should be from 12pm to 8am, slightly earlier for the elderly from 11pm to 7am, and 10pm to 8am for children. This type of sleep time conforms to the natural law of yin and yang growth and decline. If this law is violated for a long time, it will be constrained by the natural law of yin and yang growth and decline, leading to insomnia.

5. Pittsburgh Sleep Quality Index (PSQI): Compiled by Buysse Dj et al., a sleep expert at the Psychiatric Sleep and Biological Rhythm Research Center at the University of Pittsburgh Medical Center, in 1993, specifically for assessing subjective sleep quality in subjects over the past month. The measurement methods and result processing are more complex than other psychological measurement methods. The Pittsburgh Sleep Quality Index consists of 19 self-assessment questions and 5 questions assessed by sleep peers. Only score 19 self-assessment questions. 19 self-assessment questions consist of 7 factors with scores ranging from 0 to 3. The cumulative score of

each factor component is the total score of the Pittsburgh Sleep Quality Index scale, with a total score range of 0-21. The higher the score, the worse the sleep quality.

6. Irregular daily routine: Irregular sleep patterns often include staying up late and waking up late, which can affect sleep, meals, and work. In addition, excessive fatigue and comfort can damage the body's qi and blood over time, leading to sub healthy states and even diseases. So it is recommended to go to bed and wake up early, schedule three meals, balance work and rest, avoid overwork and excessive comfort, and cultivate a regular and scientific sleep pattern to ensure a healthy state.

7. sub-health: Sub health was first proposed by former Soviet scholar Berkman in the 1980s. It refers to an intermediate state in which a living individual leaves their health state and begins to move towards disease under the influence of various disease risk factors, but has not yet reached the diagnostic criteria of Western clinical diseases. It is also known as subclinical state, sub health, pre disease state, etc. Although sub health has not been classified as an international disease, it is widely present in various populations and can show signs of decreased vitality, reduced responsiveness, and decreased adaptability, causing an undeniable impact on quality of life.

8. BMI: It is an indicator to assess whether an adult's weight is healthy. It is calculated based on the relationship between weight and height and is widely used in clinical, health management and public health fields. The National Health and Family Planning Commission of the People's Republic of China (formerly the Ministry of Health) issued it in 2013. This standard is based on the characteristics of the Chinese population's body type and metabolic disease risk, and is more suitable for Asian populations than the World Health Organization (WHO) standard. ≤18.4 Underweight (emaciated)、18.5–23.9 Normal weight、24.0–27.9 Overweight、≥28.0 Obese.

Expected Benefits and applications

1. Provide scientific basis: Through in-depth research and data analysis, this study can provide scientific basis for improving the sleep quality of first-year students . This helps schools, parents, and society to have a more precise understanding of the sleep needs and issues of first-year students , thereby formulating more targeted policies and measures.

2. Promoting the development of physical and mental health: Good sleep quality is an important foundation for physical and mental health. By improving sleep quality, it can help first-year students reduce fatigue, enhance immunity, improve learning efficiency, and promote their comprehensive development.

3. Improving the quality of learning and life: Quality sleep helps to enhance cognitive function and emotional stability in the brain, making first-year students more focused, efficient, and proactive in learning and life. Therefore, improving sleep quality helps to enhance the learning and living quality of first-year students , laying a solid foundation for their future development.

4. Guiding mental health work: This study may also reveal the relationship between sleep quality and mental health, providing guidance for schools to carry out mental health education and counseling. This helps prevent and treat psychological problems caused by poor sleep quality, such as anxiety, depression, etc.

5. Promoting the construction of campus culture: The research results can further promote the construction of campus culture, advocate healtlifestyles, and enhance the awareness and importance of healthy living among first-year students . By

organizing relevant lectures, activities, and other means, guide first-year students to develop good sleep habits and create a positive and upward campus atmosphere.

CHAPTER II

LITERATURE REVIEW

Several concepts was outlined in this chapter provide explanation about the overall conceptual framework into which the research was laid. Below are specific studies which were reviewed to support this research as follows;

1. Sleep quality

    1.1 The significance of sleep

    1.2 Sleep cycle

    1.3 Benefits of sleep

    1.4 Effects of lack of sleep

    1.5 Health impact

    1.6 PSQI

2. Meaning of health status

    2.1 Determinants of health status

    2.2 Socioeconomic factors

    2.3 Environmental factors

    2.4 Behavioral factors

    2.5 Genetic and biological factors

3. Research related to this study

4. Conceptual framework

Sleep quality

The significance of sleep

Sleep temporarily reduces the body's sensory and motor activities through the control of the sleep center. When stimulated by the outside world or the body, the body will wake up immediately. It is a process controlled by both the circadian rhythm and the body's homeostasis mechanism. At present, the international community regards non-rapid eye movement (NREM) and rapid eye movement (REM) as the two main phases of human sleep (Zhanghui, 2023) .Sleep has a significant impact on people and is the basis and manifestation of a person's physical and mental health. In 2001 , the World Health Organization (WHO) March The 21st is set as " World Sleep Day " to specifically remind people of the importance of sleep. Current research generally believes that sleep is the prerequisite for individual physiological activities, is cyclical and reversible, and is actively regulated by the sleep - wake center. The quality of sleep can be measured by the corresponding physiological indicators on the one hand, and by the individual's subjective evaluation on the other hand. When evaluating sleep quality, both physiological and psychological indicators should be considered comprehensively to obtain relatively objective and accurate results. Usually, the definition of sleep quality includes the following three aspects: the sleep process is a subjective evaluation process; it is measured by objective indicators; and it is measured by both physiological and psychological indicators.

Good sleep is the key to ensure a good state of the individual. Sleep has many functions, such as relieving stress, improving cognitive level, and helping the body recover from fatigue. However, if the quality of sleep is poor, it will lead to physical

diseases, such as emotional instability, anxiety, daytime sleepiness, loss of flexibility, decreased immunity, memory, logical thinking ability, and comprehension ability. Sleep has a great impact on the individual's physical and mental health, mood and memory, etc. Insufficient sleep can damage an individual's cognitive ability and may lead to decreased attention and even depression (Guoxiaoyu, 2023) .

A good sleep plays an important role in improving and maintaining individual health. Sleep is a continuous physiological process that alternates with longer periods of wakefulness and occurs repeatedly over a certain period of time, affecting the individual's behavioral responses and physiological functions (Zengqiao, 2023).

Sleep quality is evaluated by the stability of the sleep cycle, the subjective feeling of the body or the changes in objective measurement indicators. A sleep cycle that is too long or too short is considered to be poor sleep quality or sleep disorder. Lin Mengdi et al. believe that sleep quality is a comprehensive indicator for evaluating the effectiveness of sleep, including objective evaluation (sleep time, number of awakenings, etc.) and subjective evaluation (daytime social function, degree of rest, etc.) (Zhanghui, 2023).

In general, sleep is not only a process of resting the body, but also an important pillar of overall health and quality of life. By maintaining healthy sleep habits, we can effectively improve cognitive function, maintain mental health, enhance immunity and promote physical health. Therefore, the importance of sleep cannot be ignored in health management and has become one of the necessary factors for people to pursue a healthy and happy life.

Sleep cycle

People do not have a single sleep state when they sleep. In 1953, American scholars Eugene Aserinsky and Nathaniel Kleitman first announced that they had discovered a sleep state with intense eye movement (Rapid Eye Movement, referred to as REM). Since then, people have divided sleep into two states: REM rapid eye movement and non-rapid eye movement, and these two states appear in a 90 (±20) minute cycle. After subsequent research, modern medicine has further divided the N-REM sleep stage into 1 to 4 sleep levels based on the different brain wave discharges. Its distribution is shown in the figure: Source:Baidu
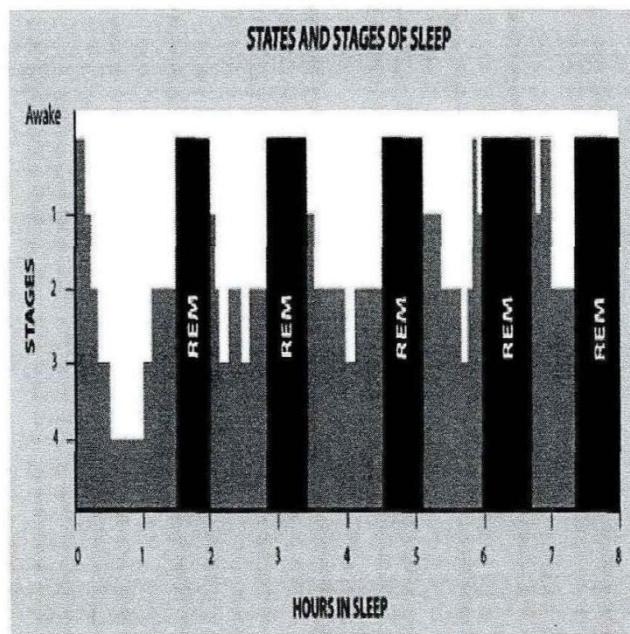
The X-axis in the figure represents the sleep time, and the numbers in the Y-axis are the 1-4 sleep levels divided according to brain waves in N-REM. REM sleep is represented by dark columns in the figure. We call N-REM and REM sleep stages. Usually, a sleep cycle refers to an N-REM stage followed by a REM sleep stage. A natural wake-up sleep usually consists of several sleep cycles (Yao Hengzhi, 2017).

A sleep cycle refers to the cycle of different stages and states that humans go through during sleep. Generally speaking, a sleep cycle consists of two main types of sleep: non-rapid eye movement sleep (NREM) and rapid eye movement sleep (REM), which alternate to form a complete cycle.

A typical sleep cycle lasts about 90 to 120 minutes and usually includes the following stages:

NREM sleep stages : Stage 1: At the beginning of falling asleep, the body begins to relax, brain waves become slower, and people are easily awakened by external sounds and interference. Stage 2: The depth deepens, body temperature drops, heart rate and breathing gradually slow down, and the brain begins to produce " sleep brain waves". This stage accounts for most of the total sleep time. Stages 3 and 4: Also known as Slow Wave Sleep (SWS), this is a deep sleep stage that is essential for physical recovery and growth and development.

REM sleep stage : REM sleep is a highly active sleep stage. Brain activity is similar to that when awake, and dreams often occur in this stage ; muscles relax, eye movements occur rapidly, and breathing and heart rate become more irregular.

During the entire sleep cycle, NREM and REM stages alternate, and multiple complete sleep cycles are experienced every night. The average person experiences about 4 to 6 sleep cycles every night. These cycles are crucial to both physical and mental health, and the proportion and quality of different stages affect the restorative effect of sleep and the individual's feeling state.

Benefits of sleep

Sleep is a cyclical physiological state, usually characterized by closing the eyes, relaxing muscles, reducing perception and responsiveness, accompanied by specific EEG activity patterns and physiological changes. It is a reversible behavioral state of reduced perception, characterized by unresponsiveness to the environment. Sleep is not only an important factor in maintaining energy and promoting physical health, but also a key factor affecting an individual's health and well-being throughout his or her life. Sleep plays an important regulatory role in the human body, promoting physical and mental recovery, energy conservation, and survival. At the same time, sleep is essential for neurodevelopment, learning, memory, emotional management, and cardiovascular and metabolic health. Sleep duration, as one of the important indicators of sleep quality, reflects an individual's healthy sleep habits and is affected by physical, psychological, and social factors (Wang Hongdan, 2023).

Sleep has a profound impact on human health and quality of life, and its benefits have been widely studied and proven. Adequate sleep has a positive impact on many aspects of the body, playing a vital role in everything from cognitive function to mood regulation to immune system stability.

First of all, sleep has a significant impact on the improvement of memory and learning abilities. Research shows that the deep sleep stage is a critical period for information processing during memory consolidation and learning. For example, Walker (2009) pointed out in his study the importance of sleep for learning, especially that deep sleep stages play a key role in memory formation and information integration.

Adequate sleep has an important impact on the cognitive function and academic performance of college students. Research has found that good sleep habits can significantly improve learning ability and memory, which is crucial for college students facing a heavy academic load. According to a study published in the journal "Sleep Health", adequate sleep can not only promote the integration of information in the brain and the consolidation of memory, but also improve academic performance and learning efficiency (Kelly et al., 2020).

Secondly, sleep has a protective effect on the mental health of college students. With the accelerated pace and stress of college life, mental health issues such as anxiety and depression are increasingly common. Research shows that getting enough sleep can effectively reduce symptoms of anxiety and depression and improve emotional stability. A study published in the Journal of Adolescence pointed out that there is a significant positive correlation between sleep quality and mental health, and insufficient sleep may increase the risk of mental health problems (Gomes et al., 2018).

Good sleep habits are also beneficial to college students' immune function and physical health. Research shows that getting enough sleep can help enhance immune system function and reduce the risk of infection. Lack of sleep affects the activity and number of immune cells, making individuals more susceptible to viruses and bacteria. According to a study in Psychosomatic Medicine, poor sleep quality is closely related to a decline in the immune system, and adequate sleep can help maintain a healthy immune status.

In summary, adequate sleep has a significant positive impact on college students' cognitive function, mental health and immune system function. Therefore, college students should pay attention to good sleep habits and ensure adequate sleep

through regular work and rest times, a comfortable sleeping environment and a healthy lifestyle, thereby improving academic performance, maintaining mental health and enhancing physical health.

Effects of lack of sleep

Studies have shown that insufficient sleep and sleep disorders can cause changes in the inflammatory, immune, metabolic, and neuroendocrine systems. In addition, sleep- related circadian rhythm imbalance appears to be related with an increased risk of cardiovascular disease and increased mortality.

Secondly, sleep is essential for the maintenance of mental health. Sufficient sleep helps maintain emotional stability and mental health. Studies have found that lack of sleep is closely related to mental health problems such as anxiety and depression (Baglioni et al., 2011). By maintaining healthy sleep habits, these mental health problems can be effectively prevented and alleviated.

In addition, sleep plays an important role in regulating the function of the immune system. Adequate sleep helps maintain the normal function of the immune system and enhances resistance to infection and disease. Studies have shown that there is a close two-way relationship between sleep and the immune system (Ibarra-Coronado et al., 2015). Poor sleeping habits may lead to decreased immune function and increase the risk of infection. Sleep is also essential for maintaining good health. It helps regulate body weight and metabolism, and plays an important role in maintaining a healthy weight by affecting hormone secretion and appetite regulation. Research by Markwald

et al. shows that lack of sleep affects daily energy expenditure, food intake, and weight gain.

Lack of sleep can also cause a significant decrease in visual and auditory response ability. The main reason is that lack of sleep causes an imbalance between oxygen supply and oxygen consumption in the human cerebral cortex, resulting in insufficient blood oxygen supply, which affects the secretion of dopamine in the nerves, reduces the connectivity of various brain nerve regions, inhibits the transmission of excitation information, reduces the concentration and persistence of attention, and causes the muscles to react to the outside world. This causes the body's ability to react quickly, especially in visual and auditory reactions that require continuous attention to complete tasks.

Health impact

In Western countries, research has highlighted the impact of sleep on cardiovascular health and mental health. For example, studies have shown that insufficient sleep is related with an increased risk of high blood pressure, heart disease, and stroke. Long-term insufficient sleep is also related with a weakened immune system and weight gain. In addition, mental health problems such as depression and anxiety are also closely related to sleep quality. Huang et al. (2017) found a significant association between sleep duration and the risk of cardiovascular events in a large prospective study, further emphasizing the importance of adequate sleep for cardiovascular health. Besedovsky et al. (2012) explored the relationship between sleep and the immune system, pointing out that good sleep can enhance immune function, while insufficient sleep can weaken the immune system.

In China, traditional Chinese medicine theory also emphasizes the impact of sleep on health, especially its relationship with qi and blood, organ function, and psychological balance. Chinese medicine believes that insufficient sleep can lead to "restlessness of mind", affect organ function, and then cause various health problems. For example, the Yellow Emperor's Classic of Internal Medicine mentions that insufficient sleep may lead to "imbalance of qi and blood" and affect overall health. Modern Chinese research also supports these traditional views, pointing out that insufficient sleep is related with an increased risk of chronic diseases such as hypertension and diabetes. For example, a study by Wang Jinhuan et al. (2020) found that poor sleep quality was related with an increased risk of metabolic syndrome, which is consistent with Western research conclusions but emphasizes TCM's unique understanding and treatment of these problems.

Pittsburgh sleep quality index (PSQI)

The Pittsburgh sleep quality index (PSQI) was compiled by Dr. Buysse, a psychiatrist at the University of Pittsburgh, and others in 1989. This scale is suitable for evaluating sleep quality in patients with sleep disorders and mental disorders, and is also suitable for evaluating sleep quality in the general public.

The sleep quality scale that is currently widely used includes subjective sleep quality, sleep latency, total sleep time, sleep efficiency, sleep disorders, medication, and daytime function. The score range for each question is 0~3 points, and the total score is 0~21 points. The higher the score, the worse the sleep quality. A total score of ≤5 points indicates good sleep quality; a total score of >5 points indicates poor sleep quality. PSQI is suitable for evaluating sleep quality in the past month. The completion time is 5~10 minutes, and the scoring time is about 5 minutes.

Meaning of health status

Determinants of health status

Health status (www. Baidu. com) refers to the comprehensive physical, psychological and social status of an individual. This status not only covers the normal function of physical organs, but also includes the emotional and cognitive health, as well as the individual's ability to adapt to the social environment and the quality of life. In general, the assessment of health status takes into account the following aspects:

1. Physical health: This includes the health of organ function, metabolic status, immune function, etc. Good physical health means that all body systems function normally and can cope with the challenges and pressures of the external environment.

2. Mental health: involves the assessment of psychological states such as emotional stability, depressive symptoms, and anxiety levels. Good mental health means that individuals can effectively cope with stress, have positive emotional experiences, and have the ability to adapt.

3. Social health: This takes into account the role and function of an individual in a social environment, including factors such as social interactions, interpersonal relationships, occupation and economic status. Good social health means that an individual can get support and recognition in society and has a stable social role and social support network.

In summary, the definition of health status not only focuses on whether the body is sick or dysfunctional, but also includes a multi- dimensional assessment of the psychological and social levels, reflecting the comprehensive state of an individual's overall health and quality of life.

The determinants of health status cover multiple levels, from individual physiological status to various factors in the social environment. The following are the main factors that affect health status:

1. Biological factors: Genetic factors: including the impact of individual genetic genes on health, such as susceptibility and risk of genetic diseases ; Age and gender: There are differences in health status among different age groups and genders, such as the specific health needs and risks of children, adolescents, adults and the elderly.

2. Behavioral factors: Dietary habits: Dietary nutrition directly affects physical health and immune function. Physical activity: Moderate exercise helps maintain physical health and cardiovascular health. Smoking and drinking: Tobacco and alcohol consumption have direct effects on health, such as causing chronic diseases and increasing the risk of disease.

3. Social and economic factors: Education level : There is a correlation between education level and health cognition, health behavior and health outcomes. Economic status: Income level, occupational status and the availability of social resources affect the health status of individuals. Social support: Support from family, community and social network is crucial for mental health and coping with stress.

4. Environmental factors: Living and working environment: Environmental pollution, working conditions and living environment have a direct impact on health. Social environment: including the impact of crime rate, social and cultural values on health status.

5. Health care factors: Access to medical services: including the impact of health insurance coverage, allocation of medical resources, etc. on health status. Quality of

health services: The level of medical technology, the quality of medical staff and the effectiveness of treatment plans have an important impact on health outcomes.

These factors interact with each other and jointly determine the health status of individuals, emphasizing that health is a multidimensional, complex and dynamic concept. Effective health interventions should take into account the combined effects of these factors to improve the overall health level of individuals and groups.

Socioeconomic factors

In the field of medical sociology research, socioeconomic status is often regarded as an important factor affecting health, generally measured by income and education level. Many research results at home and abroad have confirmed the fact that socioeconomic status can lead to health inequality. Studies have shown that people with lower socioeconomic status have lower health levels and worse mental health.

Socioeconomic status refers to the overall condition or status of an individual in a social stratification system. This concept is widely used in many disciplines. For a long time, an individual's health has been considered to be closely related to his or her socioeconomic factors. As one of the socioeconomic factors, socioeconomic status is a basic factor affecting health levels. Income, education, and occupation are often used as indicators of socioeconomic status (Zou Jiayu, 2022).

A study of the relationship between family socioeconomic status, perceived stress, and sleep quality. Existing cross- sectional studies have found that family socioeconomic status can combine various aspects of individual- related stress to have an impact on sleep disorders (Ferreira et al., 2019). For example, the socioeconomic status of adolescents can significantly predict their cardiovascular disease in adulthood through economic pressure, insufficient medical resources, etc. (Doom, 2017), and

individuals with cardiovascular disease are often accompanied by sleep problems (Long Xueyuan , 2015) ; in addition, students with low family economic status have insufficient ability to cope with external shocks, which will lead to increased levels of physiological stress hormones, higher stress perception, and corresponding increases in depression and anxiety, thereby reducing individual sleep quality. Chronic stress caused by low family socioeconomic status over a long period of time will lead to individual sleep disorders and cognitive impairment. On the contrary, sleep disorders and cognitive impairment will aggravate the individual's stress perception and emotional disorders. In short, existing cross- sectional studies have shown that family socioeconomic status will affect sleep quality through high stress, and will form a vicious cycle (Fu niuniu, 2023).

Environmental factors

Environmental factors have an important impact on sleep quality. The following are some common environmental factors:

1. Light : Light is a key factor in regulating the biological clock. An environment that is too bright or too dark may affect sleep quality. The human body's biological clock regulates the sleep-wake cycle by sensing light.

wake cycle of mammals has been operating day after day under the guidance of the light- dark cycle formed by the rotation of the earth . However, with the development of society, the popularization of electric lights has completely changed people's work and rest patterns from sunrise to sunset. In the past century, the natural light cycle has been disrupted by the presence of artificial light at night, and light pollution has become a rapidly growing global phenomenon. Light pollution can be divided into three categories: white light pollution, color light pollution, and artificial

day and night. Among them, artificial day refers to the phenomenon of artificial lighting at night that is like daylight pollution, which has the greatest impact on the sleep - wake cycle. Studies have shown that exposure to high-intensity artificial light at night will delay the onset of sleep to varying degrees, increase the number of awakenings at night, reduce total sleep time, or change the relative proportion of rapid eye movements (REM) and non -rapid eye movements (NREM) (Pan Rong, 2021). The intensification of light pollution has disturbed the sleep of more and more people, and insomnia has become more and more common. Data show that the prevalence of insomnia disorders in adults in China is as high as 9.2% .

2. Noise : Noise is a common disturbing factor in sleep. Continuous noise (such as traffic noise, neighbors' voices or mechanical equipment noise) may hinder falling asleep or interrupt sleep.

The decibel standard for sleeping is generally 30-50 decibels, of which 30-40 decibels is relatively quiet and belongs to the normal environment. More than 50 decibels will affect sleep and rest. There are many factors that affect sleep, and noise is one of them. Noise has a greater impact on sleep, not only affecting the time to fall asleep, but also affecting the quality of sleep. The details are as follows:

1. If people are in a noisy environment for a long time, it is possible that specific damage will occur to the auditory system, such as hearing loss, tinnitus and other symptoms, which will also affect emotions. Due to the influence of noise, long-term lack of sleep may also damage the nervous system and have adverse effects on the body.

2. Try to avoid sleeping in an environment with excessive noise. For example, stay up late at night, choose to sleep in a quiet environment at night, and avoid resting during noisy periods during the day. If the outside noise is loud at night, you can install

doors and windows with better sound insulation, or use earplugs, earmuffs, etc. These items can effectively reduce the decibels of noise. People can rest and sleep better in a quiet environment, which not only helps improve work and study efficiency, but is also beneficial to physical and mental health (Baidu Health,2023)

3. Temperature and air quality: The temperature and air quality of the sleeping environment have a significant impact on sleep quality. Temperatures that are too high or too low, as well as poor air quality (such as humidity or oxygen-depleted conditions), can disrupt sleep.

As early as 1897, American scholars first described the phenomenon of vasodilation at the beginning of sleep, which showed that there is a close connection between body temperature regulation and sleep, and the thermal environment has a significant impact on the body's body temperature regulation, mainly reflected in core body temperature and Diurnal cycle of skin temperature. Among them , the circadian rhythm of core body temperature is determined by changes in heat production and heat loss, and is closely related to the circadian cycle of sleep. Studies have shown that a rapid drop in core body temperature increases the likelihood of sleep onset and may facilitate progression into deeper sleep stages. Since core body temperature during sleep is related to sleep sensation, temperature changes during sleep may cause different sleep sensations. It is extremely important to create a good thermal environment for sleep.

Indoor air quality is one of the important indicators for evaluating indoor environment. Although there is no clear evidence that indoor air quality affects sleep quality, some studies have shown that air quality marked by increased CO_2 levels can Poor quality can have a negative impact on sleep quality. CO_2 and indoor air Air pollutants are positively correlated and are often used as indicators of indoor air quality

or ventilation rate. Believe that due to Poor air quality caused by increased CO_2 concentrations can lead to symptoms of sick building syndrome（SBS），For example, the prevalence of headaches has increased and the ability to think clearly has decreased (Zhang Yongming , 2023).

4. Mattress and pillow: A comfortable mattress and pillow are essential to provide correct support and posture. An unsuitable mattress or pillow may cause physical discomfort and affect sleep quality.

Meng Yuan（2020）'s research paper shows that the human body will also lose heat and water during sleep. In order to enable the human body to maintain thermal and moisture balance during sleep. Bedding plays a very important role in this. During sleep, bedding fabrics should have thermal insulation, moisture conductivity, breathability, hygroscopicity, etc. These properties can regulate the microclimate between the bedding and the skin during sleep . Among them, in the microclimate, temperature comfort is to maintain the thermal balance of the human body and make the human body feel comfortable. In real life, warmth retention should be the basic requirement of bedding. When the external environment temperature drops, bedding has the effect of resisting cold and heat insulation. When the temperature rises, the fabric should be able to exchange the heat generated by the skin with the outside world, otherwise the human skin may feel stuffy.

5. Bedroom layout: The layout and cleanliness of the bedroom are important for creating a good sleeping environment. A bedroom that is too messy or untidy may increase psychological stress and affect falling asleep.

As early as 2009, Lu Futong wrote in "Science Life": More than one-third of a person's life is spent in the bedroom. The layout of the bedroom directly affects people's rest, emotional state and sleep quality. The bedroom is best on the sunny side, which is sufficient all year round to make people feel cheerful. The bedroom should be 10-15 square meters. If it is less than 10 square meters, it will appear depressing. If it is more than 15 square meters, the heart will not be at ease, and the sleep will be unstable, which is not conducive to the storage of wind and gathering of qi, affecting the quality of sleep and health. It is best not to have a bathroom in the bedroom. If there is a bathroom, the door should be closed frequently to prevent the dirty air from affecting the bedroom. Do not install mirrors in the bedroom. Mirrors will reflect people's energy and have a negative impact on people's subconsciousness. Do not place hangers or hang clothes outside. Do not grow flowers and plants. Some flowers and plants will compete with people for oxygen, and many flowers and plants will release gases that are harmful to the human body.

6. Electronic devices: The blue light emitted by electronic devices such as mobile phones, televisions and computers will inhibit the secretion of melatonin and affect sleep quality. It is best to stop using these devices one hour before going to bed.

Medical students' mobile phone addiction is positively correlated with sleep quality disorders (Li lidan, 2024). Long-term exposure of the eyes to the blue light emitted by electronic products will disrupt people's daily biological clocks and affect the body's internal circadian rhythm. Medical students are under great academic pressure and do not get enough rest and relaxation during the day. They may immerse themselves in games or video software at night, resulting in reduced sleep time, poor sleep quality and daytime dysfunction. The more addicted medical students are to

mobile phones, the more severe their depression is, which is consistent with previous research results . Long-term addiction to mobile phones can cause medical students to be out of touch with real life and have negative thoughts, which can cause depression and sleep disorders . Generally speaking , the more time and energy medical students spend on their mobile phones, the less effective communication they have with their classmates and teachers , and they may even have family conflicts, which may make them more susceptible to other psychological problems such as depression.

7. Social factors : Xie Yingying mentioned in the 2024 World Journal of Sleep Medicine that college students are a group in the growth and learning stage, and are in late adolescence or early adulthood. During this stage, they will face various challenges, such as academic pressure, employment pressure, interpersonal relationship problems, etc. , and also face challenges in self-cognition and career planning. At this stage, college students' social anxiety and sleep problems have attracted widespread attention. It is believed that the above situation has a great impact on their mental health and social life, and for college students, the incidence of the above problems is relatively high. When college students have sleep problems, their quality of life will be reduced, and their learning status will be further affected. Their physical and mental health status has a great impact on their learning effects and social adaptability. In order to improve their learning efficiency and better integrate into interpersonal communication, they must maintain a good mental state. Once they have psychological and sleep problems, it will affect their normal study and life, and further affect their future employment competitiveness.

Behavioral factors

According to data from the U.S. National Health and Nutrition Examination Surveys (NHANES), the main risk factors for insufficient sleep or poor sleep quality include smoking, alcohol consumption, lack of exercise, obesity, unhealthy diet, and depression. Unhealthy diets often include poor eating habits and unbalanced dietary intake. Previous studies have found that poor dietary habits may affect the risk of various chronic diseases. For example, people who never eat breakfast have an 87% increased risk of death from cardiovascular disease compared with people who eat breakfast every day. People who have late dinners and late-night snacks also have a significantly increased risk of cardiovascular disease. In addition to adversely affecting the body's long-term health, these poor eating habits may also affect the short-term physical state, including daily sleep quality.

The relationship between dietary intake and chronic diseases has been widely explored. In recent years, more and more studies have found the link between dietary nutrient intake and sleep. Researchers have found that macronutrients, such as carbohydrates and amino acids (especially tryptophan), can be involved in and affect the levels of neurotransmitters in the intrinsic sleep process and affect sleep patterns (Wang Liang, 2022).

Sports activities: Most foreign studies have conducted comparative experimental studies on people with and without sleep disorders through experimental methods, and found that appropriate physical exercise has an improvement effect on patients with sleep disorders (Deng Xiaoxiang, 2023). Aoike DT et al. found through experimental studies that physical activity aerobic exercise and chronic kidney disease patients have an impact on sleep quality, aerobic exercise training has an improvement effect on the

sleep quality of chronic kidney disease patients, and the sleep quality of chronic kidney disease patients can be slowly regulated through aerobic exercise. Richardson CE et al. found that college students and adolescents have poor sleep quality. Among sleep problems, college students and adolescents have the longest time to fall asleep. Exercise can change and regulate sleep problems among college students and adolescents, thereby improving the sleep quality of college students. One of the risk factors for obesity in college students is the reduction of sleep time and changes in sleep quality. Sports can promote sleep time and improve sleep quality. Mendelson, M and other scholars conducted 12 weeks of aerobic exercise and endurance training for 20 obese college students and 20 normal - weight college students for three hours every seven days. The main study was the effect of exercise training on the sleep quality of obese college students. The experimental results showed that the sleep quality of obese college students changed, indicating that sports can improve sleep quality.

Smoking and drinking: Smoking addiction can lead to sleep disorders, and further development may cause daytime dysfunction , cognitive decline , neurotic anxiety and mental illness . Sleep not only has a physiological effect on the human body, but also helps to consolidate cognitive function . Newly encoded memories are strengthened during the sleep stage and transmitted from the hippocampus to the cerebral cortex network . Smoking behavior not only affects sleep quality, but also impairs cognitive control functions related to sleep (Sun Yaning, 2023) .

Genetic and biological factors

As the prevalence of obesity and T2DM increases, sleep deprivation has become part of the contemporary lifestyle for people of all age groups. The study found that average sleep duration dropped from 8-9 hours / night in 1960 to 7 hours / night in

1995 . Currently, sleep problems have been confirmed to be related with adverse health outcomes (such as CVD , obesity, DM) and are listed as one of the serious public health issues. Therefore, improving sleep problems may be an important strategy to reduce the incidence of obesity and diabetes. The relationship between sleep duration, obesity, and T2DM may be bidirectional. Additionally, changes in weight may lead to changes in sleep duration. Clinically significant weight loss is related with daytime sleepiness and reduced time to sleep. The sleep / wake cycle is related to the circadian rhythm, the internal clock that regulates metabolic processes. Research has shown that sleep disorders may affect insulin resistance and blood sugar control. Circadian dysregulation, in which sleep occurs during atypical circadian phases, such as sleep disorders and difficulty falling asleep, can also adversely affect insulin sensitivity . Antza reported that insufficient sleep is related to insulin resistance and changes in β-cell function (Zhang shengwu, 2023).

Studies have shown that inappropriate sleep duration is related with a variety of chronic diseases such as diabetes, hypertension, coronary heart disease and cancer. A study on European populations showed that individuals who slept 8-9.5 hours had a lower risk of chronic diseases. In women, sleeping too much or not enough can increase the risk of chronic diseases. Sleep problems such as short sleep time, poor breathing, and snoring are positively correlated with the prevalence of T2DM. Fang et al. 's research results show that the prevalence of impaired fasting plasma glucose in middle-aged people with nap habits in my country is about 68.6%. Prospective study cohort results show that sleep duration, as a predictor of cardiovascular disease, is significantly related to the prevalence of hypertension and coronary heart disease. Insufficient sleep

duration or excessive sleep duration will increase the risk of CVD ﹙Yuan bingkun , 2023﹚.

Research related to this study

Wang, F.﹙2021﹚ aims to explore the determinants of college students' sleep quality, with a special focus on the effects of physical exercise, social relationships, caffeine intake, stress, irregular sleep-wake patterns, dietary habits, sleep knowledge, and daytime naps on sleep quality. It is concluded that physical exercise and healthy social relationships can improve sleep quality, while caffeine intake, stress, and irregular sleep-wake patterns can reduce sleep quality. Regarding dietary habits and sleep knowledge, the reported results are less consistent, while appropriate daytime naps can improve overall sleep quality.

Rathakrishnan et al. ﹙2021﹚ in The Impact of Sleep Quality and Smartphone Addiction on Academic Performance aims to explore the relationship between sleep quality and academic performance, as well as the impact of smartphone addiction on sleep quality and academic performance. Specific objectives include evaluating the impact of sleep quality on academic performance, exploring how smartphone addiction interferes with sleep quality, and its further impact on academic performance. The results show that there is a significant relationship between sleep quality and academic performance. The worse the sleep quality, the lower the academic performance. The study also found that good sleep quality is generally related with better physical health, which is a predictor of academic performance. People with good sleep quality are generally less anxious, have better physical health, and may feel more energetic when

studying. In contrast, poor sleep quality may be significantly related with stress levels, and better physical health and reduced stress are related with good sleep quality, which may increase learning motivation and improve academic performance. In addition, smartphone addiction has a significant negative impact on both academic performance of adolescents and sleep quality of college students.

Scott et al. (2021) The Impact of Sleep Quality on Mental Health: Evidence and Implications aims to evaluate the impact of improved sleep quality on mental health, especially to explore how sleep can reduce mental health problems such as depression, anxiety, and stress. The study also aims to explore whether improving sleep quality can provide significant mental health benefits in the presence of different levels of mental health problems (including clinical and non- clinical problems) and comorbidities. The study found that improving sleep quality has a moderate impact on mental health. Improving sleep can effectively reduce mental health problems such as depression, anxiety, and stress. There is a causal relationship between sleep and mental health problems, which suggests that sleep, as a treatment target, can significantly improve mental health, just as it does physical health. Improved sleep is related with improved mental health regardless of the severity of mental health problems (including clinical or non-clinical problems) or the presence of comorbidities. This suggests that improved sleep quality can bring substantial benefits to mental health.

Killgore et al. (2022) in "Sleep and Emotional Functioning: The Impact of Sleep Deprivation on Emotional Intelligence and Regulation" aimed to explore the close connection between sleep and emotion, specifically how lack of sleep affects emotional expression and emotional intelligence. The research objectives included evaluating the impact of insufficient sleep on multiple aspects of emotional abilities,

such as emotion recognition, emotional expression, decision-making guidance, and the ability to inhibit negative thoughts. At the same time, the impact of sleep on different aspects of emotional intelligence (EI) was also examined, including overall self-perceived well-being and confidence in coping with stress and controlling impulses. The results showed that sleep is closely related to emotional functioning. Lack of sleep can lead to the following emotional problems: 1) depression, 2) irritability, and 3) prone to anger reactions. 4) Insufficient sleep impairs multiple emotional abilities, including the ability to recognize emotional facial expressions, 5) the ability to express emotions through facial expressions, and 6) and the ability to express emotions through voice tone. 7) In addition, insufficient sleep affects the ability to use emotions to guide decision-making, 8) and the ability to suppress unnecessary negative thoughts. 9) These abilities are part of the construct of emotional intelligence (EI), which includes not only the ability to accurately identify and understand emotional information, but also the ability to effectively reason and use this knowledge to adaptively guide the thoughts and behaviors of oneself and others. The study found that PSQI scores and sleep duration were independently related with various aspects of emotional intelligence, including self-perception of overall well-being and confidence in coping with stress and controlling impulses. However, sleep had less impact on the explicit awareness of individual emotions and objective understanding and reasoning about how to best manage emotions (as measured by peak performance tests). Overall, the impact of sleep on emotional functioning is more reflected in how to feel emotions rather than the mastery of emotional knowledge.

Wang Liang (2022) aims to analyze the current status of sleep quality and dietary influencing factors among college students in Qingdao, especially to explore the relationship between dietary habits, dietary intake and sleep patterns. The study also aims to evaluate how poor dietary habits affect college students' sleep quality and the potential protective effects of specific nutrients (such as calcium and magnesium) on sleep quality. The results of the study indicate that sleep plays an important role in maintaining homeostasis and promoting personal health. A high proportion of college students at a university in Qingdao had poor sleep quality. The study found that poor dietary habits (such as skipping breakfast, eating snacks, eating barbecue and fried foods, late-night snacks, and convenience foods) were related with poor sleep quality. In contrast, college students with high calcium and magnesium intake may be at risk for poor sleep quality. In addition, sleep quality is significantly related with multiple hematological indicators that may affect the health of college students.

Deng Xiaoxiang (2023) in Relationship Between Physical Activity and Sleep Quality Among College Students in Xiangxi aims to explore the relationship between physical activity and sleep quality among college students, with a special focus on the effects of physical activity of different intensities on sleep quality. The research objectives include analyzing the relationship between total exercise and sleep quality scores, and comparing the effects of physical activity of different intensities on sleep quality. The results of the study showed that physical activity was negatively correlated with sleep quality scores, that is, the more physical activity, the lower the sleep quality score, and the worse the sleep quality. The correlation between physical activities of different intensities and sleep quality is different. Among them, high-intensity physical activities have the highest correlation with sleep quality and have the greatest impact

on sleep quality. In general, there is a negative correlation between the total amount of physical activity and the sleep quality score. The more total amount of exercise, the lower the sleep quality score and the worse the sleep quality.

Zhang Hui（2023）Factors Affecting Sleep Quality Among College Students aims to explore the various factors affecting the sleep quality of college students, focusing on the impact of environment, entertainment activities, study and employment pressure, eating habits, and interpersonal relationships on the sleep quality of college students. The study also focuses on the role of college dormitory environment on sleep quality and how it affects sleep through various living habits and social pressure. The study found that there are many factors that affect the sleep quality of college students, including excessive use of electronic products, emotional problems, environmental factors, eating habits, smoking and drinking. In the univariate analysis, there were significant differences between the sleep disorder group and the non-sleep disorder group in terms of sleep environment, pre-sleep entertainment activities, study pressure, employment pressure, eating supper before bed, and relationships with classmates. Sleep environment is an important factor affecting the sleep quality of college students. A good dormitory environment and a regular schedule can help improve sleep quality, while a noisy environment, irregular sleep, staying up late for entertainment, and using mobile phones can directly affect sleep quality. In addition, the decoration environment outside the dormitory and the internal equipment also have an important impact on sleep quality. Entertainment activities before bed are also an important factor affecting sleep quality. College students generally stay up late to play with their mobile phones and surf the Internet, which directly affects their physical health and learning efficiency. Study pressure, employment pressure, eating supper before bed, and relationships with

classmates are also important factors. Although the study pressure of college students is less than that of high school students, the difficulty and scope of university majors still affect sleep quality. Employment pressure and confusion about career development plans can also cause anxiety, thereby affecting sleep. Eating supper before bed and relationships with classmates can also affect sleep quality. In short, the sleep quality of college students is affected by a combination of factors, including living habits, environment, psychological pressure, and interpersonal relationships.

Wang Huixia (2023) aims to investigate the lifestyle of college students in Relationship Between Lifestyle Factors and Sleep Quality Among College Students and analyze the relationship between smoking, drinking, and lack of exercise and sleep status. In particular, the study focused on how these lifestyle factors affect insomnia symptoms and sleep quality among college students, as well as the possible psychological and physiological causes of these effects. The results showed that insomnia symptoms and poor sleep quality among college students were positively correlated with physical inactivity and drinking behavior. Sleep disorders and poor sleep quality caused by physical inactivity may have psychological and physiological causes. From a psychological perspective, poor sleep status among college students may be related to depression and anxiety symptoms. College students face pressure in social interaction, academic pressure, employment, etc., which are prone to negative emotions such as depression and anxiety, which affect sleep quality.

Wu Huihui (2024) in Investigating Sleep Time, Insomnia, and Influencing Factors Among Medical Students aims to investigate the sleep time and insomnia of medical students and analyze the related factors affecting these factors. The research objectives include understanding the average sleep time of medical students, the

incidence of insomnia symptoms, and the key factors affecting sleep time and insomnia. The results showed that the average age of medical students was (21.6±3.0) years old, of which 67.0% were female. The average sleep time of medical students was (7.2±1.0) hours, of which 51.2% had insufficient sleep (less than 7 hours), and 24.8% had insomnia symptoms. The results showed that insufficient sleep and insomnia were common among medical students, and sleep hygiene and delayed sleep were important factors affecting sleep time and insomnia.

Conceptual Framework

1. Independent variable：

Personal factors:Gender, Age, Height, weight, Major

Health impact:

1. Hours of sleep

2. Affect sleep quality

3. Using phone or computer before going to bed

4. Headaches or discomfort in you head

5. Have stomach pain or indigestion

6. Feel anxious, nervous,or depressed.

7. Have difficulty maintaining high-quality sleep

8. Communication barriers with classmates

9. Ctively participate in campus activities.

10. Noticed a decline in your memory、

11. Health products、

12. Staying up late、

13. Health problems caused by staying up late

2. Dependent variable Sleep quality

Independent variable		Dependent variable
Personal factors Gender Age Height weight Major		
Health impact: - Hours of sleep - Affect sleep quality - Using phone or computer before going to bed - Headaches or discomfort in you head - Have stomach pain or indigestion - Feel anxious, nervous,or depressed. - Have difficulty maintaining high-quality sleep - Communication barriers with classmates - Ctively participate in campus activities. - Noticed a decline in your memory、 - Health products、 - Staying up late、 - Health problems caused by staying up late	}	Sleep quality

CHAPTER III

RESEARCH METHODOLOGY

This chapter focuses on the research method of analyzing the influencing factors of sleep quality among first-year students at Hainan Vocational University of Science and Technology. This study is divided into the following 8 parts.

1. Research design

2. Population and sample size

   2.1 Population

   2.2 Inclusion Criteria

   2.3 Exclusion criteria

   2.4 Elimination criteria

   2.5 Sample size

3. Study area

4. Study period

5. Research method

6. Measurement instruments

7. Data collection

8. Data analysis

Research design

This study is a cross-sectional analytical research design.

Population and sample size

Population

The research object is the first-year students student of Yunlong Campus of Hainan Vocational University of Science and Technology. The Yunlong campus includes five colleges, including School of Nursing, School of Accounting, School of Medicine, School of Urban Construction, and School of Media and Music. The total number of Yunlong Campus of Hainan Vocational University of Science and Technology are 14205, including 2562 first-year students of the School of Nursing, 673 first-year students of the School of Accounting, 1034 first-year students of the School of Medicine, 788 first-year students of Urban Construction, and 248 first-year students of the School of Media and Music.
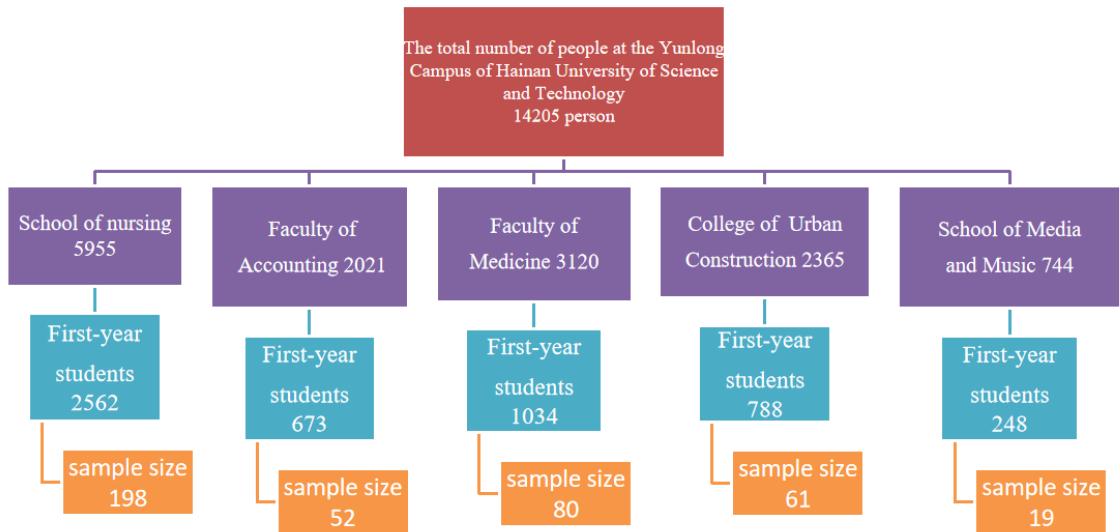
Figure 1 Teaching Secretariat of School of Medicine, Hainan Vocational University of Science and Technology.

Inclusion Criteria

1. First-year study at yunlong campus more than 6 months.

2. Participants were able to complete the questionnaire independently.

3. Participants were mentally agile, had no intellectual disabilities and had normal cognitive and behavioral abilities.

Exclusion criteria

First-year who was reluctant to participate in this study.

Elimination criteria

There were missing items in the questionnaire, and the questionnaire was consistently completed.

Sample size

The Yunlong campus of Hainan Vocational University of Science and Technology has 5,305 first-year students

Using the sample size calculation formula:

(N= sample size, N = population, e= acceptable error level / 0.05)

$$n = \frac{N}{1 + Ne^2}$$

$$= \frac{5305}{1+5305(0.5)^2}$$

$$= \frac{5305}{14.2625}$$

$$\approx 372$$

Considering 10% sample loss: 372 + (372*10%) ≈410 persons
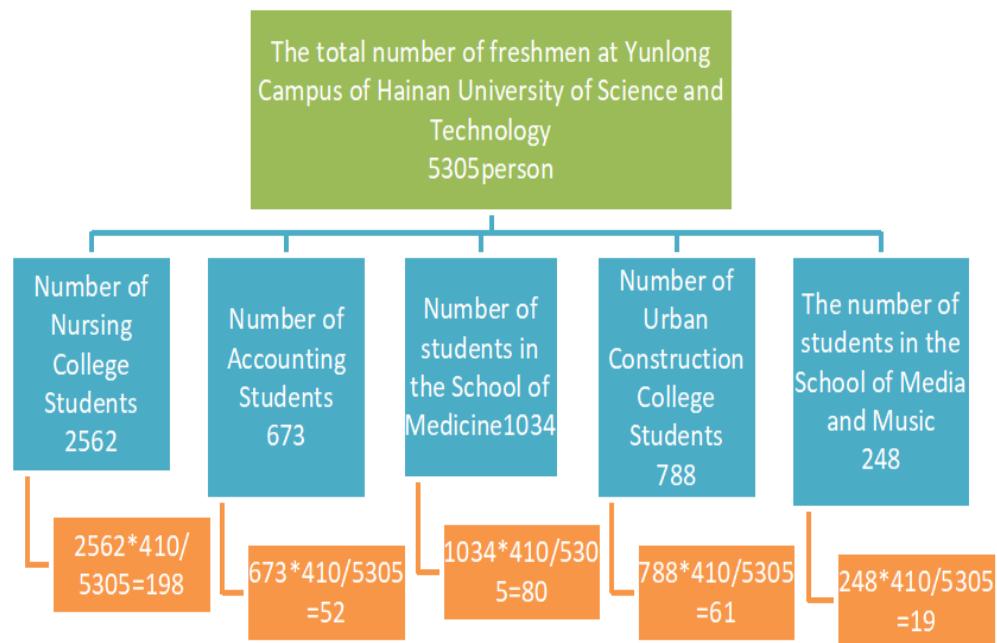
Figure 2 Sampling: stratified sampling is used to select a certain number of samples in each specialty.

Faculty in University	Population(N)	Sample size(n)
School of Nursing	2562	198
Faculty of Accountancy	673	52
Faculty of Medicine	1034	80
College of Urban Construction	788	61
School of Media and Music	248	19
total	**5305**	**410**

Study area

The study area was selected as Hainan Province in southern China. The specific study site was the Yunlong Campus of Hainan Vocational University of Science and Technology, No. 118, Yunding Road, Yunlong Town, Haikou City, Hainan Province. There are three reasons for choosing this location: first, Haikou City of Hainan Province has superior geographical location, good environment and low air pollution index, so there are few environmental factors available to eliminate and be affected by external factors; second, Yunlong Campus of Hainan Vocational University of Science and Technology is located in the suburbs, with few surrounding facilities, and most of the influence of students' sleep comes from their own behavior factors; third, I facilitate to investigate the sleep quality of college students for professional reasons.
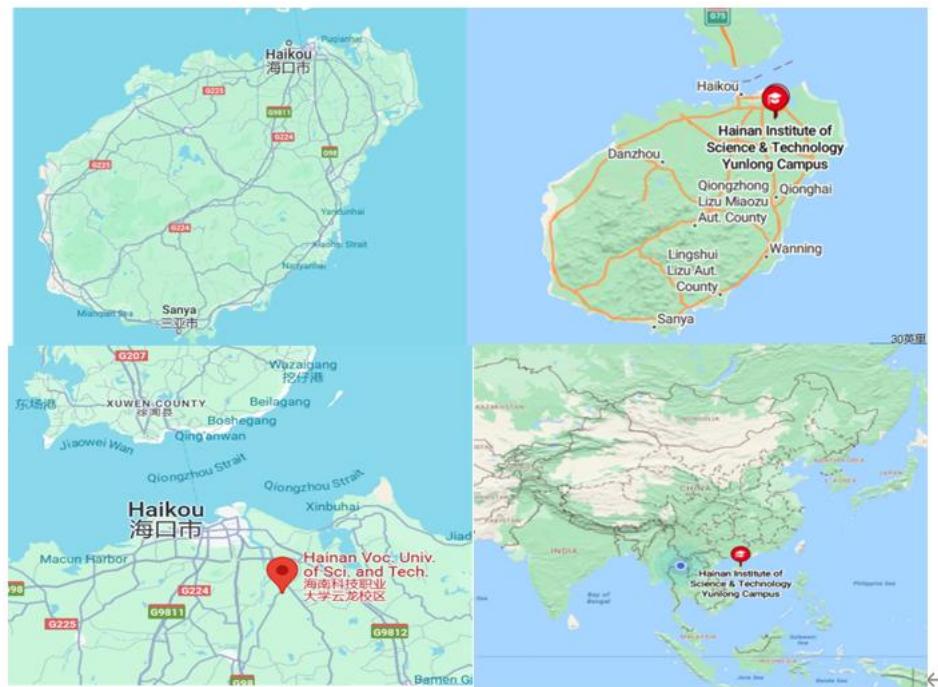
Figure 3 Hainan Province in southern China.

Study period

Preparation (1 month): literature review, questionnaire design, pre-survey and other preparatory work.

Data collection (2 months)：The questionnaire content was made through the questionnaire star mini program and distributed to the communication software group chat of college students, who scanned the code online to fill in and submit.

Data processing and analysis (1 month): clean, organize, analyze and interpret the collected data.

Results writing and paper submission（1 month）：writing the research report and academic paper.

Research method

The study was conducted using a combination of questionnaire survey method （combining random sampling and stratified sampling）. The questionnaire survey is mainly used to collect students' basic information, sleep habits, sleep quality self-evaluation and other information。

1. Survey tools and content Survey Tools: Use the validated sleep quality questionnaire as a survey tool and modify it appropriately based on the actual situation of our students. Survey content: including students' basic information (such as gender, grade, major, etc.), sleep habits (such as sleep onset time, wake-up time, sleep duration, etc.), sleep quality self-evaluation (such as sleep quality satisfaction, daytime mental state, etc.), factors affecting sleep (such as stress sources, environmental factors, etc.).

2.　Data collection and processing Data collection: Questionnaires were distributed online and offline to ensure coverage of all research student groups. The collected data is encoded for subsequent analysis. Data processing: Use professional statistical software to clean and sort out the data, eliminate invalid questionnaires and outliers, and ensure the accuracy and reliability of the data.

3. Quality control and ethics Quality control: Strict quality control is carried out in all aspects of questionnaire design, data collection, processing and analysis to ensure the scientificity and accuracy of the research. Ethical considerations: The privacy and autonomy of the respondents are fully respected during the investigation process, and all participants participate in the research on an informed and voluntary basis.

Measurement instruments

The Sleep Quality Questionnaire:

The Pittsburgh Sleep Quality Index (PSQI) is a widely used self- report questionnaire that assesses an individual's sleep quality over the past month. Authors Daniel J. Buysse, Charles F. Reynolds III, Timothy H. Monk, Susan R. Berman, and David J. Kupfer published the journal Psychiatry Research in 1989. The title of the article is: The Pittsburgh Sleep Quality Index: A new instrument for psychiatric practice and research.

PSQI has 19 self- assessment items, which are divided into 7 components: Subjective Sleep Quality Sleep Latency Sleep Duration Habitual Sleep Efficiency Sleep Disturbances、Use of Sleeping Medication、Daytime Dysfunction.Each component has a

score range of 0–3 points, and the final total score ranges from 0–21 points. The higher the total score, the worse the sleep quality.

1. Time range of use:

Review the sleep situation in the past month.

2. Scoring method:

Each component score is calculated based on a specific question.All component scores are added together to get the total score. A total score > 5 indicates "poor sleep quality" (sensitivity 89.6%, specificity 86.5%).

3. Usage scenarios:

   - Clinical sleep disorder assessment

   - Sleep research and epidemiological surveys

   - Mental health assessment

Used to screen for sleep problems related to depression, anxiety, PTSD and other diseases.

4. Filling method:

Usually in paper or electronic self-assessment form,It takes about 5-10 minutes to complete.

Reliability

The modified questionnaire was pretested on 30 students from the Meilan Campus of Hainan University of Science and Technology, who were representative of the target population. The pretest data were used to assess the reliability of the questionnaire. The Cronbach's α coefficient was 0.889, indicating that the questionnaire had good internal consistency. These results indicate that the questionnaire is suitable

for students from the Yunlong Campus of Hainan University of Science and Technology.

Data collection

1. Develop a questionnaire

Determine the research questions and research objectives, consult the relevant literature, and develop questionnaires according to the research content to collect data on sleep duration, sleep environment, sleep influencing factors, etc.

2. Issue and collect questionnaires

The most representative sample population was selected based on the inclusion criteria and exclusion criteria of the study subjects. In this study, we distributed questionnaires online and collected questionnaire information using an online platform. During the collection process, invalid questionnaires that are not fully completed or apparently answered for not meeting the criteria will be removed to ensure the validity and reliability of the data. Subsequently, an exhaustive data analysis was performed on the selected validated questionnaires.

3. Data processing

The collected data were systematically collated and analyzed, using statistical software such as SPSS for data processing, in order to quantify and compare the relationships between different variables. Analyze the correlation between sleep quality and various associate factors (such as gender, age, major, study pressure, etc.), and identify the main factors affecting students' sleep quality.

Data analysis

Descriptive statistical analysis:

Conduct a descriptive statistical analysis of the collected data to understand the overall sleep quality of the students in the school. Including frequency and percentage, mean, and standard deviation.

Inferential statistical analysis of the correlation between sleep quality and various associate factors (such as gender, age, major, study pressure, etc.) was inferred, and the chi-square test was used.

CHAPTER IV

RESULTS

The results collected in this chapter are designed to demonstrate that the sleep quality of freshmen and to assess factors related to sleep quality of first-year students in a university,which were conducted by first-year students in various majors at the Yunlong campus of Hainan Vocational University of Science and Technology, Haikou city, Hainan Province.

The questionnaire test phase was conducted in november 2024 with conteut validity more than 0.5 and reliability of 0.889, indicating that the questionnaire was good. Questionnaire collection will officially begin between December 2024 and January 2025. In this study, 418 questionnaires were collected and 410 were effectively recovered, with an effective recovery rate of 98%.

The results consist of the following three components:

Part 1:Personal factors

Part 2:Sleep quality and impact

Part 3:Assess factors related to sleep quality

Part 1:Personal factors

Table 1 Frequency and percentage of gender (n=410)

Gender	Frequency	Percentage
Male	211	51.46
Female	199	48.54
Total	**410**	**100.00**

In Table 1 Shows the frequency and percentage of the gender distribution. There are 211 boys among a total of 410 people, accounting for 51.46%, and 199 girls, accounting for 48.54% of the total number.

Table 2 Frequency and percentage of age (n=410)

Age (years old)	Frequency	Percentage
Under 18 years old	127	31
18-19	166	40.5
20	117	28.5
Total	**410**	**100.00**

Min:17 Max:20 Mean ($\pm$SD）=18.46 ($\pm$1.14)

In Table 2 Shows the frequency and percentage of the age distribution. The max of age 18-19 years old 166 case(40.5%) then age under 18 years old 127case(31%) and min of age 20 years old 117case(28.5%).

Table 3 Frequency and percentage of height (n=410)

Height	Frequency	Percentage
162	26	6.34
163	21	5.12
164	30	7.32
165	20	4.88
166	25	6.10
167	27	6.59
168	21	5.12
169	18	4.39
170	29	7.07
171	36	8.78
172	26	6.34
173	25	6.10
174	28	6.83
175	26	6.34
176	29	7.07
177	23	5.61
Total	**410**	**100.00**

Min:162   Max:177   Mean （±SD）=171.67(±2.74)

In Table 3 Shows the frequency and percentage of the height distribution.The max of weight was 177cm, the min of weight was 162cm, with mean 169.67 and standard deviation 4.58. 171cm(36 persons,or 8.78%) Other were more concentrated in 170cm(7.07%),176cm(7.07),and 174cm(6.83%).The distribution was uniform from 162cm to 177cm.The height of students showed a normal distribution trend,and the median number was about 171cm,indicating that the height balance of students in this age group was good.

Table 4 Frequency and percentage of weight (n=410)

Weight	Frequency	Percentage
52	28	6.83
53	24	5.85
54	24	5.85
55	23	5.61
56	21	5.12
57	24	5.85
58	29	7.07
59	25	6.10
60	16	3.90
61	27	6.59
62	21	5.12
63	24	5.85

Table 4 (Contiuned)

Weight	Frequency	Percentage
64	19	4.63
65	19	4.63
66	21	5.12
67	18	4.39
68	23	5.61
69	24	5.85
Total	**410**	**100.00**

Min:52 Max:69 Mean （±SD）=58.28(±1.75)

In Table 4 Shows the frequency and percentage of the weight distribution.The max of height was 69kg, the min of weight was 52kg, the average value is 60.18, and the standard deviation is 5.24. 58kg(29 persons,or 7.07%).The remaining body weight were concentrated at 52kg,54kg,57kg,and59kg,all in the range of 5.85%-6.83%.The body weight distribution was relatively average,with comprehensive coverage from 52kg to 69kg.

Table 5 Frequency and percentage of BMI (n=410)

BMI	Frequency	Percentage
≤18.5	67	16.34
18.5-23.9	297	72.44
≥24	46	11.22
Total	**410**	**100.00**

In Table 5 For the convenience of the subsequent work, the height (Table 3) and the weight (Table 4) were sorted out into the grades of BMI.Among them, 297 people had a normal BMI index, accounting for 72.44%, followed by 67 people who were underweight ≤18.5%, and only 46 people, accounting for 11.22%, who were overweight.

Table 6 Frequency and percentage of faculty (n=410)

Faculty	Frequency	Percentage
Nursing	191	46.59
Accounting	53	12.93
Medicine	76	18.54
Urban construction	67	16.34
Media and music	23	5.61
Total	**410**	**100.00**

In Table 6 Shows the frequency and percentage of the faculty distribution.Among the 410 questionnaires, there are 191 nursing students, accounting for 46.59% of the total; 53 accountants, accounting for 12.93%; 76 people from the School of Medicine, accounting for 18.54%; 67 people from the Urban Construction College, accounting for 16.34%; and 23 people from the Music School, accounting for 5.61.

Part 2:Sleep quality and health impact

Sleep quality

Table 7 Frequency and percentage of PSQI score (n=410)

PSQI score	Frequency	Percentage
2	2	0.49
3	13	3.17
4	26	6.34
5	25	6.10
6	10	2.44
7	6	1.46
8	1	0.24
10	4	0.98
11	12	2.93
12	55	13.41
13	90	21.95

Table 7 (Continued)

PSQI score	Frequency	Percentage
14	80	19.51
15	53	12.93
16	25	6.10
17	6	1.46
18	2	0.49
Total	**410**	**100.00**

Min:2 Max:18 Mean （±SD）=12.41(±2.92)

In Table 7 shows that the PSQI scores of students are mostly 13 and 14, accounting for 21.95% and 19.51%, followed by 12 and 15, accounting for 13.41% and 12.93%; indicating that most first-year students have different degrees of sleep quality problems, and the overall situation is not ideal.

Table 8 Frequency and percentage of LevelPSQI(n=410)

LevelPSQI	Frequency	Percentage
Bad sleep quality(＞5 score)	344	83.90
Good sleep quality(≤5 score)	66	16.10
Total	**410**	**100.00**

In Table 8 Shows the frequency distribution of sleep quality levels. There are 344 people with bad sleep quality scores > 5, accounting for 83.90%, and 66 people with good sleep quality scores ≤ 5, accounting for 16.10%.

Health Impact

Table 9 Frequency and percentage of hours(n=410)

Hours	Frequency	Percentage
Less than 7 hours	121	29.51
7-9 hours	185	45.12
More than 9 hours	104	25.37
Total	**410**	**100.00**

In Table 9 Shows the frequency and percentage of student how many hours of sleep get per night on average distribution.Less than 7 hours: 121 people, or 29.51%.7-9 hours: 185 people, or 45.12% (maximum proportion).More than 9 hours: 104 people, accounting for 25.37%

Table 10 Frequency and percentage of Fators that think most affect sleep quality (n=410)

Factors	Frequency	Percentage
Academic pressure	153	15.39
Use of electronic devices	257	25.86
Dormitory environment	228	22.94
Irregular diet	187	18.81
Mood swings	121	12.17
Not enough physical exercise	48	4.83

In Table 10 Shows the frequency and percentage of student what factors think most affect sleep quality.The biggest factor affecting sleep quality is that use of electronic devices for25.86%,The second biggest influence is the one dormitory environment for 22.94%,Then there is irregular diet for 18.81%,academic pressure for 15.39%,mood swings for 12.17%. The smallest effect on sleep quality is not enough physical exercise for 4.83%.

Table 11 Frequency and percentage of Use of computer and mobile phone before go

to bed (n=410)

Time long of use computer and mobile phone	Frequency	Percentage
Yes,within 1hour	94	22.93
Yes,1-2 hour	144	35.12
Yes,more than 2 hour	118	28.78
no	54	13.17
Total	**410**	**100.00**

In Table 11 Shows the frequency and percentage of student do you have the habit of using your phone or computer before going to bed?if so,how long do you use it？The most common users of computers and mobile phones before going to bed is between 1 and 2 hours, accounting for 35.12, followed by those who use mobile phones for more than 2 hours before going to bed, accounting for 28.78%.It was followed by no more than 1 hour, or 22.93%, only a few 13.17% of people do not use mobile phones or computers before going to bed.

Table 12 Frequency and percentage of headache (n=410)

Headache	Frequency	Percentage
yes	157	38.29
no	253	61.71
Total	**410**	**100.00**

In Table 12 Shows the frequency and percentage of student do you experience headaches or discomfort in you head?And 61.71% of the population did not experience headaches or discomfort in head,Only 38.29% of the population felt it experience headaches or discomfort in head.

Table 13 Frequency and percentage of Stomach pain or indigestion (n=410)

Stomach pain or indigestion	Frequency	Percentage
yes	215	52.44
no	195	47.56
Total	**410**	**100.00**

In Table 13 Shows the frequency and percentage of student do you have stomach pain or indigestion? 52.44% had stomach pain or dyspepsia, and 47.56% had no stomach pain or dyspepsia.

Table 14 Frequency and percentage of Anxious,nervous,or depressed (n=410)

Anxious,nervous,or depressed	Frequency	Percentage
yes	178	43.41
no	232	56.59
Total	**410**	**100.00**

In Table14 Shows the frequency and percentage of student do you feel anxious,nervous,or depressed? 56.59% of the population did not feel anxious, nervous or depressed, and 43.41% of the population would feel anxious, nervous or depressed.

Table 15 Frequency and percentage of Insomnia or have difficulty maintaining high-quality sleep (n=410)

Insomnia or have difficulty maintaining high-quality sleep	Frequency	Percentage
yes	202	49.27
no	208	50.73
Total	**410**	**100.00**

In Table 15 Shows the frequency and percentage of student are you prone to insomnia or have difficulty maintaining high-quality sleep?50.73% of the population are not prone to insomnia or difficult to maintain high quality sleep, 49.27% of the population will be prone to insomnia or difficulty in maintaining high quality sleep.

Table 16 Frequency and percentage of Communication barriers (n=410)

Communication barriers	Frequency	Percentage
yes	211	51.46
no	199	48.54
Total	**410**	**100**

In Table 16 Shows the frequency and percentage of student do you feel that there are communication barriers with classmates and friends around you? 51.46% of the population felt communication barriers with their classmates and friends, and 48.54% of the population did not feel communication barriers with their classmates and friends.

Table 17 Frequency and percentage of Campus activities (n=410)

Campus activities	Frequency	Percentage
yes	231	56.34
no	179	43.66
Total	**410**	**100.00**

In Table 17 Shows the frequency and percentage of student do you actively participate in campus activities and enjoy the pleasure of collaborating with other? 56.34% of the population actively participate in campus activities and enjoy the fun of cooperating with others, while 43.66% of the population did not actively participate in campus activities and enjoy the fun of cooperating with others.

Table 18 Frequency and percentage of Memory and difficulty concentrating (n=410)

Memory and difficulty concentrating	Frequency	Percentage
yes	198	48.29
no	212	51.71
Total	**410**	**100.00**

In Table 18 Shows the frequency and percentage of student have you noticed a decline in your memory and difficulty concentrating? 51.71% of the population had no problem of memory loss and had difficulty in concentrating, and 48.29% of the population had no problem of memory loss and difficulty in concentrating.

Table 19 Frequency and percentage of Health products(n=410)

Health products	Frequency	Percentage
yes	145	35.37
no	265	64.63
Total	**410**	**100.00**

In Table 19 Shows the frequency and percentage of student have you ever used health products (such as health supplements, health foods, vitamins, etc.)? 64.63% have not used health products, such as health supplements, healthy food, vitamins, etc. 35.37% of the population have used health products, such as health supplements, healthy food, vitamins, etc.

Table 20 Frequency and percentage of Staying up late (n=410)

Staying up late	Frequency	Percentage
yes	148	36.10
no	262	63.90
Total	**410**	**100.00**

In Table 20 Shows the frequency and percentage of student do you have the habit of staying up late? 63.90% of the population did not have the habit of staying up late, and 36.10% had the habit of staying up late.

Table 21 Frequency and percentage of Health problems(n=410)

Health problems	Frequency	Percentage
yes	161	39.27
no	249	60.73
Total	**410**	**100.00**

In Table 21 Shows the frequency and percentage of student are you aware of the possible health problems caused by staying up late for a long time? 60.73% of the population did not know the health problems caused by staying up late for a long time, and 39.27% knew the health problems caused by staying up late for a long time.

Part 3: Assess factors related to sleep quality

Table 22 Frequency and percentage of student(n=410)

The fators related to sleep quality					
Project	**Classify**	**Level PSQI**		**X²**	**P**
		Good sleep quality ≤5	**Bad sleep quality ＞5**		
Gender	Male	35	176	0.07	0.781
	Female	31	168		
Age	Under 18 years old	22	105	0.36	0.836
	18-19	27	139		
	20	17	100		
BMI	≤18.5	6	61	4.75	0.093
	18.5-23.9	55	242		
	≥24	5	41		
Faculty	Nursing	26	165	5.72	0.221
	Accounting	13	40		
	Medicine	12	64		
	Urban construction	9	58		

Table 22 (Continued)

The fators related to sleep quality					
Project	**Classify**	**Level PSQI**		X^2	**P**
		Good sleep quality ≤5	**Bad sleep quality ＞5**		
	Media and music	6	17		
Average sleep every night	Less than 7 hours	18	103	0.52	0.771
	7-9 hours	29	156		
	More than 9 hours	19	85		
Academic pressure	Yes	21	132	1.02	0.313
	No	45	212		
Use of electronic devices	Yes	41	216	0.01	0.918
	No	25	128		
Dormitory environment	Yes	43	185	2.90	0.089
	No	23	159		
Irregular diet	Yes	29	158	0.09	0.776
	No	37	186		
Mood swings	Yes	22	99	0.55	0.457
	No	44	245		

Table 22 (Continued)

The fators related to sleep quality					
Project	**Classify**	**Level PSQI**		**X²**	**P**
		Good sleep quality ≤5	**Bad sleep quality ＞5**		
No enough exercise	Yes	7	41	0.09	0.761
	No	59	303		
using your phone or computer before going to bed	Yes	54	302	1.73	0.19
	No	12	42		
experience headaches or discomfort in you head	yes	28	129	0.57	0.451
	no	38	215		
stomach pain or indigestion	yes	36	179	0.14	0.708
	no	30	165		
anxious,nervous,or depressed	yes	30	148	0.13	0.715
	no	36	196		
insomnia or have difficulty maintaining high-quality sleep	yes	34	168	0.16	0.690
	no	32	176		
communication barriers	yes	34	177	0.001	0.993
	no	32	167		
campus activities	yes	40	191	0.58	0.446

Table 22 (Continued)

The fators related to sleep quality					
Project	**Classify**	**Level PSQI**		**X²**	**P**
		Good sleep quality ≤5	**Bad sleep quality >5**		
	no	26	153		
memory and difficulty concentrating	yes	31	167	0.06	0.814
	no	35	177		
health products	yes	24	121	0.03	0.853
	no	42	223		
staying up late	yes	22	126	0.27	0.610
	no	44	218		
health problems	yes	27	134	0.09	0.766
	no	39	210		

In Table 22 Shows that chi-square test was used to analyze the relationship between multiple variables and sleep quality. The results showed that: gender (P=0.781), age (P=0.836), major college (P=0.221), average daily sleep time (P=0.771), academic pressure (P=0.313), use of electronic devices (P=0.918), regular diet (P=0.776), mood swings (P=0.761), length of time using electronic products before bedtime (P=0.258), headache (P=0.451), stomachache or diarrhea There was no significant difference between PSQI and factors such as malnutrition (P=0.708), emotional problems (P=0.715), insomnia (P=0.690), communication barriers

(P=0.993), participation in campus activities (P=0.446), attention or memory problems (P=0.814), use of health products (P=0.853), staying up late (P=0.610), and whether there were health problems (P=0.766) (P>0.05), indicating that these variables had no significant effect on sleep quality

CHAPTER V

DISCUSSION AND CONCLUSION

This study aims to study the sleep quality and impact of first-year students to assess factors related to sleep quality of first-year students students in a university in Hainan Vocational University of Science and Technology.The Yunlong campus includes five colleges, including School of Nursing, School of Accounting, School of Medicine, School of Urban Construction, and School of Media and Music. The total number of Yunlong Campus of Hainan Vocational University of Science and Technology is 14205 individuals. The sample size was determined using Taro Yamane's formula, yielding a final sample of 410 individuals, selected through stratified sampling method. The study employed a structured questionnaire as the primary research instrument, comprising the following sections: Part 1:Personal factors; Part 2: Health impact; Part3: PSQI

The collected data were analyzed using statistical software, employing the Descriptive statistics and the chi-squared test method for data processing. The study findings are structured as follows:

1. Summary of Research Findings

2. Discussion of Results

3. Study Limitation

4. Generalizability

5. Recommendation for further reseach

Summary of Research Findings

Based on the research data, the research results are summarized and the sleep quality of first-year students in Hainan University of Science and Technology is studied, including personal factors, sleep quality and impact, and assessment factors related to sleep quality.

Personal factors

According to a survey of the Yunlong Campus of Hainan University of Science and Technology, the ratio of male and female students is basically balanced (male 51.46%, female 48.54%). The age of students is mainly concentrated in 18-19 years old, which is in the transition period of lifestyle habits, which may affect sleep. The height distribution is close to normal, with an average of about 169.67cm; the average weight is 60.18kg, concentrated at 58kg. 72.44% of students have normal BMI, and their weight and height are generally healthy, suggesting that sleep problems are more likely to be related to psychology or environment. Nursing and medical students account for 65.13%, and the course pressure is relatively high, which may affect sleep quality.

Sleep quality and health impact

The survey shows that 62.4% of students have a PSQI score of ≥12, and about 84% of students have poor sleep quality and widespread sleep disorders. The main reasons include long-term use of electronic devices before going to bed (nearly 90% of students), dormitory environment interference, and irregular diet and work and rest. Although 45.1% of students sleep within the recommended range, 29.5% still do not get enough sleep, which may affect their health.

Common physical discomforts include stomachache (52.44%), insomnia (49.27%), anxiety and depression (43.41%), etc. Nearly half of the students are affected physically and mentally. More than half have communication barriers, 43.7% have low willingness to participate in campus activities, and social problems increase psychological pressure and affect sleep.

In addition, 48.29% of students have impaired attention or memory, reflecting that sleep problems affect cognitive ability. Although some students use health products (35.37%) or understand the harm of staying up late (39.27%), staying up late is still common (36.1%), indicating that health awareness needs to be improved.

Assess factors related to sleep quality

The chi-square test was used to analyze the relationship between multiple variables (including gender, age, BMI, college category, average sleep time, psychological state, physiological discomfort, use of electronic products, etc.) and PSQI sleep quality scores. It was found that the P values of all variables were greater than 0.05, which did not significanc statistical.

In summary, the sleep quality of college students is generally poor. Although there are many subjective factors and potential risks, there are no significant influencing factors at the statistical level. This suggests that sleep quality may be affected by a variety of complex cross-factors. Future research should combine multiple regression, structural equation modeling and other methods to further explore. At the same time, it is recommended that schools carry out systematic sleep health education to help students establish good living habits and sleep patterns and improve their physical and mental health.

Discussion of Results

Sleep quality and health impact

The results of this study found that only 16.1% of first-year students at Hainan University of Science and Technology had good sleep quality, and the overall sleep quality was worrying, and sleep problems were common. The main reasons affecting sleep are living habits and environmental factors, especially the use and interference of electronic devices, which is consistent with the research results of Zhang Hui (2023): It aims to explore the various factors affecting the sleep quality of college students, focusing on the impact of environment, entertainment activities, learning and employment pressure, eating habits, and interpersonal relationships on the sleep quality of college students. The results show that entertainment activities before bedtime are also an important factor affecting sleep quality. College students generally stay up late to play with mobile phones and surf the Internet, which directly affects their physical health and learning efficiency.At the same time, students generally believe that the use of electronic devices, dormitory environment and academic pressure affect sleep quality, which is consistent with （Lund et al,2010) research results on the factors affecting college students' sleep: the decline in sleep quality of college students is related to the use of electronic products, academic pressure, irregular diet and other behaviors.35.1% of students use electronic products for 1-2 hours before going to bed, and 28.8% of students use electronic products for more than 2 hours. Using electronic products before going to bed for too long is closely related to decreased sleep quality. This is consistent

with the research results of Li lidan (2024): blue light emitted by electronic devices such as mobile phones, televisions and computers inhibits the secretion of melatonin and affects sleep quality.

Regarding health conditions, nearly half of the students experienced mental and physical discomfort, 38.3% of the students had headaches, 52.4% of the students had stomachaches or indigestion, 43.4% of the students expressed anxiety, tension or depression, and 49.3% of the students suffered from insomnia or difficulty maintaining high-quality sleep. This shows that sleep problems have a negative impact on physical and mental health. This is consistent with the findings of Gomes et al. (2018): sleep has a protective effect on the mental health of college students. A study published in the Journal of Adolescence pointed out that there is a significant positive correlation between sleep quality and mental health, and lack of sleep may increase the risk of mental health problems. Studies have shown that getting enough sleep can effectively reduce symptoms of anxiety and depression and improve emotional stability. There is also Baglioni et al. (2011): lack of sleep is closely related to mental health problems such as anxiety and depression. By maintaining healthy sleep habits, these mental health problems can be effectively prevented and alleviated.

In addition,(Zhang Dandan et al,2022) pointed out that there was a significant positive correlation between sleep and emotional disorders, which was also supported by the results of high coexistence of anxiety and insomnia in this study.

Assess factors related to sleep quality

This study investigated 410 college first-year students and explored the factors related to their sleep quality. The results showed that none of the variables included reached the significance level in the statistical analysis, and no single variable

was found to have a significant impact on sleep quality. This result shows that the sleep quality of college first-year students is not determined by a specific factor, but is more likely to be the result of multiple factors.

Although no significant influencing factors were identified, the study also found that the overall sleep quality of college first-year students was generally poor. This phenomenon suggests that college first-year students generally have difficulty adapting to sleep after entering a new learning and living environment, which has become an important issue affecting their physical and mental health and learning efficiency.

This finding is consistent with the study by (Fudolig et al,2024), which points out that the decline in sleep quality among college students is the result of multiple factors acting together, showing significant individual differences. (Lund et al,2010) also emphasize that although variables such as stress and diet frequently appear at the descriptive level, their independent effects are weak in modeling analysis, suggesting that sleep disorders exhibit multidimensional interactive characteristics. Furthermore, (Beattie et al,2015) argue that the difficulty of "adjusting to the pace of life" during the adaptation period for freshmen is itself a potential source of stress, which may trigger or exacerbate sleep problems. In summary, existing literature broadly supports the conclusions of this study, namely that the sleep quality issues of college freshmen should be addressed from a multidimensional perspective rather than simply attributed to one factor.

Study Limitation

This paper focuses on the sleep quality and influencing factors of first-year students in Yunlong Campus of Hainan University of Science and Technology. It has advantages in research design, sample selection and research methods, but also has limitations in sample range, variable research and research methods.

Advantages The research questions are highly targeted

Focusing on the specific group of first-year students , accurately focusing on their sleep quality and influencing factors. first-year students have just entered college and are facing changes in their living and learning environment. Sleep problems are more prominent. Research on this group has important practical significance for improving college students' sleep health.

The sample selection is reasonable and representative: the research subjects cover first-year students   from five colleges in Yunlong Campus. The stratified sampling method is adopted to select samples in proportion according to the number of students in each college, so that the samples can better represent the overall population and ensure that the research results are highly applicable to the freshman group of the campus.

The research method is scientific and rigorous: the questionnaire survey method is used. The questionnaire survey collects subjective data such as basic information, sleep habits, and self-assessment of students. During the research process, strict quality control is carried out on the questionnaire design, data collection, processing and analysis, respecting the privacy and autonomy of the respondents, and ensuring the scientificity and standardization of the research.

Comprehensive and in-depth literature review: Chapter 2 elaborates on concepts related to sleep quality and health status, and sorts out a large number of previous research results, from the meaning, cycle, benefits, and impact of lack of sleep to the determinants of health status, and then to the comprehensive analysis of related studies, providing a solid theoretical basis for the study, making the research questions and research design more reasonable.

Limitations Limited sample scope

Only first-year students from the Yunlong Campus of Hainan University of Science and Technology were selected, and students from other campuses and grades were not involved, nor were students from other universities. Students from different campuses, grades, and universities may have differences in living environment, study pressure, work and rest habits, which limits the general applicability of the research results.

Some variables are not studied in depth: Although multiple factors related to sleep quality are studied, some factors are not discussed in depth. For example, when analyzing the impact of environmental factors on sleep quality, only common environmental factors are listed, and the interaction of various factors is not studied in depth; for the use of electronic devices, only the duration of use is focused, and the impact of use content and frequency on sleep quality is not considered.

The research method has certain limitations: the questionnaire survey relies on students' self-reports, which may lead to recall bias or inaccurate subjective judgment. For example, students' assessment of sleep duration and sleep quality may be different from the actual situation.

Generalizability

1. Commonality of college students: The study focuses on the sleep quality of first-year students in the Yunlong campus of Hainan University of Science and Technology. There are many common characteristics in the college student group, which makes this study universal.

In terms of life patterns, most college students live in a collective environment and share dormitory space. Their living habits are easily affected, such as work and rest time, nighttime activities, etc. This echoes the fact that the dormitory environment affects sleep quality mentioned in this study.

In terms of learning and social interaction, college students generally face problems such as academic pressure and social relationship building. These factors have also been confirmed to be related to sleep quality in this study. For example, academic pressure may lead to anxiety, which in turn affects falling asleep and maintaining sleep, which is common among students in different universities.

2. Commonality of sleep problems: From the perspective of sleep problems themselves, the fast pace and digital lifestyle of modern society have made sleep problems a common phenomenon. As a group with a high degree of dependence on electronic devices, college students often use electronic devices such as mobile phones and computers for a long time, which will interfere with the biological clock, inhibit the secretion of melatonin, and affect sleep quality. This study pointed out that the use of electronic devices is one of the important factors affecting students' sleep, and this conclusion is also likely to be true in other college student groups. In addition, unhealthy lifestyles such as irregular eating habits and lack of exercise are common

among college students, and are related with sleep quality, which is similar among students in different regions and universities.

3. Commonality of psychological development stage: first-year students are in a critical psychological development stage of transition from adolescence to adulthood. During this period, they face psychological challenges such as the reshaping of self-cognition and confusion about future plans. These psychological factors will affect sleep. First-year students in other universities and even the entire college population are consistent in their psychological development stages and will experience similar psychological changes. Therefore, the conclusions of this study on the relationship between psychological factors and sleep quality have certain universal significance.

Recommendation for further reseach

Expanding the research sample

1. This study focused on freshman students at the Yunlong campus of Hainan University of Science and Technology. Future research should include students from different colleges and universities, including those in and outside Hainan Province. Different academic environments, curriculum settings, and campus cultures can significantly affect students' sleep quality. For example, students at elite academic institutions may face higher academic pressure, while students at vocational colleges may have more practice-based learning content and different daily routines. By including a wider range of college students, researchers can better understand the

generalizability of the current findings and identify unique factors related with sleep quality in different college environments.

2. In addition to first-year students , it is also crucial to study sophomores, juniors, and seniors. As students advance through college, their academic responsibilities, social lives, and personal development change. For example, seniors may experience more stress from graduation, job hunting, or graduate school, which can affect their sleep. By comparing students of different grades, researchers can track changes in sleep quality during college and determine whether certain factors have a greater or lesser impact on sleep quality as students mature. Inclusion of non-college youth groups: To gain a more comprehensive understanding of sleep quality in young people, future research should also involve non-college youth, such as those participating in vocational training programs, apprenticeships, or in the early stages of employment. Compared with college students, this group may have different lifestyles, work-rest schedules, and stressors, and studying them can provide valuable insights into how different life trajectories affect sleep.

In-depth exploration of influencing factors

1. Although this study identified several factors that affect sleep quality, future research should focus on the interactions between these factors. For example, the combined effects of academic pressure and electronic device use may be more complex than their individual effects. High academic pressure may cause students to use electronic devices for longer periods of time to relieve stress or study, but this in turn may exacerbate sleep problems. Understanding these interactions will help develop more targeted and effective intervention strategies.

2. Long-term effects: Most current studies on sleep-related factors are cross-sectional studies. Future studies should adopt longitudinal research designs to explore the long-term effects of factors such as irregular diet, lack of exercise, and excessive use of electronic devices on sleep quality. Long-term data collection can reveal how these factors gradually affect sleep over time and whether there is a cumulative effect. For example, long-term irregular eating habits may disrupt the body's biological clock and metabolism, leading to more serious sleep problems in the long run.

3. Potential mechanisms: It is necessary to explore the potential physiological, psychological, and social mechanisms by which various factors affect sleep quality. For example, how exactly does stress disrupt the sleep-wake cycle at the neurobiological level? What are the psychological mediators between social anxiety and sleep problems? Revealing these mechanisms can not only enhance our theoretical understanding, but also guide the development of more precise, mechanism-based interventions.

Optimizing research methods

1. Qualitative research methods: Incorporating qualitative research methods, such as in-depth interviews and focus group discussions, can provide rich and in-depth information about students' experiences with sleep problems. Qualitative data can help researchers understand the subjective meaning students give to sleep, the reasons behind their sleep-related behaviors, and the coping strategies they use. For example, interviews can reveal how students view the impact of dormitory life on their sleep and what specific aspects of the dormitory environment they find most troubling. This qualitative information can complement quantitative data and provide new perspectives for the development of interventions.

2. Develop and evaluate intervention strategies: Based on the factors that have been identified that influence sleep quality, future research should focus on developing and evaluating multi-component interventions. These interventions can combine sleep hygiene education programs, stress management training, and behavior change strategies. For example, an intervention could include workshops on healthy sleep habits, relaxation techniques to reduce stress, and goal-setting exercises to encourage regular exercise and healthy eating. By targeting multiple factors simultaneously, multi-component interventions may have a greater impact on improving sleep quality.

Personalized interventions

1. Different student groups may have different needs and preferences for sleep-related interventions. Future research should explore developing personalized interventions for specific subgroups, such as students in different majors, students with pre-existing mental health conditions, or students from different cultural backgrounds. For example, students in high-stress majors such as medicine or engineering may benefit from interventions that specifically address academic stress, while students from cultural backgrounds with different sleep norms may require culturally sensitive approaches.

2. Once an intervention is developed, it is critical to conduct long-term follow-up studies to evaluate its continued effectiveness. Many interventions may show improvements in sleep quality in the short term, but it is unclear whether these effects will persist over time. Long-term follow-up can help determine whether improvements in sleep quality are maintained after the intervention ends, identify any relapse patterns, and inform the development of reinforcement programs or maintenance strategies.

REFERENCE

Baglioni, C., Battagliese, G., Garbarino, S., & et al. (2011). Insomnia as a predictor of depression: A meta-analytic evaluation of longitudinal studies. *Journal of Clinical Psychiatry, 72*(6), 1098-1104.

Besedovsky, L., Lange, T., & Born, J. (2012). Sleep and Immune Function. *PLOS Biology*, 10(6), e1002755. Link to the study

Beattie, L., Kyle, S. D., Espie, C. A., & Biello, S. M. (2015). Social interactions, emotion regulation, and the sleep–wake cycle: A scoping review. *Sleep Medicine Reviews, 24*, 83–90.

Doom, J. R., & Cicchetti, D. (2017). Socioeconomic status and cardiovascular disease: The role of economic stress and access to health resources. *American Journal of Public Health, 107*(3), 432-439.

DENG Xiaoxiang. (2023). Master of Science and Degree in Physical Activity and Sleep Quality and Its Relationship among College Students in Xiangxi Region (Dissertation, Jishou University).

Ferreira, A. I., Almeida, A. M., & Lima, L. L. (2019). The impact of socioeconomic status on sleep quality: The mediating role of perceived stress. *International Journal of Environmental Research and Public Health, 16(*23), 4581.

Fu Newnew. (2023). *The relationship between family economic conditions and sleep quality and the role of group intervention in junior high school students*, M.S. (dissertation, Guizhou Normal University).

Fudolig, C. M., et al. (2024). Sleep and activity patterns among college freshmen tracked using wearables. arXiv preprint arXiv:2412.17969.

Gomes, A. A., Tavares, J., & de Souza, D. L. (2018). Sleep quality and its impact on psychological health among university students. *Journal of Adolescent Health, 62*(5), 587-593.

GUO Xiaoyu. (2023). *The Relationship between Mindfulness Level, Ruminative Thinking,* Sleep Quality and Academic Burnout and Intervention Research of Medical Students M.S. (Dissertation, Shanxi Medical University).

Huang, Y., Kuehner, C., & He, D. (2017). Sleep Duration and Cardiovascular Events: A Systematic Review and Meta-Analysis of Prospective Studies. *European Journal of Preventive Cardiology*, 24(17), 1867-1877.

Han, L.X. (2020). *Sleep status of freshmen and the impact of mindfulness therapy on their sleep problems* (Master's thesis, Wannan Medical College). Master's degree Retrieved from

https://link.cnki.net/doi/10.27374/d.cnki.gwnyy.2020.000147doi:10.27374/d.cnki.gwnyy.2020.000147.

He Yun. (2021). Investigation and countermeasures of the current situation of sleep quality of freshmen. *Heilongjiang Science (*19), 156-157.

Ibarra-Coronado, E. G., Gonzalez, J. M., & Rivas-Arancibia, S. (2015). The role of sleep in the immune system. *Journal of Clinical Sleep Medicine, 11*(3), 259-270.

Kelly, M. J., & Kelly, K. D. (2020). The impact of sleep on college students' academic performance and cognitive function. *Sleep Health, 6*(4), 387-396.

Killgore, W. D. S., Vanuk, J. R., Persich, M. R., Cloonan, S. A., Grandner, M. A., & Dailey, N. S. (2022). Sleep deprivation and emotion: A meta-analysis of 63 studies. *Journal of Sleep Research, 31*(4), e13498.

Lund et al. (2010). "Sleep Patterns and Predictors of Disturbed Sleep in College Students." *Journal of Adolescent Health*

Lund, H. G., Reider, B. D., Whiting, A. B., & Prichard, J. R. (2010). Sleep Patterns and Predictors of Disturbed Sleep in College Students. *Journal of Adolescent Health, 46*(2), 124–132.

LONG Xueyuan. (2015). The effects of sleep problems and family economic status on students' coping ability in patients with cardiovascular diseases. *Chinese Journal of Health Psychology, 23*(8), 1123-1128.

Liu, X., & Zhang, J. (2020). "Sleep quality and its influencing factors among college students: A review of recent studies." *Journal of Sleep Research, 29*(6), e12989.

Lidan Li, Shervanigul · Ablimiti, Peidi Chen, Shuaiyin Zheng, Ningning Pang, Xujie Chen & Yang He. (2024). Relationship between mobile phone addiction and sleep quality and depression in medical students based on structural equation model. *Journal of Jining Medical College,* (03),197-200.

MENG Yuan. (2020). Master of Heat and Humidity Comfort and Style Evaluation of Wool and Linen Bedding Fabrics (Dissertation, Xi'an Polytechnic University).

Min Wang, Lei Zhang, & Xiao Chen. (2022). Environmental factors, psychological stress and sleep quality: A case study of Hainan Province. *Journal of Environmental Psychology, 35*(3), 223-230.

PAN Rong. (2021). The Effect of Red Light on Sleep and Mood in Normal Subjects and Patients with Insomnia Disorders, M.S. (Dissertation, Jinan University).

Qu Pengda. (2019). M.S. in Investigation and Analysis of Health Status and Influencing Factors of College Students (Dissertation, Yunnan University of Traditional Chinese Medicine).

Rathakrishnan, B., Bikar Singh, S. S., Kamaluddin, M. R., Yahaya, A., Mohd Nasir, M. A., Ibrahim, F., & Ab Rahman, Z. (2021). "Smartphone addiction and its effect on the academic performance and sleep quality of university students." *Journal of Behavioral Addictions, 10*(3), 678-687.

Scott, A. J., Webb, T. L., Martyn-St James, M., Rowse, G., & Weich, S. (2021). "The impact of improving sleep quality on mental health: A systematic review and meta-analysis." *Journal of Sleep Research, 30(*5), e13356.

SUN Yaning,WANG Zhengxi,ZONG Shaojie,ZHANG Fan,WANG Xiaoqing,CAO Jingchao & YU Dahua. (2023). Sleep analysis of adolescent smoking addicts. World *Journal of Sleep Medicine* (06), 1239-1241.

Walker, M. P. (2009). The role of sleep in cognition and emotion. Annals of the New York Academy of Sciences, 1156(1), 168-197.

Wang, J., Xu, Y., & Zhang, H. (2020). Sleep Quality and Its Association with Metabolic Syndrome: A Study Based on Traditional Chinese Medicine and Modern Research. *Chinese Journal of Internal Medicine, 5*9(7), 654-661.

Wang, F. (2021). "Sleep quality among university students: The role of physical activity, social relationships, and other factors." *Journal of Adolescent Health, 68*(2), 258-265.

WANG Hongdan. (2023). The effect of sleep duration on sleep quality and its related factors. *Chinese Journal of Behavioral Medicine and Brain Science, 32*(2), 105-112.

Wang Huixia,Liu Cong,Xu Jiali,Wang Liang,Xiong Jianping & Lu Jinkui. (2023). Correlation between sleep status and smoking and drinking behavior and insufficient exercise in college students. *Journal of Shangrao Normal University* (03), 94-100.

Wang Xiaokang,Jiang Ying,Du Miao & Zhao Yuan. (2023). Investigation and study on the sleep situation and influencing factors of students in a medical college in Tianjin. *Health Professions Education* (14), Retrieved from 133-136.doi:10.20037/j.issn.1671-1246.2023.14.41.

Wu Huihui, Bai Jingqi, Wang Yueying, Chen Jiyuan, Wang Wanting, Mou Yunping... & Zhu Bingqian. (2024). Analysis of the current situation and influencing factors of sleep time and insomnia in medical students. *Shanghai Nursing*(04),44-48.

Yao Hengzhi. (2017). Master of Sleep Cycle Recognition Technology and Application Research Based on Smartphone (Dissertation, Nanjing University).

Yuan Bingkun,Peng Cheng,Wu Chengkai,Chen Lei,Wu Ruipeng,Li Huanran & Li Wenyuan. (2023). Analysis of the current situation and influencing factors of overweight obesity and central obesity among urban workers in Guangzhou. *China Health Education* (05), Retrieved from 404-409.doi:10.16168/j.cnki.issn.1002-9982.2023.05.004.

Zhang Wei, Li Na, & Liu Yang. (2021). The relationship between tropical climate and sleep quality in Hainan. *Chinese Journal of Health Research, 44*(5), 785-791.

ZOU Jiayu. (2022). The Influence Mechanism of Socioeconomic Status on Loneliness in the Elderly, M.S. (Dissertation, Shanxi Medical University).

Zhang Dandan et al. (2022) Research on the relationship between sleep quality and emotional disorders among college students, *Chinese Journal of Mental Health*

ZENG Qiao. (2023). The Effect of Peer Abuse on Adolescents' Sleep Quality, M.S. (Dissertation, Sichuan Normal University).

ZHANG Hui. (2023). Investigation of the current situation of sleep quality of college students and the intervention effect of music aerobics, M.S. (dissertation, Qingdao University).

ZHANG Shengwu. (2023). *The Complex Relationship Between Eating Habits, Sleep Patterns, and Obesity in Diabetic* PatientsM.S. (Dissertation, Anhui Medical University).

ZHANG Yongpeng. (2023). Experimental Research on the Effect of Indoor Environment on Sleep Quality of College Students Before Falling AsleepM.S. (Dissertation, Nanjing University of Science and Technology).

Zheng Jing'e & Zheng Jinchi. (2023). Analysis of the influencing factors of sleep quality of college students. *Journal of Henan Medical College* (01), 69-72.

APPENDIX

Appendix A

Interview forms

Factors related sleep quality among first-year students in Hainan vocational university of science and technology

Consent day Date.........................Month...................................Year..........................

  I am Mr. / Mrs. / Miss. . . . .

address...

Read the details from the information sheet for participants in the research project and

I agree to voluntarily participate in the research project.

  I have received a copy of the consent form that I signed and dated, along with

an information sheet for research participants. This is before signing the consent form

to conduct this research. I was explained by the researcher about the purpose of the

research. The duration of the research, research methods, dangers or symptoms that

may arise from the research. or from the medicine used Including the benefits that

will arise from the research and guidelines for treatment by other methods in detail I

have had enough time and opportunity to ask questions until I have a good

understanding. The researcher answered various questions willingly and without

concealment until I was satisfied.

  I have the right to terminate my participation in the research project at any

time. There is no need to inform the reason. and termination of participation in this

research It will not affect treatment or other rights that I will continue to receive. The

researcher guarantees that my personal information will be kept secret. and will be

disclosed only with my consent. Other persons on behalf of the research sponsoring company Human Research Ethics Committee the Food and Drug Administration may be permitted to inspect and process my information. This must be done for the purpose of verifying the accuracy of the information only. By agreeing to participate in this study, I am giving consent to have my medical history reviewed.

I have read the above and have a complete understanding of it. Willing to participate in research willingly. Therefore, signed this consent document.

....Sign the person giving consent.

(...) Name of person giving consent

Date ....Month...............................Year.......................

I have explained the purpose of the research, the research methods, dangers or adverse reactions or risks that may arise from the research. or from the medicine used Including the benefits that will arise from thorough research. Let the participants in the research project named above know and have a good understanding. Ready to sign the consent document willingly

....

Signed by the researcher

(..)

Name of researcher in detail

Date ....Month………..Year…….

....

Witness signature   Witness signature

(...)   (..)

Name of witness in detail   Name of witness in detail

Date ....Month…..Year…….   Date ....Month……..Year…….

Factors related sleep quality among first-year students at Hainan vocational university of science and technology in yunlong campus

……………………………………………………………….

Dear Participants

This study will investigate the sleep quality, health status, and factors related of first- year students at Yunlong Campus of Hainan University of Science and Technology. The participants in this study are voluntary and the information you give us will be confidential, which means your name will not be mentioned anywhere and information provided by you will be presented only in a summarized form.

Please select carefully the answer for each question and the possible responses. Choose and mask (√) the response option that best represents your opinion, knowledge, attitude, and practice. Please notify the interviewer if you have any concerns about the questions or other problems.

The questionnaire is divided into five parts as follows;

Part I   Personal factors

Part II   Health impact

Part III   PSQI

The researcher hopes for your cooperation very much and I would like to thank you very much for this opportunity.

Yu Xueting

Master of Public Health

Chiang Rai Rajabhat University

Questionnaire on sleep quality and health

status of college first-year students

Dear students:

Hello! In order to understand the sleep quality of the current college first-year students and its impact on health, we hereby conduct this questionnaire survey. Your answers will provide valuable data support for our research on college students' sleep health, and help schools and all sectors of society to better pay attention to and support the physical and mental health of college students. This questionnaire is anonymous, and all information is only used for statistical analysis. Please feel free to fill it out. It is expected to take no more than 5 minutes to complete. Thank you for your participation and support!

Part I   Personal factors

1. Your gender:

    1. Male ()

    2. Female ()

2. Your age range:

    1. Under 18 years old ()

    2. 18-19 years old ()

    3. 20 years and above ()

3. What is your height?＿＿cm

4. Your weight is:＿＿kg

5. Your faculty is:

1. School of Nursing

2. School of Accounting ()

3. College of Medicine ()

4. College of Urban Construction ()

5. School of Media and Music ()

Part II   Health impact

6. How many hours of sleep do you get per night on average?

1. Less than 7 hours ()

2. 7-9hours ()

3. More than 9 hours ()

7. What factors do you think most affect your sleep quality? (Multiple choices are allowed)

1. Academic pressure ()

2. Use of electronic devices such as mobile phones/computers ()

3. Dormitory environment (such as noise, light) ()

4. Irregular diet ()

5. Mood swings (such as anxiety, depression) ()

6. Not enough physical exercise ()

7. Other, please specify _____

8. Do you have the habit of using your phone or computer before going to bed? If so, how long do you use it?

    1. Yes, within 1 hour ()

    2. Yes, 1-2 hours ()

    3. Yes, more than 2 hours ()

    4. No ()

9. Do you experience headaches or discomfort in your head?

    1.Yes()   2.No()

10. Do you have stomach pain or indigestion?

    1.Yes()   2.No()

11. Do you feel anxious, nervous, or depressed?

    1.Yes()   2.No()

12. Are you prone to insomnia or have difficulty maintaining high-quality sleep?

    1.Yes()   2.No()

13. Do you feel that there are communication barriers with classmates and friends around you?

    1.Yes()   2.No()

14. Do you actively participate in campus activities and enjoy the pleasure of collaborating with others?

    1.Yes()   2.No()

15. Have you noticed a decline in your memory and difficulty concentrating?

    1.Yes()   2.No()

16. Have you ever used health products (such as health supplements, health foods, vitamins, etc.)?

1.Yes ( )   2.No( )

17. Do you have the habit of staying up late?

1.Yes ( )   2.No( )

18. Are you aware of the possible health problems caused by staying up late for a long time?

1.Yes ( )   2.No( )

Conclusion

Thank you very much for your patience in filling out the questionnaire! Your feedback is very important to us and will help us better understand and improve the sleep health of college students. If you have any suggestions or experiences you want to share about sleep health, please leave a message at the end of the questionnaire.

Name:_____   Date: _____

Pittsburgh Sleep Quality Index (PSQI)

Instructions: The following questions relate to your usual sleep habits during the past month only. Your answers should indicate the most accurate reply for the majority of days and nights in the past month. **Please answer all questions.**

1. During the past month, what time have you usually gone to bed at night? _____

2. During the past month, how long (in minutes) has it usually taken you to fall asleep each night? _____

3. During the past month, what time have you usually gotten up in the morning? _____

4. During the past month, how many hours of actual sleep did you get at night? (This may be different than the number of hours you spent in bed.) _____

5. During the past month, how often have you had trouble sleeping because you…	Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
a. Cannot get to sleep within 30 minutes				
b. Wake up in the middle of the night or early morning				
c. Have to get up to use the bathroom				
d. Cannot breathe comfortably				
e. Cough or snore loudly				
f. Feel too cold				
g. Feel too hot				
h. Have bad dreams				
i. Have pain				
j. Other reason(s), please describe:				
6. During the past month, how often have you taken medicine to help you sleep (prescribed or "over the counter")?				
7. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?				
	No problem at all	Only a very slight problem	Somewhat of a problem	A very big problem
8. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?				
	Very good	Fairly good	Fairly bad	Very bad
9. During the past month, how would you rate your sleep quality overall?				

	No bed partner or room mate	Partner/room mate in other room	Partner in same room but not same bed	Partner in same bed
10. Do you have a bed partner or room mate?				
	Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
If you have a room mate or bed partner, ask him/her how often in the past month you have had:				
a. Loud snoring				
b. Long pauses between breaths while asleep				
c. Legs twitching or jerking while you sleep				
d. Episodes of disorientation or confusion during sleep				
e. Other restlessness while you sleep, please describe:				

Scoring the PSQI

The order of the PSQI items has been modified from the original order in order to fit the first 9 items (which are the only items that contribute to the total score) on a single page. Item 10, which is the second page of the scale, does not contribute to the PSQI score.

In scoring the PSQI, seven component scores are derived, each scored 0 (no difficulty) to 3 (severe difficulty). The component scores are summed to produce a global score (range 0 to 21). Higher scores indicate worse sleep quality.

Component 1: Subjective sleep quality—question 9

Response to Q9	Component 1 score
Very good	0
Fairly good	1
Fairly bad	2
Very bad	3

Component 1 score:_____

Component 2: Sleep latency—questions 2 and 5a

Response to Q2	Component 2/Q2 subscore
≤ 15 minutes	0
16-30 minutes	1
31-60 minutes	2
> 60 minutes	3

Response to Q5a	Component 2/Q5a subscore
Not during past month	0
Less than once a week	1
Once or twice a week	2
Three or more times a week	3

Sum of Q2 and Q5a subscores	Component 2 score
0	0
1-2	1
3-4	2
5-6	3

Component 2 score:_____

Component 3: Sleep duration—question 4

Response to Q4	Component 3 score
> 7 hours	0
6-7 hours	1
5-6 hours	2
< 5 hours	3

Component 3 score:_____

Component 4: Sleep efficiency—questions 1, 3, and 4

Sleep efficiency = (# hours slept/# hours in bed) X 100%

    # hours slept—question 4

    # hours in bed—calculated from responses to questions 1 and 3

Sleep efficiency	Component 4 score
> 85%	0
75-84%	1
65-74%	2
< 65%	3

Component 4 score:_____

Component 5: Sleep disturbance—questions 5b-5j

Questions 5b to 5j should be scored as follows:

Not during past month	0
Less than once a week	1
Once or twice a week	2
Three or more times a week	3

Sum of 5b to 5j scores	Component 5 score
0	0
1-9	1
10-18	2
19-27	3

Component 5 score:_____

Component 6: Use of sleep medication—question 6

Response to Q6	Component 6 score
Not during past month	0
Less than once a week	1
Once or twice a week	2
Three or more times a week	3

Component 6 score:_____

Component 7: Daytime dysfunction—questions 7 and 8

Response to Q7	Component 7/Q7 subscore
Not during past month	0
Less than once a week	1
Once or twice a week	2
Three or more times a week	3

Response to Q8	Component 7/Q8 subscore
No problem at all	0
Only a very slight problem	1
Somewhat of a problem	2
A very big problem	3

Sum of Q7 and Q8 subscores	Component 7 score
0	0
1-2	1
3-4	2
5-6	3

Component 7 score:_____

Global PSQI Score: Sum of seven component scores:_____

Citation: Buysse, DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ: The Pittsburgh Sleep Quality Index (PSQI): A new instrument for psychiatric research and practice. Psychiatry Research 28:193-213, 1989

Validity and Reliability

Reliability Analysis

Internal consistency reliability reflects the degree of relevance of each question in the questionnaire. Internal consistency reliability is usually measured by Cronbach's α coefficient in SPSS software. Cronbach's α coefficient value is between 0 and 1. The larger the α coefficient value is, the better the correlation between questionnaire items is, that is, the higher its internal consistency reliability is. Generally speaking, an α coefficient greater than 0.8 indicates excellent internal consistency, 0.7~0.8 indicates good, and an α coefficient of 0.6~0.7 indicates average and acceptable. If it is lower than 0.6, it means that the internal consistency is poor, and consider modifying the questionnaire scale.

Overall reliability analysis

Cronbach's Alpha	Sample Capacity	Number of items
0.889	94	34

According to the overall reliability coefficient, it can be seen that the standardized reliability coefficient is 0.889, indicating that the overall reliability of the questionnaire is excellent.

Validity Analysis

Validity refers to the degree to which the measured results reflect the content to be examined. The more consistent the measured results are with the content to be examined, the higher the validity; otherwise, the lower the validity. The validity test needs to look at the significance of the KMO coefficient and the Bartlett sphericity test.

The KMO coefficient ranges from 0 to 1. The closer it is to 1, the better the structural validity of the questionnaire. If the significance of the Bartlett sphericity test is less than 0.05, we can also believe that the questionnaire has good structural validity.

KMO and Bartlett's test		
KMO sampling suitability measure		0.914
Bartlett's test of sphericity	Approximate Chi-Square	1920.846
	Degrees of Freedom	528
	Significance	0.000

KMO and Bartlett tests were used to verify validity. The coefficient result of the KMO test was 0.914, the chi-square value of the Bartlett test was 1920.846, and the significance = 0.000 < 0.01, indicating that the overall validity of the questionnaire was excellent.

Attachment: Screenshot of analysis results

Reliability Statistics

Cronbach's Alpha	N of Items
.889	34

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.914
Bartlett's Test of Sphericity	Approx. Chi-Square	1920.846
	df	528
	Sig.	.000

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