

“Modeling a Logistic Regression Approach to
Analyze the Impact of Sleeping Disorder on
Academic Performance of Faculty of Applied
Science Students At University of Sri
Jayawardenepura”



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Abstract

This research study examines how sleep disorders affect academic performance among students in the Faculty of Applied Science at the University of Sri Jayewardenepura. The importance of sleep is emphasized here because it is often under-appreciated although it has a significant effect on one's ability to think, hold information, and perform academically. Despite advanced studies showing that cognitive weakening as a result of sleep disorders ultimately leads to increased levels of stress and consequently poor academic results not much attention has been paid towards investigating these issues with regard to those attending universities in Sri Lanka particularly those enrolled in the Faculty of Applied Science. It is noted that, in their study, the researchers have used 'Sleep50' to measure sleep disturbances in college students including oftentimes suffocation-like insomnia, obstructive apnea, narcolepsy and periodic limb movement disorder. These conditions frequently coexist with mental disorders like anxiety and depression resulting in added strain on academic work. The literature indicates that worldwide and in Sri Lanka lack of normal sleep among university-going students because of academic work load, life habits and irregular sleep is widespread. The data from a sample of 101 students is methodologically analyzed by the study that shows there are notable associations amidst sleeping patterns and academic performance with many students exhibiting signs of sleeping ailments. It also indicates that the majority of the students sleep poorly such as retiring to bed between 10pm –12am and spending long hours using screens which has adverse effects on their restfulness. Researchers stress that specific actions should be taken such as educational interventions and policies from universities that will help in ensuring that students maintain a good sleeping pattern to enhance their grades. Moreover, this paper recommends future studies looking at how sleep problems influence student performance over time, while also studying how technology can help people sleep better or make it worse. The aim of this research is to help university students do better academically and lead healthier lives by addressing issues concerning disorders.

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1.0 Introduction

In today's educational sphere, students attaining academic success leads for both their individual success as well as society's development. Within the realm of education, a hidden factor impacting student success is sleep. Different things account for different academic scores but the most important one and the area that is hardly paid attention to is sleep. Several studies indicate that sleep participates significantly in the brain's normal functioning, consolidating memories and being overall healthy (Walker 2017). Notwithstanding, the investigation of sleep disorders as a considerable and less explored area of educational success remains a research gap. Therefore, this study intends to investigate how sleep disorders influence academic success among students in the Faculty of Applied Science of the University of Sri Jayewardenepura.

Study will help to investigate the importance of sleeping and how it affects academic achievements. As undergraduates, academics play a major role. Identifying the factors that affect academics is much more important to enhance the efficiency of educational outputs. Among those factors the rest or the relaxation an undergraduate receives has a crucial part. The main way of receiving rest is quality sleep. Sleep is an essential necessity of humankind; thus, it has an influence on education. Accordingly, several studies have indicated that sleep-wake disorders including those due to insomnia, obstructive sleep apnea, restless leg syndrome can impede cognitive function leading to poor attentiveness or memory problems which adversely affect academic performance in general (Gaultney ,2010). No matter how critical it is put, the truth remains that if we want to see our students perform well in their studies, we need to take care of their sleeping habits otherwise they will become increasingly unable to deal with them due to mounting academic pressures they are under.

The study investigate how sleep disorders affect academic success. There is a big concern over the kind of sleep distribution disorders among these students and how do these disorders correlate with academic performance? Some people believe that doing a lot of things at once makes you smarter while others argue that focusing on one task increases productivity. But when trying to finish an assignment and keep up with other responsibilities, one may end up sleeping poorly. Through detailed analysis of findings and discussions, this study aims at contributing to greater comprehension on how critical is sleep for achieving better grades as well as providing practical recommendations for both students and teachers.

"Sleep50" is the concept used to determine the conditions of individual respondents. It is a term linked to sleep disorders and how they are administered. However, knowing about

sleep disorders in general creates a context for understanding what Sleep50 might mean. The sleep-wake disorders, commonly referred to as sleep disorders, include problems associated with quality, timing or quantity of sleep that results in distress during the day and damage in different aspects of both physical and social life. They usually co-occur with some medical conditions or mental health problems like depression and anxiety. The common types of sleep disorders include: insomnia, obstructive sleep apnea, narcolepsy, restless leg syndrome (RLS) as well as parasomnias.

‘Insomnia’ is defined by difficulty in falling asleep or being asleep all throughout the night. The disorder affects large proportions of the population, roughly one third adults report symptoms (American Psychiatric Association, 2023). Obstructive sleep apnea is abnormal breathing patterns during sleep, which cause interrupted sleep and lowered oxygen levels. According to the Sleep Foundation, this condition impacts numerous Americans. However, it often goes undiagnosed in many instances. Narcolepsy, a form of hypersomnia, results in too much drowsiness during the day as well as unexpected sleep attacks. In America alone, about 1 out of every 2,000 people are affected as it has serious impacts on their lives (Sleep Foundation, 2023). The most distinguishing feature of restless leg syndrome (RLS) is an overwhelming need to shift the legs which is often further compounded by discomfort. It can interfere with sleep and is associated with diverse causes including limited iron intake, as well as some drugs like antidepressants and antihistamines (Verywell Mind, 2023).

For decades, scientists have been looking at how academic performance is related to sleep. Researchers began recognizing its significance to cognitive processes back in the 1960s and 1970s, which led to important trials on sleep deprivation and its effect on learning and memory (Carskadon & Dement, 1979). The 1990s saw enhanced research in this area with a focus on sleep disorders like insomnia, sleep apnea and restless leg syndrome and how they lead to reduced daytime functionality together with poor academic performance as emphasized by Gaultney (2010).

The most recent studies have kept on affirming how important sleep is while studying. For example, Gilbert and Weaver discovered that university students who do not sleep well or have sleeping disorders have lower GPAs than those who are properly rested (2010). At the same time, Hershner and Chervin noted that many college students suffer from different kinds of sleep problems which negatively affect their academic performance (2014). Together these studies imply that tackling sleep-related problems may be instrumental in enhancing learning results.

Within the Sri Lankan context, there is a lack of sleep research that is specific to Sri Lankan students particularly in the Faculty of Applied Science at the University of Sri Jayewardenepura. It is important to understand how widespread sleep disorders are among this population as well as their effects on them because of unique cultural, social, and academic pressures experienced by Sri Lankan students. According to narratives and initial studies, it seems like university students in Sri Lanka experience sleep deprivation and disorders just like their counterparts across the world (Perera & Fernando 2014). Comprehensive research about the interested area has not been conducted yet.

1.1 Objectives

- To investigate sleep disorders among undergraduates of the Faculty of Applied Sciences at the University of Sri Jayewardenepura.
- To examine how different types of sleep disorders affect students' academic outcomes.
- To investigate the relationship between sleep disorders and academic performance.
- To find other factors contributing to sleep disorders.
- To develop strategies and recommendations for students and educational institutions to manage and reduce the impact of sleep disorders.

2.0 Literature Review

The academic preferences of an undergraduate are the most important to pave the path for a successful carrier in balance of mental and physical health. The literature review looks at the effects of sleep problems on students' academic achievement from the Faculty of Applied Science, University of Sri Jayewardenepura. Its purpose is to show how little sleep, or low-quality ones can influence their grades, cognitive abilities as well as general State of Mind through available works on sleep patterns, legislations that govern good sleeping manners among others. In order to have a wider understanding of the obstacles faced as well as ways to promote student performance, the report had to take into account a number of things that lead to sleeping disorders among students in institutions of higher learning such as stress, lifestyle choices, workload from schools among others.

Normal sleep pattern disturbances are what is involved in sleep disorders, which are widespread among universities' students and insomnia is one of them where individuals have difficulty in either of the cases. The reason why this problem is very common among students contrary to other people is because of stress and having disorganized sleeping hours (Hershner and Chervin, 2014). For instance, stress due to fear of final exams interferes with students' sleeping schedules leading to sleeplessness. Sleep disorders are a range of issues that interfere with the standard sleep patterns, and they are frequent in university students. One of the examples is insomnias where someone cannot fall asleep or they wake up intermittently. Besides the stress, the prevalence of this condition is also associated with irregular sleeping hours in this category of individuals mostly students as Hershner and Chervin argued (2014). As an example, students frequently get insomnia as they worry about examination periods. Sleep apnea is an additional disorder that brings about repeated pauses in breath when sleeping, leading to excessive tiredness and poor concentration (Peppard et al., 2013). This makes it hard for students to stay awake and alert in class since they are likely to experience sudden sleep attacks as well as have too much daytime fatigue due to narcolepsy. In addition to this, restless leg syndrome is a condition characterized by an uncontrolled urge to move one's legs as well as discomfort, thereby disturbing one's slumber. These sleep disorders such as insomnia have negative impacts on students' quality of sleep hence leading to underperformance in class due to lack of focus, forgetfulness, and inability to solve problems while sleeping little amounts of into the midnight. So, it is very important that the root causes are known so you can help somebody overcome them if need be.

It is quite prevalent amongst university students to have difficulty falling asleep. In fact, Lund et al. (2010) found that 60% of college students have poor sleep quality while 20% suffer from clinical insomnia at one point in their lives. There are several reasons behind this sleep disorder; major among them being academic pressure, lifestyle choice of taking alcohol and caffeine related products for leisure purposes as well as engaging in social activities according to the research by Taylor et al., (2011). The scenario is even worse for scholars in active subjects namely applied science. This is because many of the students have long college nights coupled with abnormal sleep patterns. As a result, there is continuous lack of sleep. The lot of work to be completed plus the wish to do so well academically contribute to time spent sleeping no wonder their quality of sleep keeps weakening. They have difficulty remembering things, finding solutions for issues or being able to concentrate properly because of not getting enough sleep which also makes it hard for them to be successful in their education. It is therefore important, that these problems are solved so that they can enhance their sleeping habits and do better academically.

Sleep plays a vital role in human cognitive processes such as how humans remember information, problem solving abilities or critical thinking - as argued by some of these scholars: "When deprived of sleep, we have trouble with memory, problem-solving and critical thinking" (Walker, 2009). If people have trouble sleeping, this will affect those thinking overnight. Issues can also impact on daytime functioning since an inability to rest makes one feel tired all day round regardless of what time it is in the phrase "waking up tired". The other perspective is that poor quality night, means should go hand in hand with poor performance during daylight hours, based on research done by Trockel, Barnes and Egget (2000) on college students. Not getting enough sleep often makes it hard to focus, process information fast, and solve problems well (Gaultney, 2010). There are many studies stressing on the relation between sleep disorders and doing well in school. According to Buboltz et al., about 31% of learners feel tired each morning and this affects their daytime activities. Persons with sleeping disorders also experience reduced cognitive abilities. Additionally, lower GPAs are linked with reduced hours of sleeping and inconsistent sleep hours among the students. With that, those learners who are constantly deprived of sleep find it hard to succeed in class. Nevertheless, insomnia affects cognitive functions through reduced ability to learn new information or recall what has already been memorized as well as impaired ability to solve problems (Schlarb, Friedrich, & Claßen, 2017). Nonetheless, it is still not known whether insomnia directly results in reduced academic grades. Consequently,

good quality of sleep is able to better the grades obtained by a student as well as his or her brain performance as well.

Sleep disorders have an enormous effect on students' psychological and emotional health that goes beyond merely damaging their cognitive abilities. According to Pilcher, Ginter, & Sadowsky, insufficient sleep leads to increased stress, anxiety, and depression among pupils (1997). A situation which subsequently leads to poor school performance since such adolescents become less motivated, have reduced levels of concentration, and cannot handle problems effectively (Galambos, Howard, & Maggs, 2011). Stress and sleep lack have a tendency to support each other, resulting in a 'vicious circle'. More academic pressure tends to exacerbate sleep problems, while lack of sleep induces additional stress and academic difficulties. Accordingly, in order to assist students in keeping sound mental health and succeeding in school, it's significant to disrupt this chain.

The lifestyle and the environment of university students have an effect on making them have sleep problems. This is because a lot of students have unpredictable sleeping hours; and use their computers and televisions too much, among other things (Hershner & Chervin, 2014). In programs like applied science, for example, many students are forced to read late into the night hence interfering with their body's natural sleep patterns causing them not to get enough rest. Additionally, the social environment of university life can negatively affect sleep quality. Noise, disturbances from roommates, and other social activities can make it difficult for students to get enough restful sleep (Buboltz, Brown, & Soper, 2001). These factors combined create a challenging environment for maintaining good sleep habits, further impacting students' overall health and academic performance. Addressing these issues is essential to help students improve their sleep and succeed in their studies.

Technological progression offers unique approaches for addressing sleep disturbances. For instance, many mobile applications as well as wearable gadgets are now able to monitor our sleep habits then provide us with individual recommendations on how we can make it better like what is suggested by Kolla (et al., 2010). Recently, Seyffert (et al., 2016) conducted an experiment on how students can access online cognitive-behavioral therapy for insomnia with some promising findings. Nonetheless, there are some drawbacks associated with such advancements in innovation especially when they occur close or around bedtime. Overspending on electronic devices can lead to insomnia, showing how much importance it is

to strike a balance. To avoid solving one sleep problem by creating another; it is essential one uses them thoughtfully.

Future studies should focus primarily on conducting long term research on how sleep problems affect academic performance. Scholars can create appropriate interventions by identifying individual triggers of insomnia among students practicing applied science at Sri Jayewardenepura University. Besides, the effect of technology on sleep ought to be investigated. Although technology may contribute to sleep problems, it could provide solutions for example apps and devices that can monitor sleep patterns and give recommendations. Better understanding of how these two sides influence sleep classes as well as pointers would be of help in order to devise better strategies towards enhancing one's well-being during the night time.

Sleeping problems are serious problems when it comes to the success of university students in learning especially for the students in the hard programs such as the faculty of Applied Science. Their sleep quality can be improved through education programs and other university policies that support them about good behavior or cognition which thereby will in return enable them feel good about themselves academically. Educational interventions can teach students better sleeping routines, meanwhile CBT can assist individuals suffering from consistent insomnia. This includes mental care services besides favorable regulations. It is necessary to do more research so that we can incorporate particular software solutions into systems designed for education purposes in this country, as well as to come up with interventions custom-made specifically for Sri Lankan pupils. Prioritizing the promotion of proper sleep patterns among students will ultimately lead to a more successful and healthier university community.

3.0 Methodology

3.1 Study Design and Participants

This study was conducted cross-sectionally at the University of Sri Jayewardenepura, Sri Lanka between June, and July 2024. Undergraduate students who had enrolled in the Faculty of Applied Sciences at the University of Sri Jayewardenepura were the target population for the research. A total of 103 responses were collected as the sample, but two of them were identified as outliers. Ethical approval for the study was granted by the relevant review board of the university.

3.2 Data Collection

Data were collected via an online survey conducted through Google Forms, which was distributed to respondents using WhatsApp Messenger. The survey was divided into two sections. The first section explored demographic and academic information such as gender, age, academic year, sleeping hours, length of sleep, residence status, coffee intake, and time spent on mobile devices. For the second section of the questionnaire a modified version of SLEEP-50 (Spoormaker et al., 2005) was used as it has been validated for use in research. This tool contains fifty short statements that are rated by participants on a four-point Likert scale going from 1 (not at all) to 4 (very much) depending on how much they feel about them. Only the first four sub scales on Sleep Apnoea, Insomnia, Narcolepsy and Restless Legs/Periodic Limb Movement Disorder were included in this study because they are the most prevalent among university students. The participants were asked to consider how often each issue happened during their normal university learning phase.

Sleep disorders were identified using cutoff marks for each Likert subscale as referenced by Spoormaker et al. (2005). A student was considered having disorder if three or four of the four disorders considered in the study were met by him/her. In the collected data set, originally “sleeping time” variable comprised six levels but shrank to three. The levels “8 pm-9 pm” and “9 pm-10 pm” merged together forming one level coded as 1; the second one for those who go to bed by 10 pm or later was made up of “10 pm -11 pm,” “11 pm -12 am” made such grouping which received number two while those going to sleep after midnight received code 3.

Screen time too topped from four to two; while “0 hours” and “1/2 hour” formed level one others such as 1 hour or more than one hour was merged under level two. Caffeine use was originally classified into four levels, reduced to two by combining “never” and “sometimes” as level 0, while “often” and “always” formed level 1.

3.3 Statistical Analysis

All statistical analyses were performed using Minitab versions 21 and 16. The analysis was conducted in two main phases: exploratory data analysis and logistic regression analysis.

3.3.1 Exploratory Data Analysis

The computations relating to descriptive statistics were used that enabled a summary of the socio-demographic traits and responses to the items in the questionnaire. Continuous variables like age, GPA, and sleep duration were expressed as means, standard deviations, and other summary measures. Frequencies and percentages were used to report categorical variables including gender, academic year, sleep time or pattern, screen time or usage, caffeine consumption as well as residential area. Additionally, categorical variables aided in separating summary statistics for quantitative variables thus enhancing the level of detail provided by the analysis.

3.3.2 Logistic Regression Analysis

Logistic regression was performed to examine the relationship between the presence of sleep disorder (binary response variable) and multiple predictors. The adequacy of the model was confirmed since the p-value of deviance was above 0.05. From the analysis, significant variables using Wald test identified gender and caffeine consumption as critical predictors. Based on these variables, confidence intervals were calculated while a final logistic regression model was also built in order to provide an insight into factors associated with sleep disorders in the studied population.

4.0 Analysis of Data

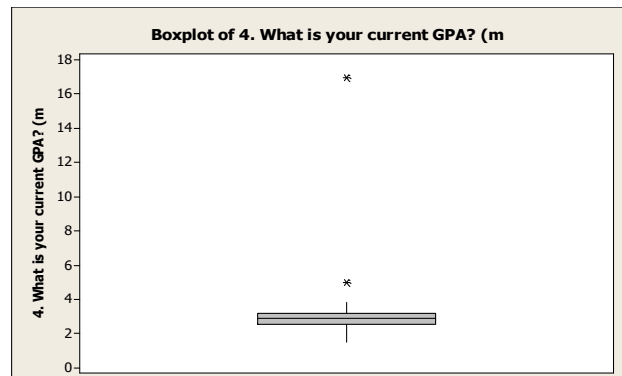


Figure 4.01

Figure 4.01 presents the boxplot for respondents' GPA distribution with measures of central tendency and dispersion. There are outliers which have higher or lower results than others hence a median GPA of about 2.89 is approximately stated. The majority of students perform within the same academic range, and it appears to be normally distributed. Rows 70 (GPA=17) and 3 (GPA=5.00) are omitted.

| Variable | Level | Description |
|----------------|-------|--|
| Gender | 1 | Female |
| | 2 | Male |
| Sleeping time | 1 | Go to bed at 8pm-10pm |
| | 2 | Go to bed at 10pm-12am |
| | 3 | Go to bed After 12am |
| Screen time | 1 | Usage of mobile devices less than or equal 1/2 hours |
| | 2 | Usage Mobile devices more than 1/2 hours |
| Caffeine usage | 1 | Never, sometimes using |
| | 2 | Always, often using |
| Age | | Age of an undergraduate |
| GPA | | GPA value of an undergraduate |
| Sleeping hours | | Number of hours of an undergraduate slept for a day |

Table 4.01 - Variables and levels

The dependent variable is whether a person has a disorder (coded as 1) or not (coded as 0). In our sample of undergraduates of Applied science students of university of Sri Jayewardenepura. After cleaning our sample data, there are 101 total observations. Of these, 58 individuals have a disorder symptom, while 43 do not have disease symptoms.

Tally for Discrete Variables: Gender

| gender | Count | Percent |
|---------------|--------------|----------------|
| 1 | 56 | 55.45 |
| 2 | 45 | 44.55 |
| N= | 101 | |

Table 4.02

Table 4.02 the respondents' gender distribution with 44.55% identifying as male and 55.45% as female. That is more than 50% of the people who have responded are male.

Tally for Discrete Variables: Academic year

| Academic year | Count | Percent |
|----------------------|--------------|----------------|
| 2nd year | 36 | 35.64 |
| 3rd year | 49 | 48.51 |
| 4th year | 16 | 15.84 |
| N= | 101 | |

Table 4.03

The distribution of respondents across the second, third, and fourth academic years is displayed in Table 4.03. Each academic year's student count and percentage are included. Fourth-year students make up the least number of responses (15.84%), with the majority (48.51%) in their third year, followed by second-year students (35.64%). This distribution provides information about the academic development of the sample.

Tally for Discrete Variables: Sleeping time

| Sleeping time | Count | Percent |
|----------------------|--------------|----------------|
| 1 | 7 | 6.93 |
| 2 | 54 | 53.47 |
| 3 | 40 | 39.60 |
| N= | 101 | |

Table 4.04

Table 4.04 indicates that most respondents (53.47%) prefer to sleep for Time 2 (Go to bed at 10pm-12am), and few respondents (6.93%) prefer to sleep for Time 1 (Go to bed at 8pm-10pm). This shows that respondents' choices for different sleep duration are not consistent. The information demonstrates the variety of sleeping patterns.

Tally for Discrete Variables: Screen Time

| Screen Time | Count | Percent |
|--------------------|--------------|----------------|
| 1 | 40 | 39.60 |
| 2 | 61 | 60.40 |
| N= | 101 | |

Table 4.05

Table 4.05 shows the majority of respondents spend their screen time in the 2nd category, with 60.40% of the 101 participants reporting this. This indicates that Screen Time 2 is the most common duration, with 39.60% falling into the 1st category (Usage of mobile devices less than or equal 1/2 hours). This data provides insight into prevalent screen usage patterns.

Tally for Discrete Variables: Use caffeine

| Caffeine usage | Count | Percent |
|-----------------------|--------------|----------------|
| 1 | 74 | 73.27 |
| 2 | 27 | 26.73 |
| N= | 101 | |

Table 4.06

Table 4.06 shows the majority of 101 participants, specifically 73.27%, report higher caffeine usage in Usage 1 (Never, sometimes using), indicating a dominant trend. However, 26.73% fall into Usage 2 (Always, often using), indicating a lower intake. This data reveals a

significant difference in caffeine consumption levels within the surveyed group, with a smaller subset reporting lower usage.

Tally for Discrete Variables: Residential Status

| Residential Status | Count | Percent |
|-----------------------------------|-------|---------|
| Boarding house | 55 | 54.46 |
| Hostel | 8 | 7.92 |
| Living with parents/ guardians | 38 | 37.62 |
| N= | 101 | |

Table 4.07

Table 4.07 displays the residential status of the respondents, classified into the groups like "Hostel," "Boarding house," and "Living with parents/guardians." Among the respondents, it is found that 54.46% live in a boarding house, while 37.62% live with their parents or guardians. This data is of importance when analyzing the differences in the lifestyle based on the type of living situation.

Tabulated statistics: Academic year, Sleeping time

| | 1 | 2 | 3 | All |
|----------|----------|----------|----------|------------|
| 2nd year | 2 | 21 | 13 | 36 |
| | 5.56 | 58.33 | 36.11 | 100.00 |
| 3rd year | 4 | 28 | 17 | 49 |
| | 8.16 | 57.14 | 34.69 | 100.00 |
| 4th year | 1 | 5 | 10 | 16 |
| | 6.25 | 31.25 | 62.50 | 100.00 |
| All | 7 | 54 | 40 | 101 |
| | 6.93 | 53.47 | 39.60 | 100.00 |

Table 4.08

Table 4.08 displays the respondents' distribution among second, third, and fourth-year student categories. Among second-year students, 36.11% are in Category 3 (Go to bed After 12am),

5.56% are in Category 2 (Go to bed at10pm-12am), and 58.33% are in Category 2. 8.16% of the population in the third year belongs to Category 1 (Go to bed at 8pm-10pm), 57.14% to Category 2 (Go to bed at10pm-12am), and 34.69% to Category 3 (Go to bed After 12am). With 6.25% in Category 1, 31.25% in Category 2 (Go to bed at10pm-12am), and 62.50% in Category 3(Go to bed After 12am), Category 3 (Go to bed After 12am) is more common among fourth-year students. In general, the most prevalent category is Category 2 (Go to bed at10pm-12am).

Tabulated statistics: Use caffeine, Sleeping time

| | 1 | 2 | 3 | All |
|-----|-----------|-------------|-------------|---------------|
| 1 | 5 6.76 | 42 56.76 | 27 36.49 | 74 100.00 |
| 2 | 2 7.41 | 12 44.44 | 13 48.15 | 27 100.00 |
| All | 7 6.93 | 54 53.47 | 40 39.60 | 101 100.00 |

Table 4.09

Table 4.09 displays the respondents' distribution for two different groups and the entire sample over three categories. 36.49% of respondents in Group 1(Never, sometimes using) are in Category 3 (Go to bed After 12am), 56.76% are in Category 2 (Go to bed at10pm-12am), and 6.76% are in Category 1 (Go to bed at 8pm-10pm). This suggests that Category 2 (Go to bed at10pm-12am) accounts for the majority, with a sizeable portion also falling into Category 3 (Go to bed After 12am). As a percentage of the total, group 1 (Never, sometimes using) is smaller, indicating a lower concentration in this group. Of the respondents in Group 2, 7.41% belong to Category 1, 44.44% to Category 2 (Go to bed at10pm-12am), and 48.15% to Category 3 (Go to bed After 12am). Out of the three, Category 3 (Go to bed After 12am) is more common than Category 2 (Go to bed at10pm-12am), while Category 1 (Go to bed at 8pm-10pm) is still less common. As a whole, Category 2 (Go to bed at10pm-12am) predominates in the distribution, while Group 2 (Always, often using) clearly favors Category 3 (Go to bed After 12am).

Tabulated statistics: Residential Status, Sleeping time

| | 1 | 2 | 3 | All |
|----------------------------------|------|-------|-------|--------|
| Boarding house | 4 | 30 | 21 | 55 |
| | 7.27 | 54.55 | 38.18 | 100.00 |
| Hostel | 0 | 2 | 6 | 8 |
| | 0.00 | 25.00 | 75.00 | 100.00 |
| Living with parents/guardians | 3 | 22 | 13 | 38 |
| | 7.89 | 57.89 | 34.21 | 100.00 |
| All | 7 | 54 | 40 | 101 |
| | 6.93 | 53.47 | 39.60 | 100.00 |

Cell Contents
Count
% of Row

Table 4.10

Table 4.10 shows a distribution of respondents across three categories based on their living arrangements. In a boarding house, Category 2 (Go to bed at 10pm-12am) is the most common, followed by Category 3. In a hostel setting, Category 2 is the most common, with 25% falling into Category 2 (Go to bed at 10pm-12am) and 75% in Category 3 (Go to bed After 12am). For those living with parents or guardians, Category 2 is the most prevalent, with a significant number in Category 3 (Go to bed After 12am). Category 1 (Go to bed at 8pm-10pm) represents a smaller portion, consistent with the boarding house group. Overall, 6.93% of respondents are in Category 1, 53.47% in Category 2 (Go to bed at 10pm-12am), and 39.60% in Category 3 (Go to bed After 12am), aligning with individual living arrangements. Category 2 (Go to bed at 10pm-12am) is the most common overall, followed by Category 3 (Go to bed After 12am).

Descriptive Statistics: GPA by Residential

| Variable | Residential Status | Total Count | Percent | Mean |
|----------|--------------------------|-------------|---------|--------|
| StDev | Variance | | | |
| GPA | Boarding house | 55 | 54.4554 | 2.7630 |
| 0.4210 | 0.1772 | | | |
| | Hostel | 8 | 7.9208 | 2.764 |
| 0.522 | 0.273 | | | |
| | Living with parents/guar | 38 | 37.6238 | 2.9243 |
| 0.4941 | 0.2441 | | | |

| Variable | Residential Status | Minimum | Maximum |
|----------|--------------------------|---------|---------|
| GPA | Boarding house | 1.9000 | 3.8200 |
| | Hostel | 1.900 | 3.350 |
| | Living with parents/guar | 1.5000 | 3.7500 |

Table 4.11

Table 4.11: Descriptive Statistics of GPA by Residential Status of Students The average GPA was highest among students who stayed with parents/guardians with a mean of 2.9243 and moderate dispersion. Boarding house residents obtained the lowest mean GPA of all at 2.7630, while hostellers obtained the highest at 2.764.

Descriptive Statistics: GPA by Gender

| | | SE | | | | | | | | |
|----------|--------|----|----|--------|--------|--------|---------|--------|--------|--------|
| Variable | gender | N | N* | Mean | Mean | StDev | Minimum | Q1 | Median | Q3 |
| GPA | 1 | 56 | 0 | 2.7876 | 0.0627 | 0.4695 | 1.9000 | 2.4125 | 2.8250 | 3.1700 |
| | 2 | 45 | 0 | 2.8688 | 0.0668 | 0.4482 | 1.5000 | 2.6735 | 2.9700 | 3.1150 |

| Variable | gender | Maximum |
|----------|--------|---------|
| GPA | 1 | 3.7500 |
| | 2 | 3.8200 |

Table 4.12

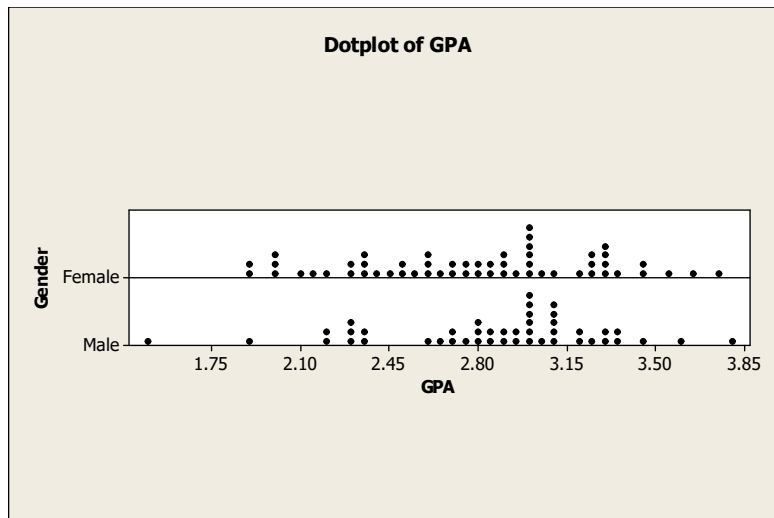


Figure 4.02

Table 4.12 and Figure 4.02 gathered by the study reveals the following: female students have an average GPA score of 2.7876, while the GPI score of male students is a bit higher - 2.8688. The GPA of both sexes is about the same, with the females having a minimum of 1.90 and a maximum of 3.90, and the males having a minimum of 1.80 and a maximum of 3.85. A visual representation of these GPA distributions is shown in the dotplot in Figure 4.02, which clearly indicates that the majority of both genders have GPAs that are very similar to the mean values. The data shows that the respondents' GPA score does not have gender as a significant factor. A holistic understanding of the gender distribution of GPA is made possible through the combination of numerical data together with a visual representation.

Descriptive Statistics: GPA by Sleeping Time

| Sleeping | | SE | | | | | | | | |
|----------|------|---------|----|--------|--------|--------|---------|--------|--------|--------|
| Variable | time | N | N* | Mean | Mean | StDev | Minimum | Q1 | Median | Q3 |
| GPA | 1 | 7 | 0 | 2.599 | 0.212 | 0.562 | 1.500 | 2.300 | 2.780 | 3.000 |
| | 2 | 54 | 0 | 2.8573 | 0.0650 | 0.4773 | 1.9000 | 2.4875 | 2.9850 | 3.2850 |
| | 3 | 40 | 0 | 2.8179 | 0.0657 | 0.4156 | 1.9000 | 2.6000 | 2.8700 | 3.1025 |
| Sleeping | | | | | | | | | | |
| Variable | time | Maximum | | | | | | | | |
| GPA | 1 | 3.200 | | | | | | | | |
| | 2 | 3.7500 | | | | | | | | |
| | 3 | 3.8200 | | | | | | | | |

Table 4.13

The Grade Point Average (GPA) distribution for respondents classified by sleeping time is examined in Table 4.14 of the study. Respondents with Sleeping Time 1 (Go to bed at 8pm-10pm) had a mean GPA of 2.599 and a standard deviation of 0.562. With values ranging from 1.900 to 3.7500, individuals with Sleeping Time 2 (Go to bed at10pm-12am) had a higher mean GPA (2.8573). Respondents with Sleeping Time 3 (Go to bed After 12am) had a little higher mean GPA (2.8179), and their results were distributed more evenly. Longer sleep durations are often associated with higher mean GPAs and lower GPA variability, according to the research. This implies that variations in academic achievement may be related to sleeping patterns.

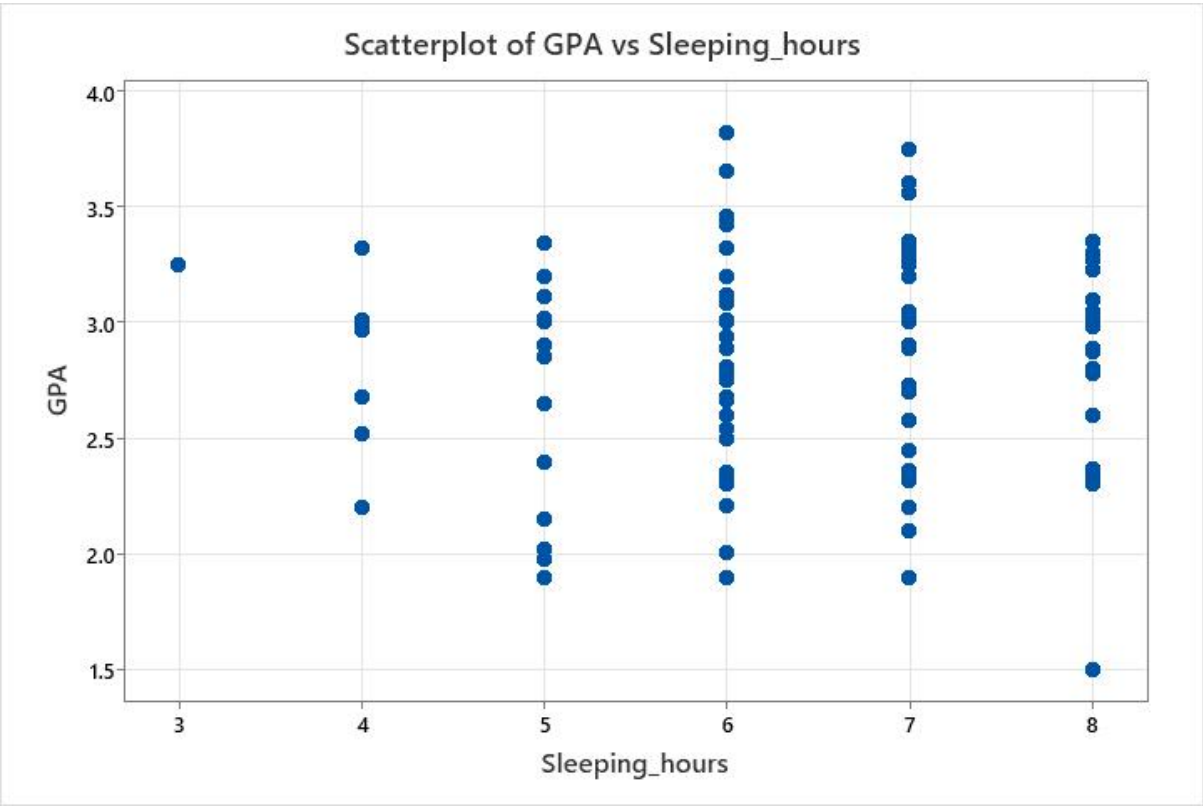


Figure 4.03

| Method | | Correlation | |
|---------------------|---------|------------------------|-----|
| Correlation type | Pearson | Sleeping hours code | GPA |
| Number of rows used | 101 | | |
| | | 0.026 | |

Table 4.14

Table 4.14 and Figure 4.03 shows the Pearson correlation of 0.026 between GPA and sleep hours per day suggests a negligible linear relationship, indicating minimal to no association between sleep duration and academic performance.

Analyzing the model

The logistic regression model is used to analyze whether there is a correlation between sleep disorder and academic performance. Because the response variable is binary.

Here our assumed model is,

$$\frac{1}{1-\pi} = e^{\alpha + \beta * GPA + \gamma * Age + \delta * Gender + \varepsilon * Sleeping_hours + \Phi * Sleeping_time + \theta * Screen_time + \Psi * Caffeine_usage}$$

First we are going to test our model is adequate or not. For that we are going to test Pearson's Chi-square (goodness of fit test).

Our hypothesis is,

H_0 : Model is adequate Vs H_1 : Model is not adequate.

Goodness-of-Fit Tests

| Test | DF | Chi-Square | P-Value |
|-----------------|----|------------|---------|
| Deviance | 92 | 124.55 | 0.063 |
| Pearson | 92 | 101.78 | 0.228 |
| Hosmer-Lemeshow | 8 | 14.84 | 0.062 |

Table 4.15

P-value of deviance is greater than 0.05. H_0 is not rejected at 5% level of significance. Therefore, our model is adequate.

Next we want to check whether parameters are significant or not.

Here we are going to test whether coefficients are significant or not.

Our hypotheses are,

H_0 : Coefficient is equal to zero. Vs H_1 : Coefficient is not equal to zero.

| | | Wald Test | |
|------------------------|----|------------|---------|
| Source | DF | Chi-Square | P-Value |
| Regression(α) | 8 | 11.30 | 0.185 |

| | | | |
|---------------------------------|---|------|-------|
| GPA(β) | 1 | 1.64 | 0.200 |
| Age (in years)(γ) | 1 | 1.59 | 0.207 |
| Gender(δ) | 1 | 4.64 | 0.031 |
| Sleeping hours(ε) | 1 | 0.03 | 0.869 |
| Sleeping time(Φ) | 2 | 0.02 | 0.992 |
| Screen Time(θ) | 1 | 0.43 | 0.513 |
| Caffeine usage(Ψ) | 1 | 3.84 | 0.050 |

Table 4.16

P-values can be used to determine whether H_0 is reject or not. According to above table, GPA variable is not in our model because p-value (=0.200) is greater than 0.05 and age variable is not in our model because p-value (=0.207) is greater than 0.05. But gender variable is in our model because p-value (=0.031) is less than 0.05. Sleeping hours variable is not in our model because p-value (=0.869) is greater than 0.05 and sleeping time variable is not in our model because p-value (=0.992) is greater than 0.05. Screen time variable is not in our model because p-value (=0.513) is greater than 0.05. Caffeine use variable is in our model because p-value (=0.050) is less than 0.05.

The updated model focuses on the significant variables and excludes non-significant predictors “Sleeping time”, “Screen time”, “Sleeping hours”, “GPA” and “age”. But “Gender” and “Caffeine usage” are still included, because p-values are less than 0.05.

Now we are going to interpret the significance variables. First of all, the categorical variable is gender. Here our reference variable level is female.

| Level A | Level B | Odds Ratio | 95% CI |
|-------------|---------|------------|------------------|
| gender code | | | |
| 2 | 1 | 2.7846 | (1.0968, 7.0697) |

Odds of a male with symptoms are almost three times that for a female.

$$e^{\delta_{hat}} = e^{1.024} = 2.78$$

Confident interval for variable gender is,

$$e^{1.024} \pm 1.96$$

Then categorical variable is caffeine usage. Here our reference variable level is ‘never and sometimes’

| Level A | Level B | Odds Ratio | 95% CI |
|-------------------|---------|------------|------------------|
| Caffeine use code | | | |
| 2 | 1 | 2.9573 | (1.0002, 8.7436) |

Odds of an undergraduate using caffeine always or often are almost three times that using never or sometimes.

$$e^{\psi_{hat}} = e^{1.082} = 2.95$$

Confident interval for variable gender is,

$$e^{1.082} \pm 1.96$$

Logistic regression equation is,

$$\pi = \frac{e^{\alpha + \beta * GPA + \gamma * Age + \delta * Gender + \epsilon * Sleeping_hours + \Phi * Sleeping_time + \theta * Screen_time + \Psi * Caffeine_usage}}{1 + e^{\alpha + \beta * GPA + \gamma * Age + \delta * Gender + \epsilon * Sleeping_hours + \Phi * Sleeping_time + \theta * Screen_time + \Psi * Caffeine_usage}}$$

$$P(1) = \frac{\exp(Y')}{1 + \exp(Y')}$$

| Equation No: | Gender | Sleeping time | Screen Time | Caffeine usage | |
|--------------|--------|---------------|-------------|----------------|---|
| 1 | 1 | 1 | 1 | 1 | Y' = -4.270 - 0.6271 GPA + 0.2447 Age (in years) - 0.06974 Sleeping hours |
| 2 | 1 | 1 | 1 | 2 | Y' = -3.186 - 0.6271 GPA + 0.2447 Age (in years) - 0.06974 Sleeping hours |
| 3 | 1 | 1 | 2 | 1 | Y' = -3.965 - 0.6271 GPA + 0.2447 Age (in years) - 0.06974 Sleeping hours |
| 4 | 1 | 1 | 2 | 2 | Y' = -2.881 - 0.6271 GPA + 0.2447 Age (in years) - 0.06974 Sleeping hours |

| | | | | | |
|----|---|---|---|---|---|
| 5 | 1 | 2 | 1 | 1 | Y' = -4.390 - 0.6271 GPA + 0.2447 Age (in years) - 0.06974 Sleeping hours |
| 6 | 1 | 2 | 1 | 2 | Y' = -3.306 - 0.6271 GPA + 0.2447 Age (in years) - 0.06974 Sleeping hours |
| 7 | 1 | 2 | 2 | 1 | Y' = -4.086 - 0.6271 GPA + 0.2447 Age (in years) - 0.06974 Sleeping hours |
| 8 | 1 | 2 | 2 | 2 | Y' = -3.001 - 0.6271 GPA + 0.2447 Age (in years) - 0.06974 Sleeping hours |
| 9 | 1 | 3 | 1 | 1 | Y' = -4.363 - 0.6271 GPA + 0.2447 Age (in years) - 0.06974 Sleeping hours |
| 10 | 1 | 3 | 1 | 2 | Y' = -3.278 - 0.6271 GPA + 0.2447 Age (in years) - 0.06974 Sleeping hours |
| 11 | 1 | 3 | 2 | 1 | Y' = -4.058 - 0.6271 GPA + 0.2447 Age (in years) - 0.06974 Sleeping hours |
| 12 | 1 | 3 | 2 | 2 | Y' = -2.973 - 0.6271 GPA + 0.2447 Age (in years) - 0.06974 Sleeping hours |
| 13 | 2 | 1 | 1 | 1 | Y' = -3.246 - 0.6271 GPA + 0.2447 Age (in years) - 0.06974 Sleeping hours |
| 14 | 2 | 1 | 1 | 2 | Y' = -2.162 - 0.6271 GPA + 0.2447 Age (in years) - 0.06974 Sleeping hours |
| 15 | 2 | 1 | 2 | 1 | Y' = -2.941 - 0.6271 GPA + 0.2447 Age (in years) - 0.06974 Sleeping hours |

| | | | | | |
|----|---|---|---|---|---|
| 16 | 2 | 1 | 2 | 2 | Y' = -1.857 - 0.6271 GPA + 0.2447 Age (in years) - 0.06974 Sleeping hours |
| 17 | 2 | 2 | 1 | 1 | Y' = -3.366 - 0.6271 GPA + 0.2447 Age (in years) - 0.06974 Sleeping hours |
| 18 | 2 | 2 | 1 | 2 | Y' = -2.282 - 0.6271 GPA + 0.2447 Age (in years) - 0.06974 Sleeping hours |
| 19 | 2 | 2 | 2 | 1 | Y' = -3.061 - 0.6271 GPA + 0.2447 Age (in years) - 0.06974 Sleeping hours |
| 20 | 2 | 2 | 2 | 2 | Y' = -1.977 - 0.6271 GPA + 0.2447 Age (in years) - 0.06974 Sleeping hours |
| 21 | 2 | 3 | 1 | 1 | Y' = -3.338 - 0.6271 GPA + 0.2447 Age (in years) - 0.06974 Sleeping hours |
| 22 | 2 | 3 | 1 | 2 | Y' = -2.254 - 0.6271 GPA + 0.2447 Age (in years) - 0.06974 Sleeping hours |
| 23 | 2 | 3 | 2 | 1 | Y' = -3.033 - 0.6271 GPA + 0.2447 Age (in years) - 0.06974 Sleeping hours |
| 24 | 2 | 3 | 2 | 2 | Y' = -1.949 - 0.6271 GPA + 0.2447 Age (in years) - 0.06974 Sleeping hours |

4.0 Scope And Limitation

Therefore, this study concerning the effects of the sleeping disorders on the academic success among the undergraduates of the Faculty of Applied Sciences, University of Sri Jayewardenepura is not bereft of some limitations. The number of respondents for 4th year students was smaller as compared to 2nd and the 3rd year students and this might have influenced the results. The respondents completed the questionnaires simultaneously with a non-academic staff strike at the university, which could have influenced the participants' availability and willingness to answer the questions. The study was also conducted only on students from the Physical and Biological Sciences faculties and did not include the students from the Sport Sciences and Food Sciences faculties, thus restricting the work's validity. Also, one more crucial decision in staking out boundaries of sleep disorders was made since a friend who is attending the Medical Faculty advised me. Because nearly all of them were identified as positive in at least one of the mentioned conditions, we decided that a student could be diagnosed as having a sleep disorder if he or she matches three or four of the four studied disorders. This criterion can be considered as subjective because it was not based on some clinical guideline, and it brings some bias to the design. Therefore, it is suggested that the future research must try to overcome these limitations by increasing the number of participants; applying more objective criteria in the process of their disorder categorization; and involving specialists belonging to other disciplines in an attempt to make the outcomes of the study more generalizable.

5.0 Discussion

Sleep and academic performance are an interdependent relationship. This study used logistic regression to unravel the elements linked to sleep disturbance in a sample of faculty of applied science at the University of Sri Jayewardenepura (FAS) undergraduate students. A strict criterion was used in this regard the tendency of a sleep disorder was considered to exist with symptoms. Coded as presence of sleep disorder, the presence of three or more symptoms showed higher probability that the FAS student was affected by the sleep disorder. For this to facilitate, a positively diagnosed case would have at least three disorders out of the possible four sleep disorders so by coding this as 1 and otherwise coding it as 0.

These criteria were set based on the cut-offs found in the report of *Initial Validation of the Sleep 50 Questionnaire* report (Spoormaker et al., 2005) among other prestigious institutions. Thus, this research was conducted with the proper support and foundation that this validated tool provided for the diagnosis of sleep disorders.

The response variable in the analysis was the presence or lack of sleep disturbances, while gender, sleep time, screen time, caffeine use, age, GPA, and sleeping hours were among the predictor variables. However, the most important predictor variables brought forth by the analysis were caffeine use and gender. This agrees with previous literature that tends to associate the intake of caffeine with sleep difficulties extremely frequently. Most students usually rely on caffeine's potent stimulant effect in the CNS (Central Nervous System) to enhance alertness and counteract tiredness and exhaustion. This effect creates an addiction cycle that interferes with sleep's regular nature, especially if caffeine is consumed in late hours and interferes with the sleep's quality.

Further, this study has indicated gender differences in sleeping problems. In fact, female are particularly prey to insomnia and negative sleep patterns. Hormonal fluctuations and increased sensitivity to stress would clearly explain this heightened susceptibility. The reasons for this susceptibility in women are probably greater because of cultural, gender-specific expectations, indicating that cultural and social factors should be taken into account when interpreting these differences.

This is quite interesting because, as the study notes, the collected data were unable to strongly correlate sleep issues with academic performance as measured by GPA. It was argued that the particular finding does not lend support to the general reasoning that sleeping inadequately might directly lead to poorer academic performance. Various factors might

explain this finding, including the fact that sleep issues amongst students or youths, in general, may be compromised by other behaviours, such as pulling all-nighter or studying instead of sleeping in order to keep grades up. In addition, GPA may not completely reflect the cognitive and learning effects of sleep problems because further influences, such as classroom attentiveness, timely assignment submission, and exam preparation, may help moderate these effects at least in part.

Finally, the results indicated that interventions on the key sleep problems reported in this research should be developed. For example, prevention measures for sleep disturbances may involve educating students on how to reduce caffeine consumption late in the day. Additionally, specific gender-related support and interventions will be necessary for the management of sleep disorders and improved academic performance based on the challenges of a student category.

7.0 Conclusion

The study's objectives are to highlight the key characteristics linked to sleeping disorders in the faculty of applied science at the University of Sri Jayewardenepura (FAS) undergraduate students and to demonstrate the significance of coffee consumption and gender as the two major determinants of sleep problems. FAS students who had at least three out of four sleep problems were shown to be at a higher risk, according to validated criteria employed in this comprehensive evaluation for sleeping disorders, which was generated from the Sleep 50 Questionnaire.

Findings refute the widely held belief that inadequate sleep is directly associated with substandard academic achievement, since there isn't much evidence linking sleep problems to GPA. This means that while getting enough sleep is crucial, so are good study habits, attending class, and being ready for tests—all of which help to succeed academically. There is no relationship between sleeping disorder and academic performance. Therefore sleeping disorders of FAS student only depend on caffeine usage and gender.

Treatments are necessary and ought to focus on lessening problems with sleep, among other things. These could include educating the students about the effects of caffeine consumption in the late afternoon on sleep quality and providing gender-specific help to address specific issues. It becomes necessary for institutions to take the into account in order to improve both the academic performance of their FAS students and the quality of their sleep. There is no relationship between sleeping disorder and academic performance. Therefore sleeping disorders of FAS student only depend on caffeine usage and gender.

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Appendix

Google Form

Study How Sleep Disorders Affect the Academic Success of Faculty of Applied Science Students at University of Sri Jayewardenepura

We are a group of undergraduates of Department of Statistics, University of Sri Jayewardenepura conducting a research on how sleep disorders affect the academic success using the undergraduates of Faculty of Applied Sciences, University of Sri Jayewardenepura.


We really appreciate your contribution and concern you paid to fill the form below. All the responses and feedback will be confidential and secured throughout the process.

This questionnaire will take few minutes to complete.

Thank you for your valuable time and consideration.

* Indicates required question

Please take a moment to watch the video below, to get a brief idea about sleep disorders.
Reference: <https://www.youtube.com/watch?v=k-GG1dIFu4>



<http://youtube.com/watch?v=k-GG1dIFu4>

1. Age (in years) *

1/2/24, 4/25/24

Study How Sleep Disorders Affect the Academic Success of Faculty of Applied Science Students at University of Sri Jayewardenepura

6. How many hours of sleep do you get per day?(including day time) *

Mark only one oval.

☐ 3 hours

☐ 4 hours

☐ 5 hours

☐ 6 hours

☐ 7 hours

☐ 8 hours

☐ More than 8 hours

7. How long would you spend time on electronic devices(phones, laptops, etc.) after you got to bed, to sleep? *

Mark only one oval.

☐ 0 hours

☐ 1/2 hour

☐ 1 hour

☐ More than 1 hours

8. Do you use caffeine(coffee, tea, chocolate, Nescafe, etc.) within 4 hours before sleeping? *

Mark only one oval.

☐ Always

☐ Often

☐ Sometimes

☐ Never

1/2/24, 4/25/24

Study How Sleep Disorders Affect the Academic Success of Faculty of Applied Science Students at University of Sri Jayewardenepura

Study How Sleep Disorders Affect the Academic Success of Faculty of Applied Science Students at University of Sri Jayawardenapura

9.92/24 4.25 PM

2. 2. What is your academic year? *

Mark only one oval.

☐ 2nd year

☐ 3rd year

☐ 4th year

3. 3. Gender *

Mark only one oval.

☐ Male

☐ Female

4. 4. What is your current GPA? (mention in 2 decimal points) *

5. 5. What time do you typically go to sleep at night? *

Mark only one oval.

☐ Before 8pm

☐ 8pm - 9pm

☐ 9pm - 10pm

☐ 10pm - 11pm

☐ 11pm - 12am

☐ After 12am

6. 6. How often do you experience sleep problems? *

Mark only one oval.

☐ Never

☐ Rarely

☐ Sometimes

☐ Often

☐ Always

7. 7. Do you have any sleep disorders? *

Mark only one oval.

☐ Yes

☐ No

8. 8. If you have a sleep disorder, what type of disorder do you have? *

Mark only one oval.

☐ Insomnia

☐ Sleep apnea

☐ Restless leg syndrome

☐ Narcolepsy

☐ Other

9. 9. Have you noticed a change in your sleep patterns during exam periods or high-stress academic times? *

Mark only one oval.

☐ Having lack of sleep (less than 4 hours)

☐ Over sleep (more than 9 hours)

☐ Restless sleep (can't sleep continuously)

☐ No changes

10. 10. What is your usual residential status while studying at university? *

Mark only one oval.

☐ Hostel

☐ Boarding house

☐ Living with parents/guardians

☐ Other: _____

11. 11. Have you sought medical advice or treatment for sleep-related issues? If yes, * what was recommended? If not, mention as "No".

Sleep Questions: Please respond to what extent a statement (item) has been applicable to you during exam and onsite academic time period. Score each item on a 4-point-scale: 1 (not at all) 2 (somewhat) 3 (rather much) 4 (very much)

12. Section 1 : *

Mark only one oval per row.

| | 1 | 2 | 3 | 4 |
|--|-----------------------|-----------------------|-----------------------|-----------------------|
| I am told that I snore. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I sweat during the night. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I am told that I hold my breath when sleeping. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I wake up with a dry mouth. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I wake up during the night while coughing. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I wake up with a headache. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I wake up with a sour taste in my mouth. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I am told that I wake up gasping for air. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

https://docs.google.com/forms/d/5N5Dv05u0KJ0M30j9P3CDDCw339G5uAgj_8P9v8d7p/edit#survey

0/11

13. Section 2 : *

Mark only one oval per row.

| | 1 | 2 | 3 | 4 |
|--|-----------------------|-----------------------|-----------------------|-----------------------|
| Thoughts go through my head and keep me awake. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I worry and find it hard to relax. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| After waking up during the night, I fall asleep slowly. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I wake up early and cannot get back to sleep. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I sleep lightly. (i.e. even a small noise disturb your sleep.) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I have difficulty in falling asleep. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

https://docs.google.com/forms/d/15V05u05u0KJ0M30j9P3CDDCw339G5uAgj_8P9v8d7p/edit#survey

0/11

14. Section 3 : *

Mark only one oval per row.

| | 1 | 2 | 3 | 4 |
|--|-----------------------|-----------------------|-----------------------|-----------------------|
| I see dream like images when falling asleep or waking up. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I sometimes fall asleep on a social occasion. (lectures, meetings, etc.) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I fall asleep suddenly during the day. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| With intense emotions (extreme joy, sadness, anger, overwhelming fear, and deep love), my muscles sometimes collapse during the day. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I sometimes cannot move when waking up. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

https://docs.google.com/forms/d/15V05u05u0KJ0M30j9P3CDDCw339G5uAgj_8P9v8d7p/edit#survey

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15. Section 4 : *

Mark only one oval per row.

| | 1 | 2 | 3 | 4 |
|--|-----------------------|-----------------------|-----------------------|-----------------------|
| I am told that I kick my legs when I sleep. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I have cramps or pain in my legs during the night. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I feel little shocks in my legs during the night. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I cannot keep my legs at rest when falling asleep. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

https://docs.google.com/forms/d/15V05u05u0KJ0M30j9P3CDDCw339G5uAgj_8P9v8d7p/edit#survey

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