Napata College

College of Medicine

Community Medicine

Insomnia and it is Impact on the Academic Performance of Medical Students of Napata College in 2022

A Thesis Submitted for Partial Fulfillment of the Requirement for Bachelor in Medicine and Bachelor of Surgery (MBBS)

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2022

Dedication

We dedicate the fruit of our humble effort to those who gave us life and hope, and raised us with a passion for learning and knowledge, and to those who taught us to ascend the ladder of life with wisdom and patience; Righteousness, kindness, and loyalty to them: our dear fathers and our dear mothers. To who's God gave us the blessing of their presence in our life to the strong knot who helped us in our research journey: our brothers and sisters.

To the companions of the path who accompanied us as we paved the way together towards success in our scientific career. Finally, to everyone who helped us, and had a role, from near or far, in completing this study, asking the Lord that everyone be rewarded with the best reward in this world and the Hereafter.

Thanks to you, what was yesterday's dream became true.

Acknowledgment

“Be a scholar… If you cannot, then be a

learner. If you cannot, then love the scholars. If you cannot, then do not hate them.”

We thank God Almighty who has enabled us to complete this scientific research, and who has provided us with health, wellness and determination.

We extend our sincere thanks and appreciation to the supervising doctor, "Bahja Hamid Mohammad" for all the guidance and valuable information he provided us that contributed to enriching the subject of our study in its various aspects.

We also extend our thanks to Dr. Hadeel Ahmed Al-Hassan and Dr. Munir Ali Abdullah for their fruitful and inspiring teachings and advice in this field that helped establish this research.

Abstract

Background: Insomnia is the most recognized sleep disturbance and the most common sleep complaint.

Objective: To evaluate insomnia and its impact on the academic performance of medical students of Napata college.

Methods: Cross-sectional observational study was conducted at the college of medicine, Napata college in the period between October to December 2022.

Results: The mean age of the students was 23.42±4.39 and the majority were fifth year medical students (27.3%), 30.7% of students were mature, and 38.7% of students had a job. Regarding the medical condition, 24.7% of students had a chronic disease and 18% had a psychiatric disorder. Only 12% of students were a smoker and 3.3% consume alcohol, 52% consume 1-2 cups of coffee per day. Half of the students (49.3%) study 2-4h per day as average and 66% had a 4-6h average sleep duration. The majority of students (56%) suffer from sleepiness during the day 40.7% of them suffer from that sometimes, the most common reason was studying late at night (50%). Half of students (50%) reports that sometimes feel difficulty concentration and paying attention during the day, 56% had excessive sleepiness in class, 39.3% tend to reduce their sleeping hour in order to study and 35.3% mainly during the exams period. Regarding Academic performance, the mean GPA of students were 2.82±0.40 and 30.7% of students report that their GPA decreased while 42% reported that there was increase compared with the semester before. Considering the insomnia severity, 60% had subthreshold insomnia, 5.3% had moderate severe insomnia and 2.7% had severe insomnia. There a statistically significate relationship between GPA and insomnia.

Conclusion: There is a high prevalence of insomnia symptoms among the medical students and affects their academic performance.

Keywords: Insomnia, Medical students, GPA, Sudan.

ملخص الأطروحة

الخلفية: الأرق هو اضطراب النوم الأكثر شهرة وشكوى النوم الأكثر شيوعا.

الاهداف: لتقييم الأرق وتأثيره على الأداء الأكاديمي لطلاب الطب في كلية نبتة.

منهجية الدراسة: أجريت دراسة رصد مستعرضة في كلية الطب ، كلية نبتة في الفترة بين أكتوبر إلى ديسمبر ٢٠٢٢.

النتائج: كان متوسط العمر للطلاب ٢٣,٤٢± ٤,٣٩ وكان الغالبية طلاب الطب في السنة الخامسة (٢٧,٣٪) ، و ٣٠,٧ ٪ من الطلاب ناضجون ، و ٣٨,٧٪ من الطلاب لديهم وظيفة. فيما يتعلق بالحالة الطبية ، يعاني ٢٤,٧ ٪ من الطلاب من مرض مزمن و ١٨٪ يعانون من اضطراب نفسي. فقط ١٢٪ من الطلاب كانوا مدخنين و ٣,٣ ٪ يستهلكون الكحول ، و ٥٢٪ يستهلكون ١-٢ أكواب من القهوة يوميًا. يدرس نصف الطلاب (٤٩,٣٪) من ٢-٤ ساعات في اليوم حيث كان المتوسط و ٦٦٪ ٤-٦ ساعات في متوسط مدة النوم.غالبية الطلاب (٥٦٪) من النعاس خلال اليوم ٤٠,٧ ٪ منهم يعانون من ذلك في بعض الأحيان ، كان السبب الأكثر شيوعًا هو الدراسة في وقت متأخر من الليل (٥٠٪). يذكر نصف الطلاب (٥٠ ٪) أنه يشعرون في بعض الأحيان بتركيز الصعوبة والاهتمام خلال اليوم ، وكان ٥٦٪ من النعاس المفرط في الفصل ، و ٣٩,٣٪ يميلون إلى تقليل ساعة النوم من أجل الدراسة و ٣٥,٣٪ بشكل رئيسي خلال فترة الامتحانات. فيما يتعلق بالأداء الأكاديمي ، كان متوسط المعدل التراكمي للطلاب ٢,٨٢ ± ٠,٤٠ و ٣٠,٧ ٪ من الطلاب يذكرون أن المعدل التراكمي الخاص بهم قد انخفض بينما يبلغ ٤٢٪ أن هناك زيادة مقارنة بالفصل الدراسي من قبل. بالنظر إلى شدة الأرق ، كان لدى ٦٠٪ من الأرق الفرعي ، و ٥,٣٪ من الأرق الحاد المعتدل و ٢,٧٪ من الأرق الشديد. هناك علاقة إحصائية بين المعدل التراكمي والأرق.

الخاتمة: هناك انتشار كبير لأعراض الأرق بين طلاب الطب و يأثير على أدائهم الأكاديمي.

الكلمات الرئيسية: الأرق، طلاب الطب، المعدل التراكمي، السودان.

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Chapter One

Introduction

1.1 Background:

Sleep is an essential part of a human being's life. An average person spends about 7 - 9 hours per day sleeping. Sleeping is crucial for promoting efficient thinking and daily physical performance(1). Good sleep has been shown to improve the problem-solving skills and to increase memory performance of both children and adult(2–4).The sleep–wake cycle, one of our biological rhythms, is driven by a circadian timing system which is influenced by some factors such as physiological function, school and work schedules, and many others(5).Sleep deprivation can be harmful to students. A high correlation has been demonstrated between sleep duration and performance in some activities as well as subjective alertness(6).

The American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders (DSM-V) devotes sleep disorders as primary (not related to other medical conditions or psychological disorders) and secondary (the conditions resulting from illness, psychological disorders, or alcohol or drug use). Primary sleep disorders can be classified as either dyssomnias or parasomnias. Dyssomnias are able to affect onset, duration, or quality of sleep. Insomnia or inability to sleep is the most prevalent dyssomnia and could be narcolepsy, sleep apnea, and circadian rhythm sleep disorders. Other abnormal behaviors that can happen during sleep are parasomnias comprising nightmares, sleep terrors, and sleep walking disorders(7).Insomnia is the most recognized sleep disturbance and the most common sleep complaint(8,9). Individuals suffering from insomnia have either difficulty in initiating the sleep process or maintaining sleep for more than seven hours(10). It is reported that approximately 30% of adults suffer from insomnia(10). Specific academic environments, increased responsibility, difficult examinations, and time spent on learning may lead to sleep deprivation(11). Students are advised to sleep about 7 to 9 h per night(12,13). However, medical students are particularly prone to sleep-related problems. Sleep is not considered a top priority and students tend to reduce their sleep to have extra time for studies(11,14).

The academic performance of medical students seems to influence and be influenced by sleep. In a qualitative study that addressed factors that determine the academic achievement of medical students, students identified the management of sleep deprivation as crucial for academic success(15). Hours of sleep acquired before exam time has been identified as a predictor of exam scores among medical students(16). Similarly, poor sleep quality before exams has been shown to correlate with worse academic achievement(17). The effect of poor sleep on cognitive and psychomotor performance may underlie these associations(18,19).

1.2 Problem statement:

A meta‐analysis of seventy studies concluded that acute sleep deprivation harms most cognitive domains, such as simple attention, intricate attention, working memory, and short‐term memory(20).

Moreover, the psychomotor performance of medical students, particularly in judgment ability, has been shown to worsen with 24 hours of sleep deprivation(18). Although studies have investigated the associations among sleep, stress and academic performance in medical students, many of those studies look at stress and academic performance as the outcome. However, it is reasonable to argue that medical students are subject to high levels of stress and work hard to increase and maintain their grade point average (GPA) at the expense of sleep.

1.3 Justification:

Sleeping plays a significant function in learning and memory(21). The prevalence of sleep disorders in medical students is usually high and its impact could be reflected in physical, social and mental health problems. A Sudanese study has reported the frequency of poor sleepers among Sudanese medical students and its association with academic performance(22). This indicates the need for further research to highlight this problem.

1.4 Objectives:

1.4.1 General Objective:

To assess the insomnia and its impact on the academic performance of medical students of Napata College 2022

1.4.2 Specific Objectives:

1. To assess the insomnia among the medical students of Napata college.
2. To assess the impact of insomnia on the academic performance of medical students.

Chapter Two

Literature Review

2.1 General knowledge:

Insomnia is defined as repeated difficulty with sleep initiation, maintenance, consolidation, or quality that occurs despite adequate time and opportunity for sleep and that results in some form of daytime impairment(23). Specific criteria vary, but common ones include taking longer than 30 minutes to fall asleep, staying asleep for less than 6 hours, waking more than 3 times a night, or experiencing sleep that is chronically nonrestorative or poor in quality(24).

Approximately one third of adults report some difficulty falling asleep and/or staying asleep during the previous 12 months, with 17% reporting this problem as a significant one(25). From 9-12% experience daytime symptoms, 15% are dissatisfied with their sleep, and 6-10% meet the diagnostic criteria of insomnia syndrome.

Insomnia is more prevalent in women; middle-aged or older adults; shift workers; and patients with medical and psychiatric diseases. In young adults, difficulties of sleep initiation are more common; in middle-aged and older adults, problems of maintaining sleep are more common.

As many as 95% of Americans have reported an episode of insomnia at some point during their lives(26). The 2008 update to the American Academy of Sleep Medicine (AASM) guideline for the evaluation and management of chronic insomnia calls insomnia an important public health issue(27).

Classification (DSM-5 and ICSD-3):

The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) makes no distinction between primary and comorbid insomnia. This previous distinction had been of questionable relevance in clinical practice and a diagnosis of insomnia is made if an individual meets the diagnostic criteria, despite any coexisting conditions. The International Classification of Sleep Disorders, Third Edition (ICSD-3) criteria are consistent with the changes to the DSM-5.

The DSM-5 defines insomnia as dissatisfaction with sleep quantity or quality, associated with one (or more) of the following symptoms(28):

- Difficulty initiating sleep

- Difficulty maintaining sleep, characterized by frequent awakenings or problems returning to sleep after awakenings
- Early-morning awakening with inability to return to sleep

Other criteria include the following:

- The sleep disturbance causes clinically significant distress or impairments in social, occupational, educational, academic, behavioral, or other important areas of functioning
- The sleep difficulty occurs at least 3 nights per week
- The sleep difficulty is present for at least 3 months
- The sleep difficulty occurs despite adequate opportunity for sleep
- The insomnia cannot be explained by and does not occur exclusively during the course of another sleep-wake disorder
- The insomnia is not attributable to the physiological effects of a drug of abuse or medication.
- Coexisting mental disorders and medical conditions do not adequately explain the predominant complaint of insomnia

Epidemiology:

In a 1991 survey, 30-35% of adults in the United States reported difficulty sleeping in the past year, and 10% reported the insomnia to be chronic and/or severe. Despite the high prevalence, only 5% of persons with chronic insomnia visited their physicians to specifically discuss their insomnia. Only 26% discussed their insomnia during a visit made for another problem(29).

A 2016 report from the CDC is the first to provide state-specific estimates of the prevalence of a ≥7 hour sleep duration in a 24-hour period. The report shows geographic clustering of lower prevalence estimates for this duration of sleep in the southeastern United States and in states along the Appalachian Mountains, which are regions with the highest burdens of obesity and other chronic conditions(30).

In an epidemiologic study from Quebec, 29.9% of 2001 respondents reported insomnia symptoms, and 9.5% met criteria for insomnia syndrome(31). A study of young adults in Switzerland indicated a 9% rate of chronic insomnia. A World Health Organization study of 15 sites found a prevalence of approximately 27% for patients reporting "difficulty sleeping."

National surveys in England showed a modest but steady increase in the prevalence of insomnia from 1993-2007. The percentage of respondents reporting any insomnia symptoms increased from 35.0% to 38.6% over that period, while insomnia diagnosis rose from 3.1% to 5.8%(32). The following features were associated with insomnia:

- Female gender
- Increased age
- Lower educational attainment

- Depression
- Unemployment
- Economic inactivity
- Widowed, divorced, or separated status

Etiology:

Many clinicians assume that insomnia is often secondary to a psychiatric disorder, However, a large epidemiologic survey showed that half of insomnia diagnoses were not related to a primary psychiatric disorder(33). A diagnosis of insomnia does, however, increase the future risk for depression or anxiety. Insomnia may also be secondary to other disorders or conditions, or it may be a primary condition.

The International Classification of Sleep Disorders, 2nd Edition (ICSD-2)(34) classifies insomnia into 11 categories, as follows:

- Adjustment insomnia (acute insomnia)
- Psychophysiological insomnia (primary insomnia)
- Paradoxical insomnia
- Insomnia due to medical condition
- Insomnia due to mental disorder
- Insomnia due to drug or substance abuse
- Insomnia not due to substance or known physiologic condition, unspecified
- Inadequate sleep hygiene
- Idiopathic insomnia
- Behavioral insomnia of childhood
- Primary sleep disorders causing insomnia

Acute and chronic insomnia:

Insomnia is usually a transient or short-term condition. In some cases, however, insomnia can become chronic.

Acute insomnia lasts up to 1 month. It is often referred to as adjustment insomnia because it most often occurs in the context of an acute situational stress, such as a new job or an upcoming deadline or examination. This insomnia typically resolves when the stressor is no longer present or the individual adapts to the stressor.

However, transient insomnia often recurs when new or similar stresses arise in the patient's life(23). Transient insomnia lasts for less than 1 week and can be caused by another disorder, changes in the sleep environment, stress, or severe depression.

Chronic insomnia lasting more than 1 month can be associated with a wide variety of medical and psychiatric conditions and typically involves conditioned sleep difficulty. However, it is believed to occur primarily in patients with an underlying predisposition to insomnia. The different subtypes of chronic insomnia are described in Etiology.

Chronic insomnia has numerous health consequences. For example, patients with insomnia demonstrate slower responses to challenging reaction-time tasks(35). Moreover, patients with chronic insomnia report reduced quality of life, comparable to that experienced by patients with such conditions as diabetes, arthritis, and heart disease. Quality of life improves with treatment but still does not reach the level seen in the general population(36).

In addition, chronic insomnia is associated with impaired occupational and social performance and an absenteeism rate that is 10-fold greater than controls. Furthermore, insomnia is associated with higher health care use, including a 2-fold higher frequency of hospitalizations and office visits. In primary care medicine, approximately 30% of patients report significant sleep disturbances.

Management:

The American Academy of Sleep Medicine (AASM) guideline states that the 2 primary goals of treatment are to improve sleep quality and to improve related daytime impairments(27). Strategies for achieving these goals will vary depending on the underlying etiology. If the patient has a medical, neurologic, or sleep disorder, treat the disorder. In particular, adequate pain control can greatly relieve the insomnia associated with pain syndromes. In 2017, the AASM released an updated guideline for the pharmacologic treatment of chronic insomnia in adults(37).

The AASM guideline recommends psychological and behavioral interventions (including, but not limited to, cognitive-behavioral therapy [CBT]) as effective in the treatment of chronic comorbid insomnia as well as primary insomnia. The guideline also encourages these interventions as initial therapy when appropriate(27). A study of 291 patients aged 60 years and older (mean age, 70 years; 58% women) with confirmed insomnia disorder and no major depression within the previous 12 months found CBT significantly reduced risk of depression in patients with insomnia(38).

The treatment of primary (psychophysiological) insomnia begins with education about the sleep problem and appropriate sleep hygiene measures. Before therapy is instituted, most patients are asked to maintain a sleep diary for 1-2 weeks. This provides a clearer picture of the degree of sleep disturbance and allows development of a tailored treatment.

Strong evidence supports the use of nonpharmacologic interventions (e.g., CBT) for insomnia. Head-to-head comparison has shown that the long-term

benefits of nonpharmacologic interventions are superior to those of medication(39–41). CBT is now considered the most appropriate treatment for patients with primary insomnia(42–44). Use of this therapy is based on the fact that primary insomnia is associated with physiologic, emotional, and cognitive arousal and conditioning to arousal in bed.

If the patient has a psychiatric disorder, the disorder should be treated. Management may involve medications, psychotherapy, and possible referral to a psychiatrist, psychologist, or therapist. If the insomnia is related to medication or drug abuse, the offending medication or drug must be slowly tapered and withdrawn.

Even when comorbid causes of insomnia (i.e., medical, psychiatric) are treated, however, variable degrees of insomnia persist that require additional interventions. These patients can benefit from CBT(45) and a short course of a sedative-hypnotic or melatonin receptor agonist. In the case of a psychiatric disorder(46) (e.g., depression or anxiety), CBT and a short-term sedative-hypnotic in conjunction with an antidepressant can be beneficial.

2.2 Previous Studies:

A study was done in 2014 by Hyder O. Mirghani, et la titled Daytime sleepiness and chronic sleep deprivation effects on academic performance among Sudanese medical students. Aimed to explored the relationship between academic performance, sleep deprivation, and daytime sleepiness among Sudanese medical students. This study was cross-sectional study was conducted on 108 medical students from Omdurman University during the period from June to August 2014. Their results were A significant difference ($p < 0.001$) was found between the A (excellent) and C (average) groups regarding daytime sleepiness, insufficient sleep, sleeping less than 6 h per night, and falling asleep while reading ($p < 0.005$). No significant difference was reported regarding snoring or the subjective feeling of sleepiness during study hours. Their study confirms that there is enormous effects of sleep deprivation and daytime sleepiness on academic performance among medical students(22).

A study was done in 2019 by Abdullah D. Alotaibi, et la titled the relationship between sleep quality, stress, and academic performance among medical students. Aimed to assess the quality of sleep and psychological stress among medical students and investigate the relationship between sleep quality, stress, and academic performance. This study was cross‐sectional study targeted all medical students in their preclinical years at a Saudi medical college in 2019. Their results were the mean PSQI score was 8.13 ± 3.46; 77% of the participants reported poor quality of sleep and 63.5% reported some level of psychological stress (mean K10 score: 23.72 ± 8.55). Poor quality of sleep was significantly

associated with elevated mental stress levels ($P < 0.001$) and daytime naps ($P = 0.035$). Their study confirms that poor sleep quality was significantly associated with elevated levels of stress. However, they did not show any statistically significant relationship with academic performance(47).

A study was done in 2017 by Paulina Ojeda-Paredes, et la titled Sleep quality, insomnia symptoms and academic performance on medicine students. Aimed to relate sleep quality and insomnia symptoms with academic performance of first year students of surgeon medical career in Yucatan. This study was cross-sectional study was developed, which included 118 first year regular students from Medicine School of the Autonomous University of Yucatan, Mexico. Their results were 65 men (19.15 ± 1.60 years) and 53 women (18.98 ± 1.23 years) were included. 98.11% of women and 90.76% of men perceived poor sleep quality. No association was found between sleep quality and academic performance. 73% of women and 66% of men were classified with insomnia symptoms. 50.94% of women and 44.61% of men had poor academic performance. Poor academic performance was related with mild ($p = 0.0035$) and moderate ($p = 0.031$) insomnia symptoms only in women. In men, insomnia symptoms was related to body mass index and living out of a family home. Their study confirms that a great majority of students perceived poor sleep quality and insomnia symptoms. In women, insomnia symptoms adversely affect academic performance(48).

A study was done in 2019 by Ganpat Maheshwari and Faizan Shaukat titled Impact of Poor Sleep Quality on the Academic Performance of Medical Students. Aimed to find whether or not poor academic performance is a consequence of poor sleep quality among Pakistani medical students. This study was an observational, cross-sectional study conducted with undergraduate medical students. Their results were 512 (64.24%) students with global PSQI score ≥5 indicating poor sleep quality. The mean GPA of poor sleepers was 2.92 ± 1.09 which was significantly lower than that of good sleepers ($p < 0.0001$). In the group of students who scored lower GPA (2.0-2.7), 28.2% had very bad subjective sleep quality, 29.05% had sleep latency of 16-30 min, 29.4% had sleep duration of <5-7 h, 27.8% had sleep efficiency of <85%, and 37.7% experienced daytime dysfunction almost every day. Their study confirms that medical students of Pakistan have poor sleep quality which has a negative impact on their academic performance. Adequate sleep is essential to refresh the students every day and help them in learning and memory processing(49).

A study was done in 2012 by Hamza M. Abdulghani, et la titled Sleep disorder among medical students: Relationship to their academic performance. Aimed to examine the prevalence of sleep disorder among medical students and investigate any relationship between sleep disorder and academic performance.

This study was a cross-sectional self-administered questionnaire-based study. Their results were 491 responses with a response rate of 55%. The ESS score demonstrated that 36.6% of participants were considered to have abnormal sleep habits, with a statistically significant increase in female students (p=0.000). Sleeping between 6–10 h per day was associated with normal ESS scores (p=0.019) as well as the academic grades _3.75. Abnormal ESS scores were associated with lower academic achievement (p=0.002). Their study confirms that a high prevalence of sleep disorder was found in this group of students, specifically female students. Analysis of the relationship between sleep disorder and academic performance indicates a significant relationship between abnormal ESS scores, total sleeping hours, and academic performance(50).

A study was done in 2019 by Vijia Kumar Gemnani, et la titled Impact of Insomnia on Academic Performance among Undergraduate Medical Students of Chandka Medical College (Shaheed Mohtarma Benazir Bhutto Medical University) Larkana. Aimed to assess the frequency of insomnia among medical students, secondary to evaluate the impact of insomnia on their education performance. A valid Athens Insomnia Scale (AIS) was applied to assess the frequency of insomnia and the GPA was computed for academic performance. This study was a cross-sectional study. Their results were all the participating undergraduate medical students mean age was 20.15 ± 1.413 years and the range of age was 17 to 24 years. Scale GPA 4.0 was used to measure the Academic performance of subjects, therefore 166 (66.9%) subjects secured good performance while 82(33.1%) subjects obtained low GPA (poor performance). Their study confirms that a high frequency of insomnia in medical students of CMC (1st year to 4th year MBBS) with multiple factors affecting sleep. The frequency of insomnia even high in female students. Insomniac students are found to have an impact on their GPAs (academic performance). (51).

Chapter Three

Methodology

3.1 Study design:

Observational Cross-sectional study.

3.2 Study Area:

The country of Sudan, Khartoum state, the city of Bahri Kafory, Faculty of Medicine at Napata College

3.3 Study period:

From the first of October to the twentieth of December 2022.

3.4 Study population:

Medical students from first to fifth year.

3.5.1 Inclusion Criteria:

All medical students.

3.5.2 Exclusion Criteria:

None.

3.6 Sample size & technique:

Convenience sampling.

3.7 Data Collection:

Self-administered questionnaires contain sociodemographic data, and questions regarding the knowledge of sleep disturbances and insomnia severity index(52).

3.8 Data Analysis:

Data were checked for completeness and consistency. IBM SPSS (Statistical Package for the Social Science) version 26.0 was used to analyze data, descriptive frequency analysis was made for all variables, the relationship between variables was analyzed according to chi-square test and the alpha value (significance level in statistics) was 0.05, results was displayed in tables and figures constructed using Microsoft Excel 2013.

3.9 Ethical considerations: We obtained approval for the research project from the responsible authority, and the students have the right to agree or refuse to participate in the survey.

Chapter Four

Results

Table 4.1: Distribution of participants according to the sociodemographic data.

Sociodemographic data			
Age	Mean	Std. Deviation	
	23.42	4.388	
		Frequency	Percent
Gender	Male	69	46
	Female	81	54
	Total	150	100
Academic year	First year	28	18.7
	Second year	26	17.3
	Third year	28	18.7
	Fourth year	27	18
	Fifth year	41	27.3
	Total	150	100
Marital status	Single	119	79.3
	Married	27	18
	Divorced	3	2
	Widow	1	0.7
	Total	150	100
Residency	Urban	113	75.3
	Rural	37	24.7
	Total	150	100
Did you study any medical college before (mature student)?	Yes	46	30.7
	No	104	69.3
	Total	150	100
Do you have an occupation (Job/work)?	Yes	58	38.7
	No	92	61.3
	Total	150	100

Economic state	Poor	2	1.3
	Average	66	44
	Good	71	47.3
	Very good	11	7.3
	Total	150	100

Table 4.1: Continue.

Sociodemographic data			
		Frequency	Percent
Do you have any chronic disease?	Yes	37	24.7
	No	113	75.3
	Total	150	100
Do you have any psychiatric disorder?	Yes	27	18
	No	123	82
	Total	150	100
Smoking	Yes	18	12
	No	132	88
	Total	150	100
Caffeine intake per day	No	55	36.7
	1-2 cups	78	52
	3 or more cups	17	11.3
	Total	150	100
Alcohol consumption	Yes	5	3.3
	No	145	96.7
	Total	150	100
Sleep cycle	Nighttime sleeper	115	76.7
	Daytime sleeper	35	23.3
	Total	150	100

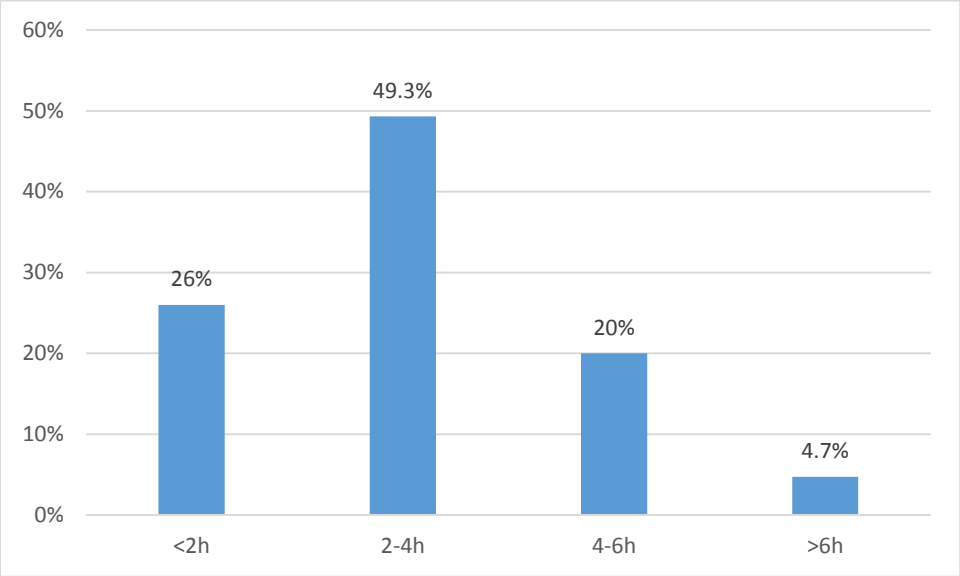

Figure 4.1: Distribution of participants according to the average studying hours per day.

It shows that students who study from two to four hours are the highest percentage.

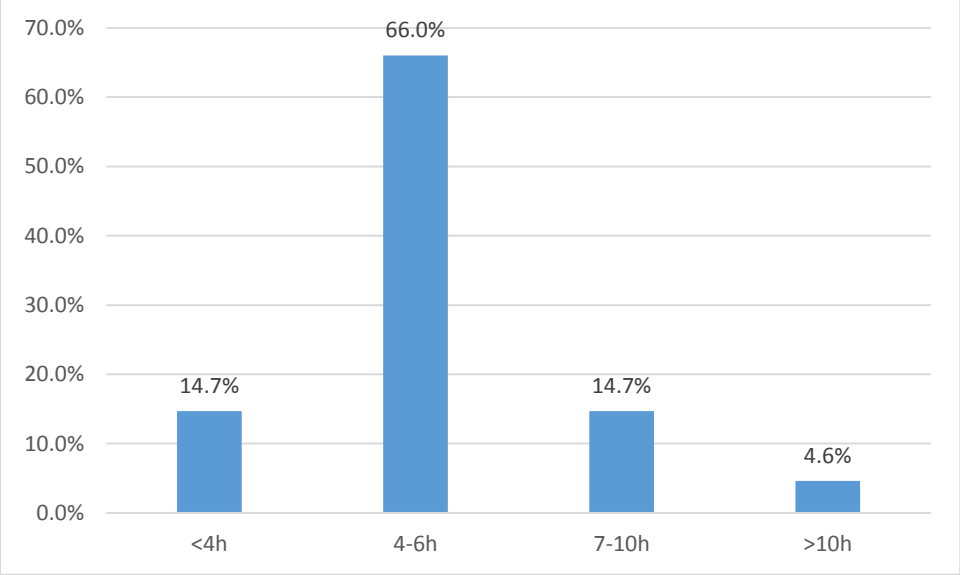

Figure 4.2: Distribution of participants according to the sleep duration.
The vast majority of students sleep six hours or less.

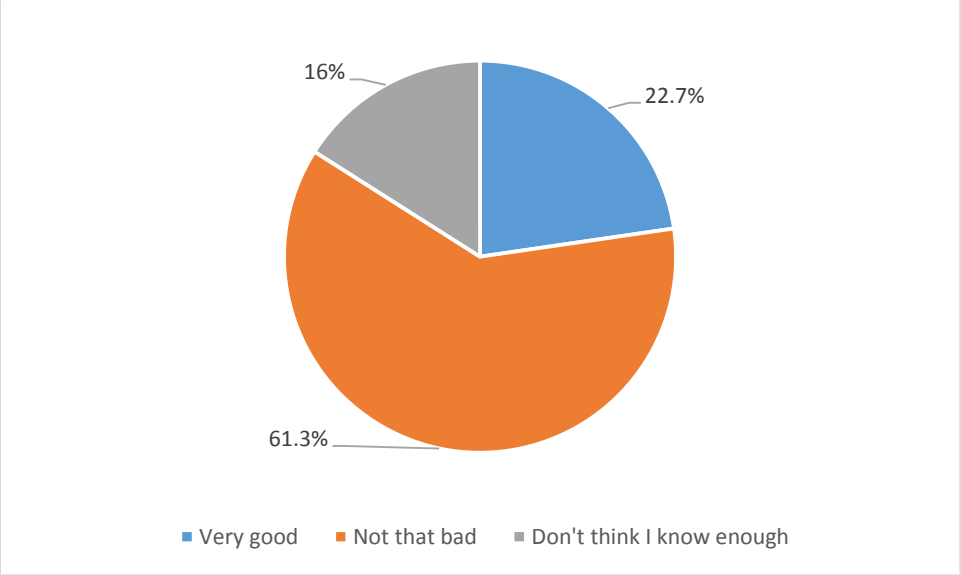

Figure 4.3: Distribution of participants according to their awareness and knowledge about sleep.

A large number of students do not have sufficient knowledge and awareness about sleep, as 61% said that their knowledge is not bad, and 16% do not know enough.

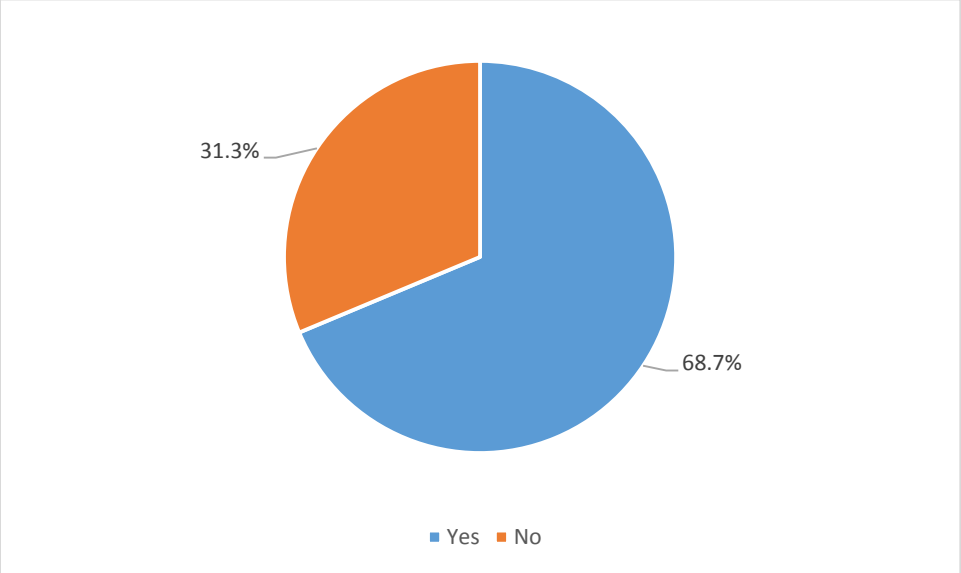

Figure 4.4: Distribution of participants according to the knowledge about the lack of sleep can affect the physical health and become a risk for other diseases.

Almost two-thirds of the students are aware of the side effects of lack of sleep on physical health, but the other third do not know about that.

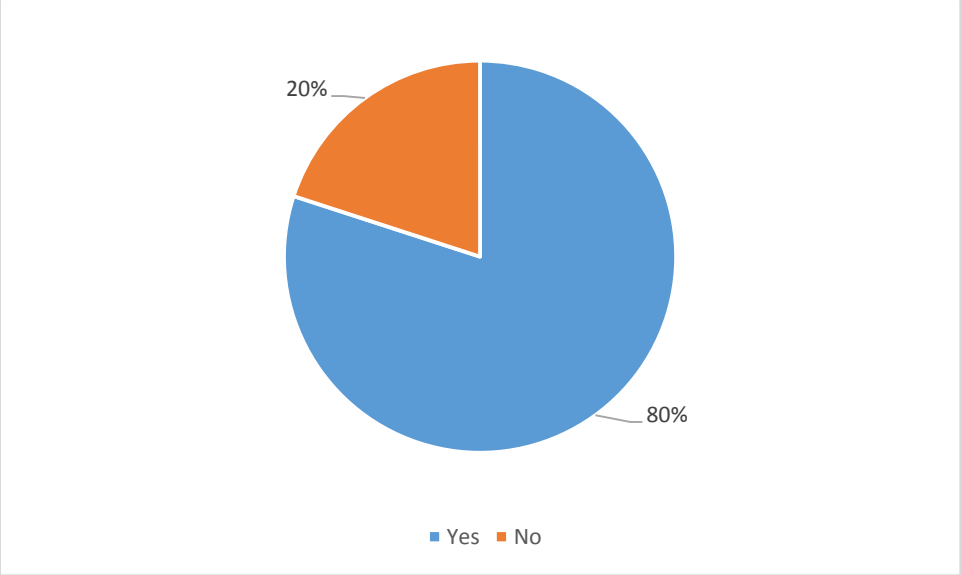

Figure 4.5: Distribution of participants according to if they know that the sleep disturbance can cause anxiety and depression.

Eighty percent know about the effects of lack of sleep and its impact on mental health.

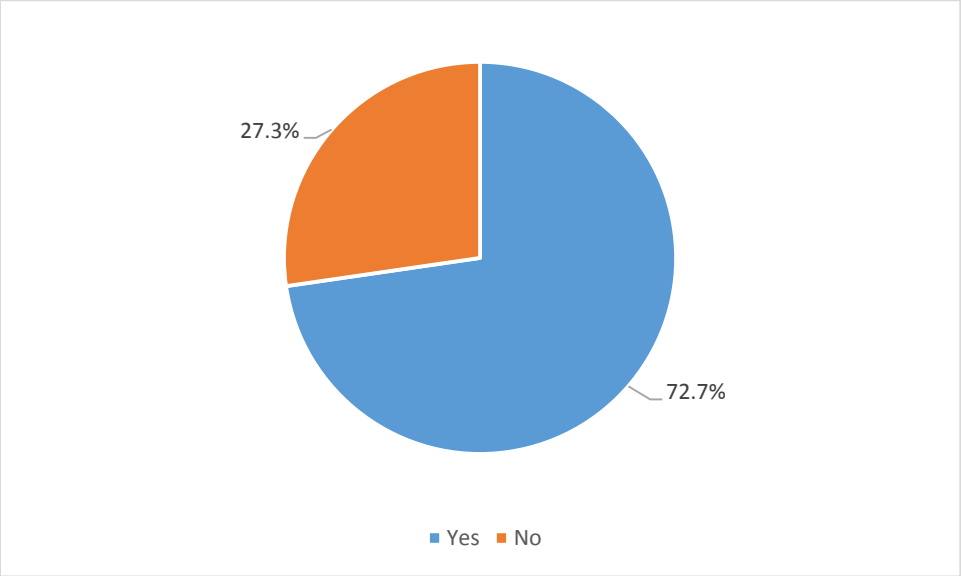

Figure 4.6: Distribution of participants according to if they know that the sleep disturbances are an important problem.

27% of medical students do not think that sleep disorders are an important problem, which is a worrying percentage.

Table 4.2: Distribution of participants according to the knowledge about the types of sleep disorders.

Knowledge about the types of sleep disorders			
		Frequency	Percent
Do you know any types of sleep disorders?	Yes	61	40.7
	No	89	59.3
	Total	150	100
		Frequency	Percent
If yes, mention them	Insomnia	47	77
	Insomnia and restless leg syndrome	7	11.5
	Insomnia, narcolepsy, and sleep apnea	1	1.6
	Insomnia, restless leg syndrome and narcolepsy	1	1.6
	Insomnia, sleep apnea, and parasomnias	1	1.6
	Insomnia, sleep apnea, restless leg syndrome and narcolepsy	1	1.6
	Sleep paralysis	3	4.9
	Total	61	100

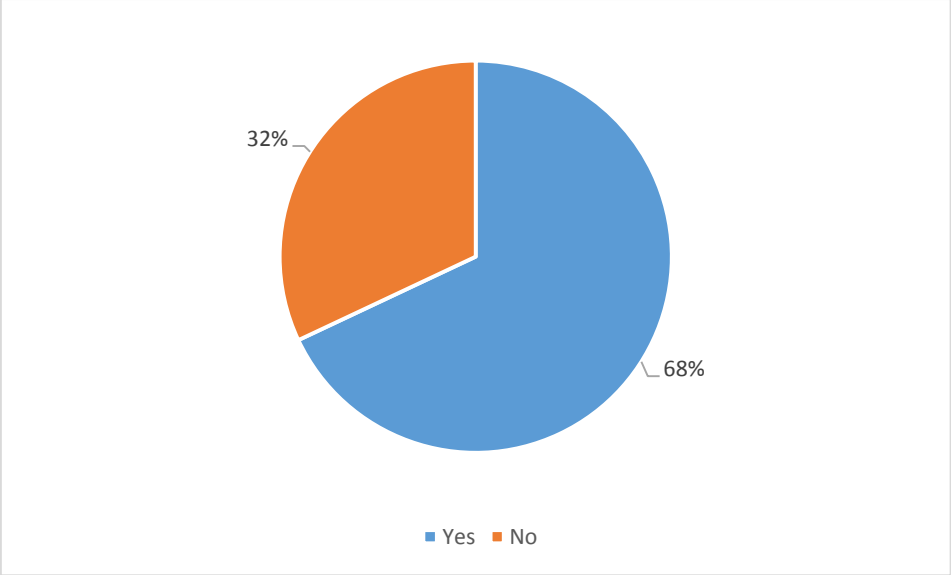

Figure 4.7: Distribution of participants according to their opinion about people who suffer from sleep disturbance if they need to seek medical advice and treatment or not.

36% of the students do not think that a person who suffers from sleep disorders needs medical advice.

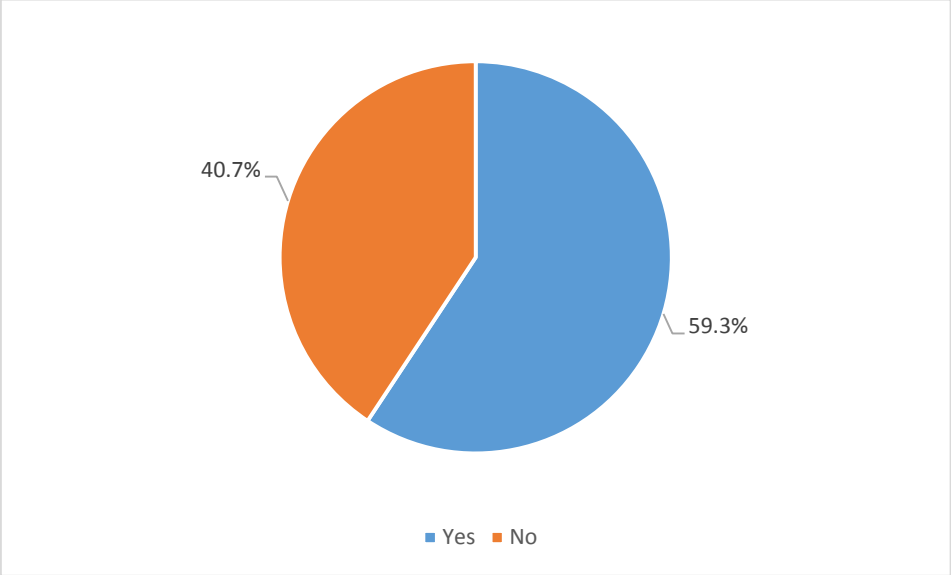

Figure 4.8: Distribution of participants according to their opinion about if willpower can overcome drowsiness and sleep.

Table 4.3: Distribution of participants according to the suffering from sleepiness during the day and its reasons.

Suffering from sleepiness during the day and its reasons			
		Frequency	Percent
Do you suffer from sleepiness during the day?	A lot	8	5.3
	Sometimes	61	40.7
	Not that much	15	10
	No	66	44
	Total	150	100
		Frequency	Percent
What do you think is the reason for that? (N=84)	I study late at night	42	50
	Work late at night	22	22
	Doing things late at night	4	5
	Using the phone and social media late at night	4	5
	Consuming a lot of caffeine	1	1
	Have a baby	1	1
	Overthinking	5	6
	I don't know the reason	1	1
	I wake up a lot at night and I also don't sleep that much	1	1
	Sometimes I study and sometimes without obvious reason	1	1
	Came home late at night	2	2
	Total	84	100

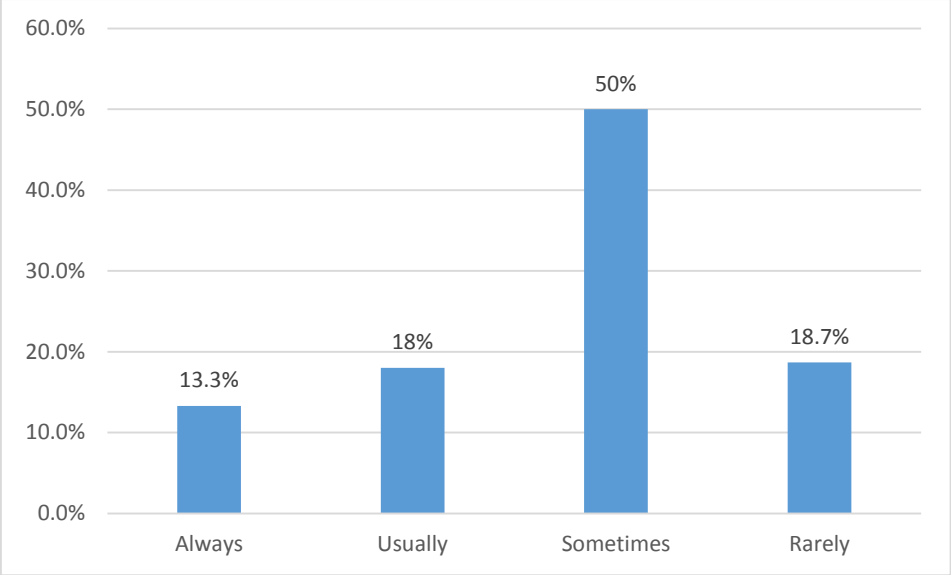

Figure 4.9: Distribution of participants according to the feeling of difficulty concentrating, paying attention and remembering during the day.

Half of the students suffer from that sometimes.

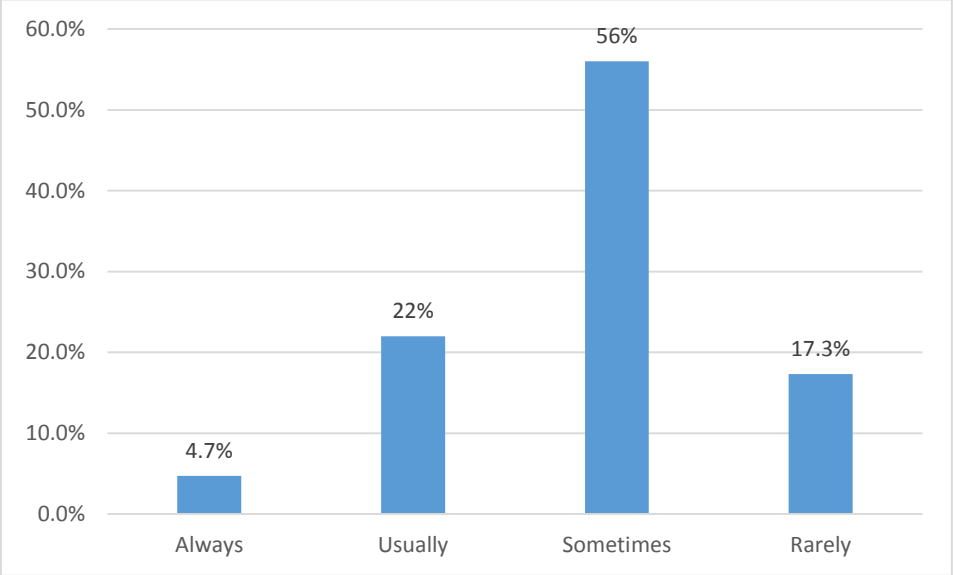

Figure 4.10: Distribution of participants according to if they had excessive sleepiness in class.

More than half of the students suffer from that sometimes.

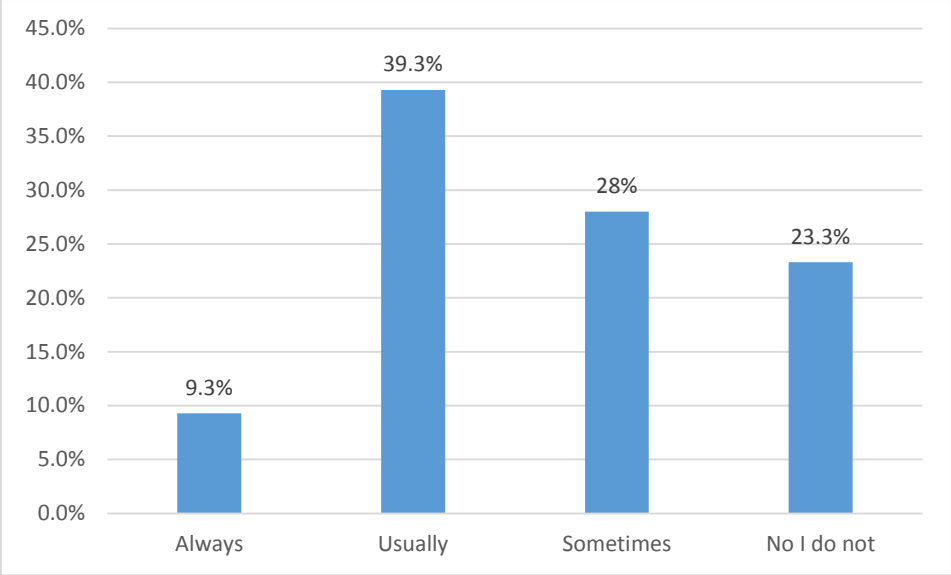

Figure 4.11: Distribution of participants according to if they tend to reduce or deprive sleep in order to study.

The vast majority of students use this method.

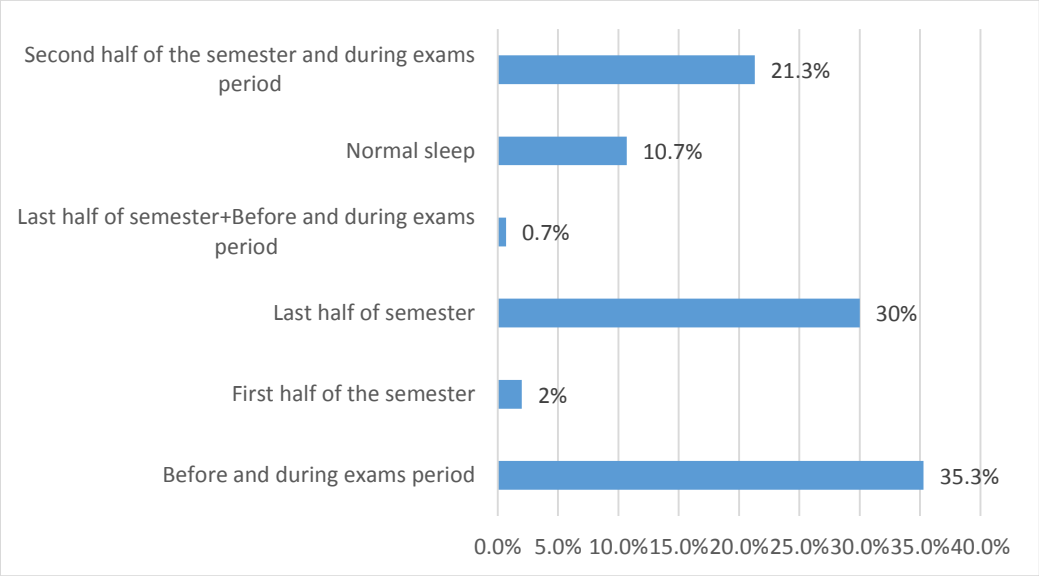

Figure 4.12: Distribution of participants according to when they tend to sleep less during the semester.

The examination period is the period during which the student suffers most from lack of sleep.

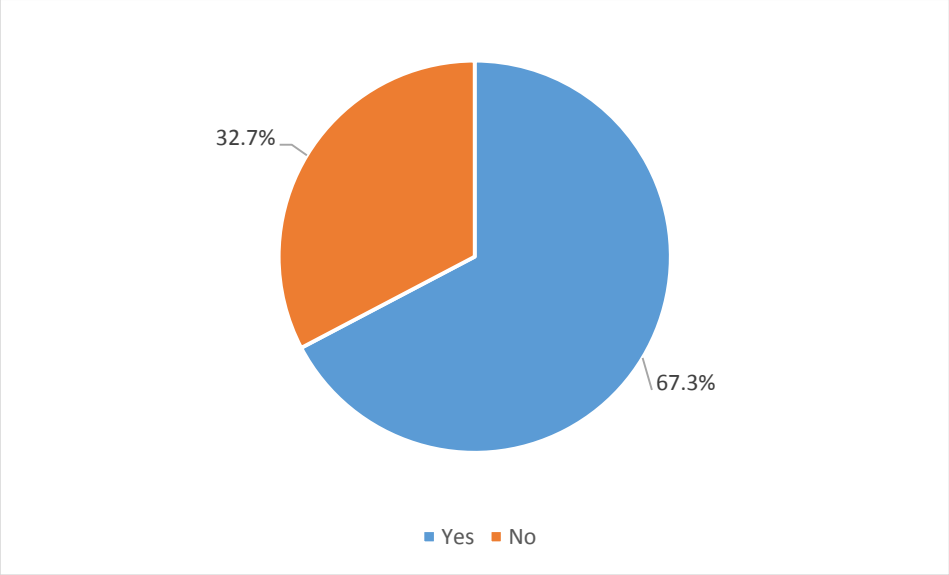

Figure 4.13: Distribution of participants according to if they had a sleep disturbance recently could be due to fear of exams.

Lack of sleep due to fear was the largest percentage among students.

Table 4.4: Distribution of participants according to the last semester GPA, compared with the semester before, and correlation between the severity of insomnia and last semester GPA

Last semester GPA and its change			
What is your last semester GPA?	Mean	Std. Deviation	
	2.8244	0.39806	
		Frequency	Percent
Compared with your last semester what do you think about your GPA?	Raised	63	42
	Decreased	46	30.7
	Less with 0.05	12	8
	Increase by 0.05	12	8
	The difference is not more than + or - 0.05	17	11.3
	Total	150	100
Correlation between severity of insomnia and last semester GPA			
P-value	<0.001*		

*Significant p-value

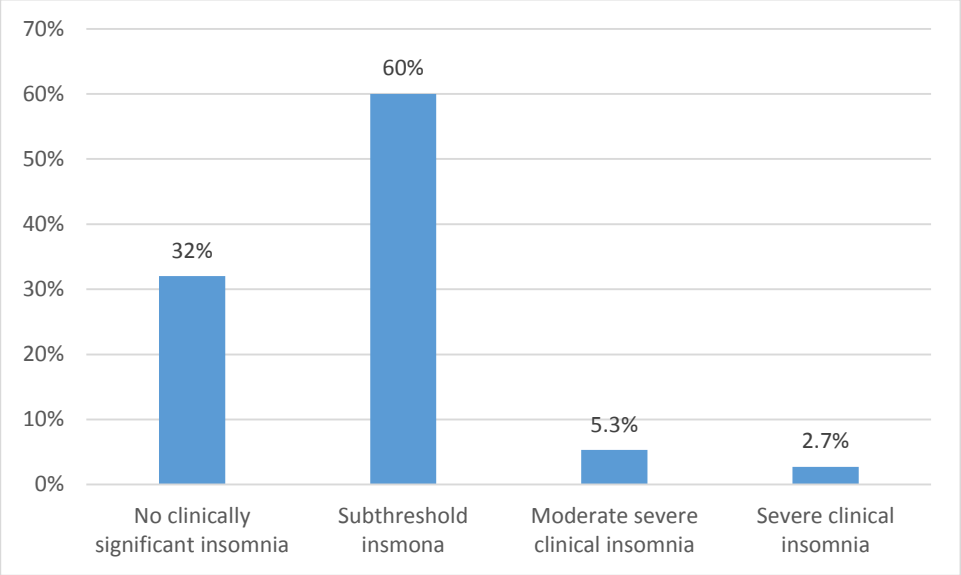

Figure 4.14: Distribution of participants according to the severity of insomnia.

Subthreshold insomnia was the commonest types between students.

Table 4.5: Distribution of participants according to insomnia severity index.

	Difficulty falling asleep					Total
	None	Mild	Moderate	Sever	Very Severe	
Frequency	24	65	52	4	5	150
Percent	16	43.3	34.7	27	3.3	100
	Difficulty staying asleep					Total
	None	Mild	Moderate	Sever	Very Severe	
Frequency	33	74	30	7	6	150
Percent	22	49.3	20	4.7	4	100
	Problems waking up too early					Total
	None	Mild	Moderate	Sever	Very Severe	
Frequency	38	57	33	14	8	150
Percent	25.3	38	22	9.3	5.3	100
	How SATISFIED/DISSATISFIED are you with your CURRENT sleep pattern?					Total
	Very satisfied	Satisfied	Moderately satisfied	Dissatisfied	Very dissatisfied	

Frequency	17	39	77	9	8	150
Percent	11.3	26	51.3	6	5.3	100
	How NOTICEABLE to others do you think your sleep problem is in terms of impairing the quality of your life?					Total
	Not at all noticeable	A Little	Somewhat	Much	Very Much noticeable	
Frequency	27	69	42	8	4	150
Percent	18	46	28	5.3	2.7	100
	How worried/distressed are you about your current sleep problem?					Total
	Not at all worried	A Little	Somewhat	Much	Very Much worried	
Frequency	24	78	38	9	1	150
Percent	16	52	253	6	0.7	100
	What extent do you consider your sleep problem to INTERFERE with your daily functioning (e.g. daytime fatigue, mood, ability to function at work/daily chores, concentration, memory, mood, etc.) CURRENTLY?					Total
	Not at all Interfering	A Little	Somewhat	Much	Very Much Interfering	
Frequency	26	89	22	9	4	150
Percent	17.3	59.3	14.7	6	2.7	100

Table 4.6: Correlation between severity of insomnia and gender

		Gender		Total	P-value
		Male	Female		
Severity of insomnia	No clinically significant insomnia	13	35	48	0.002*
	Subthreshold insomnia	52	38	90	
	Moderate severe clinical insomnia	4	4	8	
	Severe clinical insomnia	0	4	4	
Total		69	81	150	

*Significant p-value

Table 4.7: Correlation between the severity of insomnia and the academic year.

		Academic year					Total	P-value
		First year	Second year	Third year	Fourth year	Fifth year		
Severity of insomnia	No clinically significant insomnia	15	3	9	8	13	48	0.005*
	Subthreshold insomnia	13	23	15	15	24	90	
	Moderate severe clinical insomnia	0	0	3	1	4	8	
	Severe clinical insomnia	0	0	1	3	0	4	
Total		28	26	28	27	41	150	

*Significant p-value

Table 4.8: Correlation between the severity of insomnia and the average studying hours per day.

		Average studying hours per day				Total	P-value
		<2h	2-4h	4-6h	>6h		
Severity of insomnia	No clinically significant insomnia	18	22	5	3	48	0.02*
	Subthreshold insomnia	16	50	20	4	90	
	Moderate severe clinical insomnia	4	2	2	0	8	
	Severe clinical insomnia	1	0	3	0	4	
Total		39	74	30	7	150	

*Significant p-value

Table 4.9: Correlation between severity of insomnia and the sleep duration.

		Sleep duration				Total	P-value
		<4h	4-6h	7-10h	>10h		
Severity of insomnia	No clinically significant insomnia	5	30	9	4	48	0.05*
	Subthreshold insomnia	16	62	11	1	90	
	Moderate severe clinical insomnia	1	3	2	2	8	
	Severe clinical insomnia	0	4	0	0	4	
Total		22	99	22	7	150	

*Significant p-value

Table 4.10: Correlation between severity of insomnia and the caffeine intake per day.

		Caffeine intake per day			Total	P-value
		No	1-2 cups	3 or more cups		
Severity of insomnia	No clinically significant insomnia	24	23	1	48	0.004*
	Subthreshold insomnia	26	50	14	90	
	Moderate severe clinical insomnia	1	5	2	8	
	Severe clinical insomnia	4	0	0	4	
Total		55	78	17	150	

*Significant p-value

Table 4.11: Correlation between severity of insomnia and if had psychiatric disorder.

		Do you have any psychiatric disorders?		Total	P-value
		Yes	No		
Severity of insomnia	No clinically significant insomnia	5	43	48	<0.001*
	Subthreshold insomnia	15	75	90	
	Moderate severe clinical insomnia	3	5	8	
	Severe clinical insomnia	4	0	4	
Total		27	123	150	

*Significant p-value

Chapter Five

5.1 Discussion

The poor quality of sleep and insomnia symptoms are frequent worldwide health problems, vulnerable groups are adolescents and university student's especially medical students. This study amid to evaluate the insomnia and its impact on the academic performance of medical students of Napata college.

Regarding the sociodemographic data, the mean age of the students was 23.42±4.39 and 54% of the students were females, the previous studies(14,51) show nearly similar findings where the majority were female. We assume that since the first years students were included in this study, the adolescents the environmental light can increase sensitivity and produce a change in circadian cycle, so the hormone levels can be altered and finally decrease sleep quality and increase insomnia symptoms also the level of stress and anxiety may increase by changes in social roles associated with university life. The majority were fifth year medical students (27.3%), 79.3% were single and 18% were married, 75.3% were residing in the urban area, 30.7% of students were mature students (graduated from another medical college like a laboratory), and 38.7% of students had a job. The number of working students in higher than the previous studies(22,47), this could be due to the presence of mature students who may had a job or due to the economic status of the students and that lead to increase the stress on the student lead to increase insomnia symptoms among them. The married students because of their responsibilities the stress in their lives is more than single students and this may cause increase in insomnia level among them.

About half of students (47.3%) had a good economic state. Regarding the medical condition, 24.7% of students had a chronic disease and 18% had a psychiatric disorder. Chronic disease can be a risk factor for insomnia. The psychiatric disorder leads to insomnia(34) and the effect of poor sleep on cognitive and psychomotor performance may underlie these associations(18,19). Only 12% of students were a smoker and 3.3% consumed alcohol, 52% consume 1-2 cups of coffee per day and 11.3% consumed 3 cups or more, and 23.3% were daytime sleepers. Surprisingly, this finding was higher than the previous study(51) shows that 5.2% were smokers and 0.8% consume alcohol and this could be due to the differences in the study population and the life style of the students. Tobacco has stimulating effects that can alter neurosecretion and affect circadian rhythms and could reduce sleep quality and loss in health and significantly more prone, to trouble in falling asleep in addition to daytime sleepiness. Considering consuming of caffeine, the previous study(14) found that 65% of students consume 1-2 cups per day. Caffeine usually prolongs sleep

latency, reduces total sleep time, and decreases sleep efficiency and sleep quality perception. Only 8% of students were daytime sleepers in the previous study(14). Half of the students (49.3%) study 2-4h per day as average and 66% had 4-6h average sleep duration. The majority of students sleep more than 7h at night in the previous study(50).

Considering the knowledge about sleep, 61.3% consider their knowledge not that bad, 31.3% do not know that the lack of sleep can affect physical health, 20% do not know that the sleep disturbance can cause anxiety and depression, and 27.3% do not consider sleep disturbance as an important problem. Since, there is a known clinical association between psychiatric disorders and insomnia(18,19,34) university should provide sessions about how to regulate the sleep pattern and overcome the insomnia and it impact of the mental and physical health. More than half of students (59.3%) do not know any type of sleep disorder and insomnia was the most common sleep disorder mentioned by the students. We assume that the cause of this big gap of knowledge could be due to the participation of first years medical students in the study.

The majority of students (56%) suffer from sleepiness during the day 40.7% of them suffer from that sometimes, the most common reason was studying late at night (50%). Half of the students (50%) reports that sometimes feel difficulty concentration and paying attention during the day, 56% had excessive sleepiness in the class, 39.3% tend to reduce their sleeping hour in order to study and 35.3% mainly during the exams period. Most of the students (67.3%) had sleep disturbance recently due to fear of exams. We assume that the medical students tend to sleep less than other people because of the study load and due to academic demands, students tend to bear stress at higher levels, especially during the exam period. Examination periods increase both stress and poor sleep quality of medical students. Also, the learning strategies for each student depend on their personal conditions; many of them use nighttime schedules for study, affecting habits and quality of sleep.

Regarding academic performance, the mean GPA of students were 2.82±0.40 and 30.7% of students reported that their GPA decreased while 42% reported that there was increased compared with the semester before. We assume that this could be due to the participation of first year's medical students, since the last years medical students could have more stress and insomnia due to the load of the study. Also, could be due to different strategies developed by the students to overcome the stress and insomnia symptoms.

Considering the insomnia severity, 60% had subthreshold insomnia, 5.3% had moderate severe insomnia and 2.7% had severe insomnia. In terms of the symptom's, 43.3% had a mild difficulty falling asleep, 49.3% had a mild difficulty staying asleep, 38% had mild problems with waking up too early, 51.3% moderately satisfied their current sleep pattern, 46% thought their sleep problems a little noticeable because it affects their quality of life, 52% worried a little about their current sleep problem, and 59.3% consider the sleep problem interfere a

little with their daily functioning. This study showed that the insomnia was correlated and affected by different factors including gender (p=0.002) which is more among females this could be due to sexual hormones, especially estrogen, which has been linked to certain neural and physiological characteristics associated with better cognitive competence, the academic year (p=0.005) this due to the study load that increases with increase academic yea, average studying hours (p=0.02) could be due to the stress and difficulty of concentration during the study, sleep duration (p=0.05) which is directly affected by the insomnia symptoms, caffeine intake per day (p=0.004) which could be consumed to overcome the daytime sleepiness, and psychiatric disorder (p=<0.001) which there is a direct relationship between then, and the last GPA (p=<0.001) that could be affected by the symptoms of insomnia.

5.2 Conclusion

Medical students are continuously under high academic stress and pressure. Adequate sleep is essential to refresh them every day and help in learning and memory processing. Sleep disturbances are common in medical students and worsen their academic performance.

In conclusion, our study reveals a high prevalence of insomnia and it is impact on the academic performance among medical student.

There was a significant Correlation between severity of insomnia and GPA also the prevalence of insomnia was high between the fifth year's students.

There was a number of limitations in the current work that should be considered as caveats. The sample size was small therefore may have an artificially inflated effect size and the duration of the research period was short.

In future, there is a need to investigate the causes of the high prevalence of sleep disturbances among college students in Sudan as well as to study the impact of sleep problems on other aspects such as health status and mental health In order to find solutions to get rid of sleep disorders among students.

Undergraduate medical students should be educated about the importance of adequate sleep to their academic performance and progression in their study. Sufficient daily sleep may also have an impact on their general physical and psychological well-being

5.3 Recommendation

- Providing a campaigns on sleep education, counseling on time management, and plans for treatment for insomnia.

- We recommend that future studies continue to investigate different psychological and behavioral parameters of medical students and their impact on academic performance.

- Medical students and their facilitators should comprehend the negative effects of sleep deprivation on student academics and should take adequate measures to improve the sleep quality of students.

- The remedy to this problem is not to study less, but rather to create a schedule that allows for sufficient study time and adequate and healthy sleep time.

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Annexes

Questionnaire

Insomnia and the Impact on the Academic Performance of Medical Students of Napata College in 2022

❖ Sociodemographic data:-

1. Age: …….. years
2. Gender: Male ☐ Female ☐
3. Academic year: First year ☐ Second year ☐ Third year ☐ Fourth year ☐ Fifth year ☐
4. Marital status: Single ☐ Married ☐ Divorced ☐ Widow ☐
5. Residency: Urban ☐ Rural ☐
6. Did you study any medical college before (mature student): Yes ☐ No ☐
7. Do you have an occupation (Job/work): Yes ☐ No ☐
8. Economic state: Poor ☐ Average ☐ Good ☐ Very good ☐
9. Do you have any chronic disease: Yes ☐ No ☐
10. Kwon psychiatric disorder: Yes ☐ No ☐
11. Average studying hours per day: <2h ☐ 2-4h ☐ 4-6h ☐ >6h ☐
12. Smoking: Yes ☐ No ☐
13. Caffeine intake per day: No ☐ 1-2 cups ☐ 3 or more cup ☐
14. Alcohol consumption: Yes ☐ No ☐
15. Sleep cycle: Nighttime sleeper ☐ Daytime sleeper ☐
16. Sleep duration: <4h ☐ 4-6h ☐ 7-10h ☐ >10h ☐
17. How do you think your aware and knowledge about sleep? Very good ☐ Not that bad ☐ Don't think I know enough ☐
18. Do you know lack of sleep can affect your physical health and become a risk for other diseases? Yes ☐ No ☐
19. Do you know that sleep disturbance can cause anxiety and depression? Yes ☐ No ☐
20. Do you think that sleep disturbances are an important problem? Yes ☐ No ☐
21. Do you know any types of sleep disorders? Yes ☐ No ☐
22. **If yes**, mention them: ……..
23. Do you think is someone suffering from sleep disturbance need to seek a medical advice and treatment? Yes ☐ No ☐

24. Do you think that through willpower one can overcome drowsiness and sleep? Yes ☐ No ☐

25. Do you suffer from sleepiness during the day?
    A lot ☐ Sometimes ☐ Not that much ☐ No ☐
26. What do you think is the reason of that? (eg: I study or work late at night):……
27. Do you feel difficulty concentrating, paying attention and remembering during the day?
    Always ☐ Usually ☐ Sometimes ☐ Rarely ☐
28. Had you experienced excessive sleepiness in class?
    Always ☐ Usually ☐ Sometimes ☐ Rarely ☐
29. Do you tend to reduce or deprive yourself of sleep in order to study?
    Always ☐ Usually ☐ Sometimes ☐ No I do not ☐
30. When do you think you tend to sleep less in the first half of the semester, the last half of the semester, or before and during exams?.....
31. If you have a sleep disturbance recently, do think this could be due to fear of exams? Yes ☐ No ☐
32. What is your last semester GPA:……
33. comparing with your last semester what do you think about your GPA?
    Raised ☐ Decreased ☐ Less with 0.05 ☐
    Increase by 0.05 ☐ The differences is not more than + or - 0.05 ☐

❖ Insomnia Severity Index:-

34. Difficulty falling asleep:
    None ☐ Mild ☐ Moderate ☐ Sever ☐ Very sever ☐

35. Difficulty staying asleep:
    None ☐ Mild ☐ Moderate ☐ Sever ☐ Very sever ☐

36. Problems waking up too early:
    None ☐ Mild ☐ Moderate ☐ Sever ☐ Very sever ☐

37. How SATISFIED/DISSATISFIED are you with your CURRENT sleep pattern?
    Very satisfied ☐ Satisfied ☐ Moderately Satisfied ☐
    Dissatisfied ☐ Very Dissatisfied ☐

38. How NOTICEABLE to others do you think your sleep problem is in terms of impairing the quality of your life?

Not at all Noticeable ☐ A Little ☐ Somewhat ☐
Much ☐ Very Much Noticeable ☐

39. How WORRIED/DISTRESSED are you about your current sleep problem?

Not at all Worried ☐ A Little ☐ Somewhat ☐
Much ☐ Very Much Worried ☐

40. To what extent do you consider your sleep problem to INTERFERE with your daily functioning (e.g. daytime fatigue, mood, ability to function at work/daily chores, concentration, memory, mood, etc.) CURRENTLY?

Not at all Interfering ☐ A Little ☐ Somewhat ☐
Much ☐ Very Much Interfering ☐