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Sleep And The Pandemic:Evaluation Of Sleep Patterns During The Covid -19 Pandemic

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Abstract – Since the outbreak of the COVID-19 pandemic, the world has come to a standstill, with enforcement of the lockdown, several regulations, and restrictions that brought significant change to people's lifestyles, and induced waves of panic and delirium in individuals everywhere. This unfunded cross-sectional survey-based study aims to evaluate the pandemic's impact on sleep patterns in a sample of the general population worldwide. An online survey was constructed , composing of 31 questions. The Athens scale was used to estimate nocturnal sleep dysfunction and daytime dysfunction. The survey's target population was 13 years and above. 300 responses were received .A majority of the participants reported that they sleep late, have an increased screen time , and used electronics . 45% of the participants said they have insomnia and 55% of the participants claimed they did not have insomnia. Despite the majority claiming to not have insomnia, on employing the Athens scale to calculate individuals' insomnia scores, the results were quite contradictory .Nighttime routines and alarm usage were also monitored. .Therefore, this study has enabled to observe that there has been a definite impact in the sleep cycles of certain individuals since the beginning of the pandemic. Limitations of this study include sample size, random sampling and lack of additional profound data

Keywords – Sleep, Pandemic , Sleep cycle, COVID-19, Sleep patterns

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I. Introduction

Since the outbreak of the COVID-19 pandemic, the world has come to a standstill, with enforcement of the lockdown, several regulations, and restrictions that brought significant change to people's lifestyles, and induced waves of panic and delirium in individuals everywhere.

Sleep plays a vital role in people's physical and mental well-being. Factors such as unemployment, poverty, travel bans causing people to be stranded, and fear of getting infected by the virus have caused significant distress. They have collectively become a rather unprecedented challenge to regular sleep cycles and the normal functioning of individuals. For most adults, at least seven hours of sleep each night is needed for normal cognitive and behavioral functions, and insufficient sleep can have serious repercussions. It has also been suggested that people can develop tolerance to chronic sleep deprivation and become unaware of their lack of sleep.

This study aims to evaluate the pandemic's impact on sleep patterns in a sample of the general population worldwide

II. Method

This is a cross-sectional study evaluating changes in sleep patterns due to the COVID -19 pandemic. An online survey using Google docs was constructed and composed of 31 questions. The Athens scale was used to estimate nocturnal sleep dysfunction and daytime dysfunction. The survey's target population was 13 years and above. It was circulated on multiple social platforms for about a month. 300 responses were received. Authenticity was received, and the survey was limited to one response per person to avoid duplication of responses. Consent to participate was acquired as well.

III. Results

In the conducted survey, a total number of 300 responses were recorded. A majority of 57.7% (n=173) were females. The ages of participants ranged from 13 to 60 years, out of which the majority, 49% (n=147), were students. The majority of participants were of South Asian origin, India being the predominant country of residence at 56.3% (n=169). The second-largest percentage of participants, at 19% (n=57), was from Georgia. (Table 1a, 1b, 1c)

Table 1a. Age of participants

Age	**Percentage**	**Number of responses**
13-20	14.3%	43
21- 30	46.3%	139
31-40	10.3%	31
41-50	19%	57
50-61	7.3%	22
61 and above	2.7%	08

Table 1b. Gender

Gender	**Percentage**	**Number of responses**
Female	57.7%	173
Male	40%	120
Other	1%	03
Prefer not to say	1.3%	04

Table 1c. Country of residence

Country of Residence	Percentage	Number of responses
India	56.3%	169
Georgia	19%	57
United States of America	9%	27
United Arab Emirates	4.3%	13
United Kingdom	2.3%	7
Sri Lanka	1.6%	5
Canada	1.3%	4
Qatar	1%	3
Germany	0.6%	2
Philippines	0.6%	2
Nigeria	0.3%	1
Saudi Arabia	0.3%	1
Australia	0.3%	1
Singapore	0.3%	1
Myanmar	0.3%	1
Hungary	0.3%	1
Israel	0.3%	1
Poland	0.3%	1
Estonia	0.3%	1
Kuwait	0.3%	1

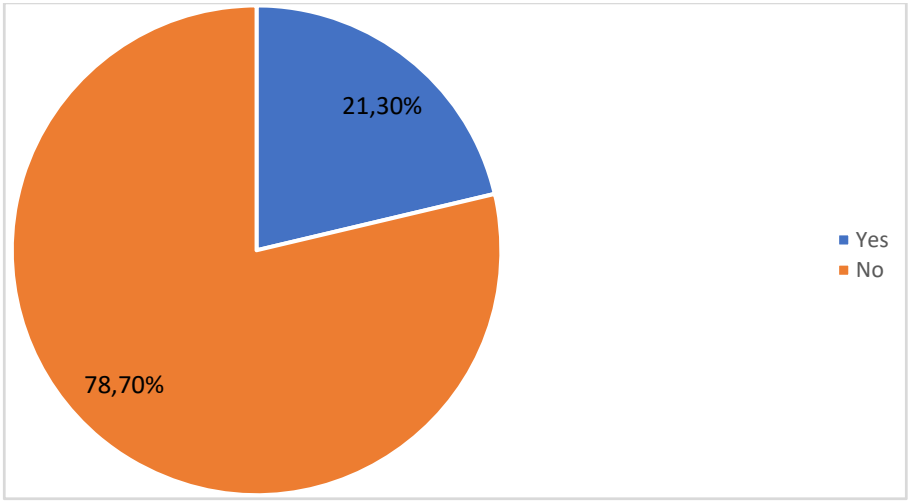

Figure 1: Do you consume alcohol

(Figure 1) When asked about consumption of alcohol, 78.7% (n=236) participants denied consuming alcohol and 21.3% (n=64) stated that they do consume alcohol

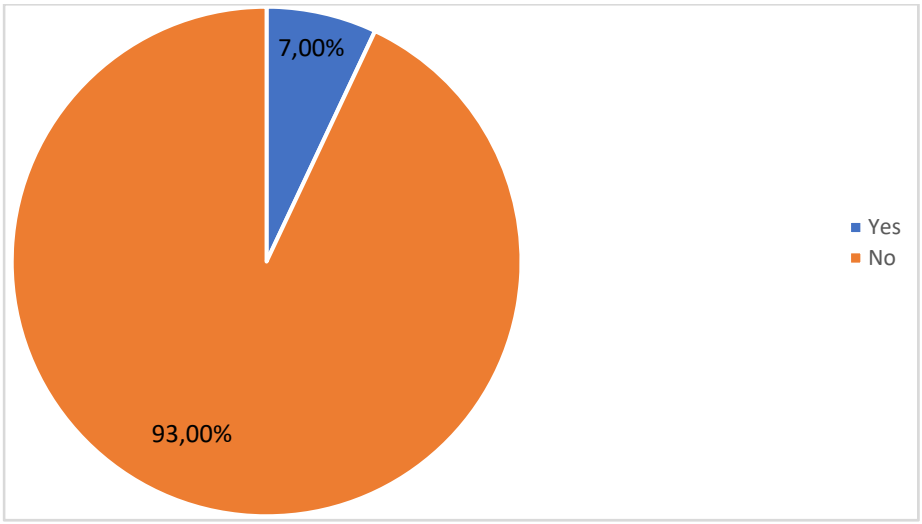

Figure 2: Are you a smoker

(Figure 2) When asked if the participant is a smoker , 93% (n=279) participants stated that they were non-smokers while 7% (n=21) participants stated that they are smokers

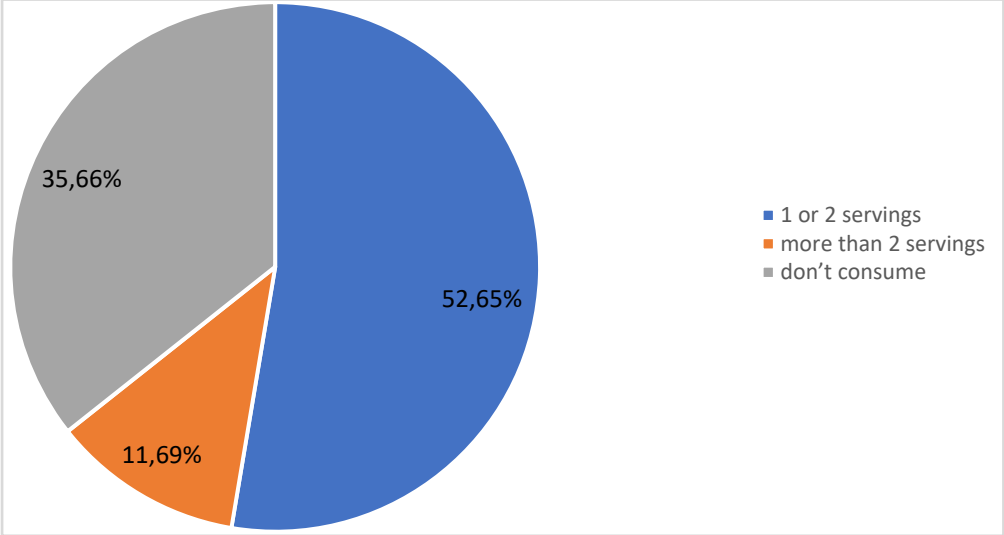

Figure 3: How would you describe your daily caffeine intake?

(Figure 3) Most participants, 52.7% (n=158), consume 1-2 servings of caffeine daily. 11.2% (n=35) consume more than two servings of caffeine daily, and 35.7% (n=107) do not.

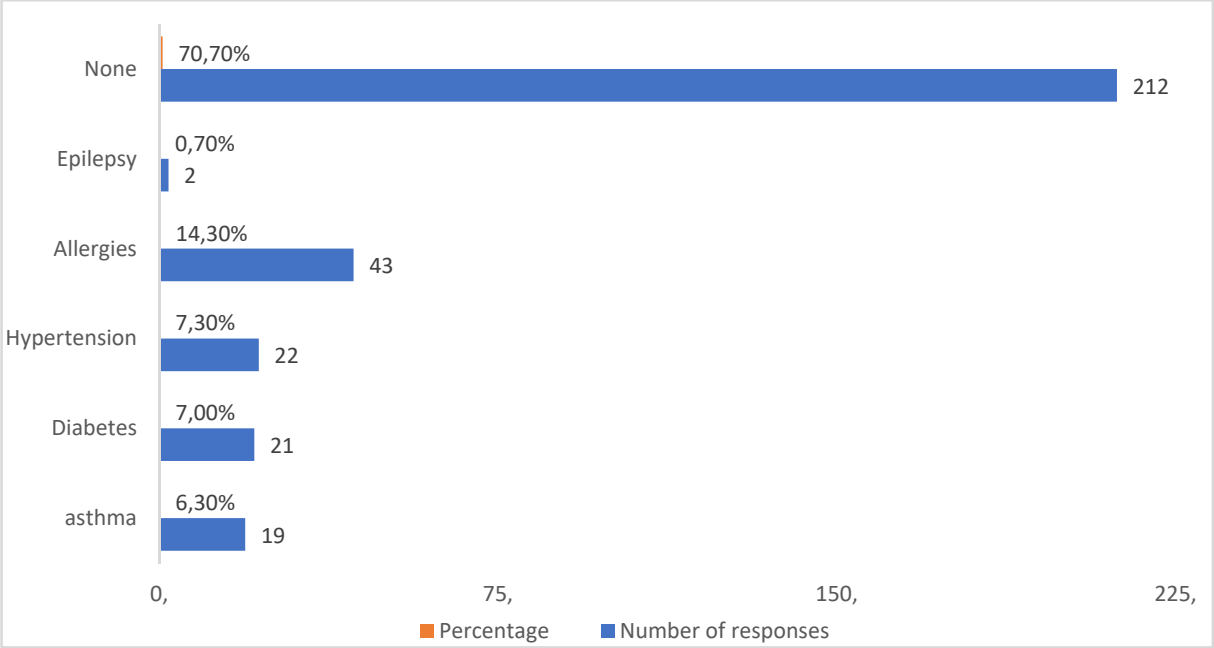

Figure 4: Do you suffer from any of the following conditions?

(Figure 4) The majority of the participants, 70.7% (n=212) were healthy and did not suffer from any co-morbid condition. 6.3% (n=19) suffered from asthma, 7% (n=21) from diabetes, 7.3% (n=23) from hypertension, 14.3% (n=43) from allergies, and 0.7% (n=2) suffered from epilepsy.

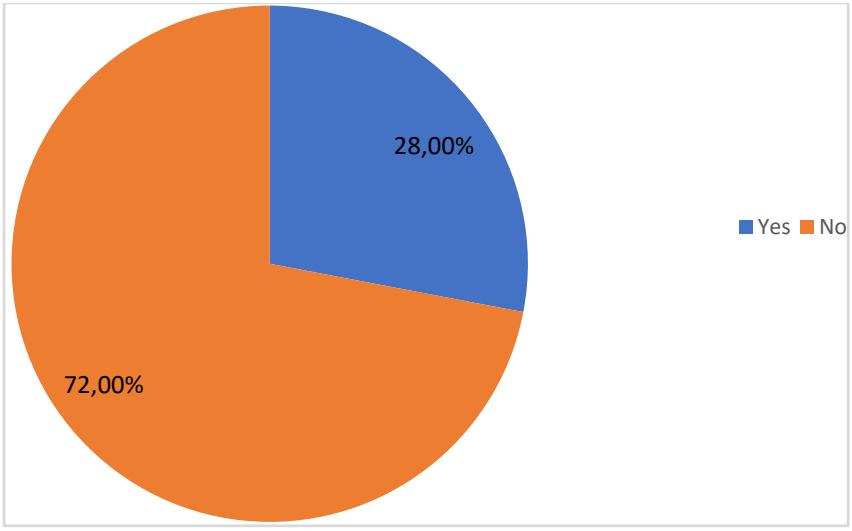

Figure 5: Have you been infected with the Covid-19 infection?

(Figure 5) Participants were asked whether they were infected with the Covid-19 infection. Out of 300 responses, 72% (n=216) stated that they were infected with the Covid-19 infection, and 28% (n=84) stated that they were not.

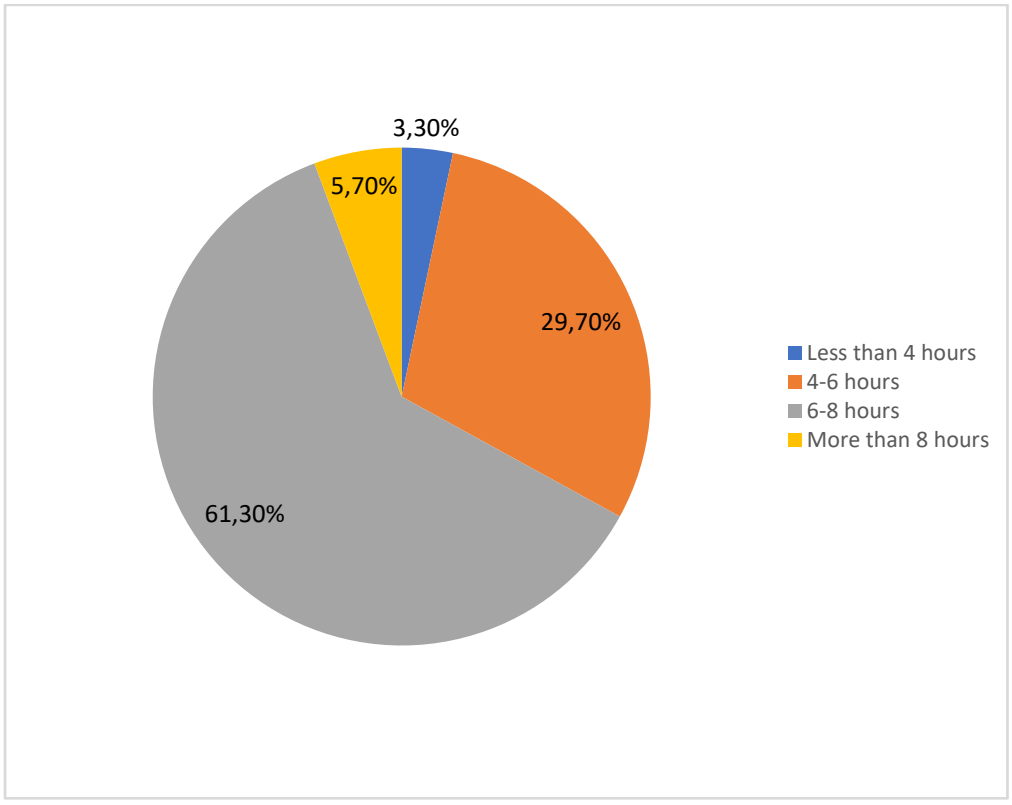

Figure 6: How many hours of sleep do you get each night?

(Figure 6) Participants were asked how many hours of sleep they got each night. 61.3% (n=184) stated that they get 6-8 hours of sleep; 29.7% (n=89) get 4-6 hours of sleep; 5.7% (n=17) get more than 8 hours of sleep, and 3.3% (n=10) get less than 4 hours of sleep.

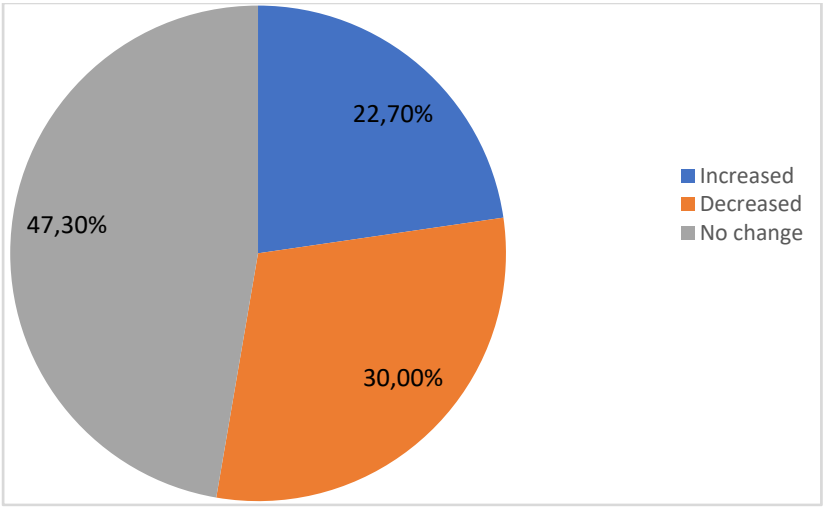

Figure 7: How has it changed since the Covid-19 pandemic?

(Figure 7) Participants were asked how their hours of sleep have changed since the Covid-19 pandemic. Of the 300 responses, 47.3% (n=142) stated that the hours of sleep did not change since the pandemic; 30% (n=90) stated that the hours of sleep decreased since the pandemic, and 22.7% (n=68) stated that the hours of sleep increased since the pandemic.

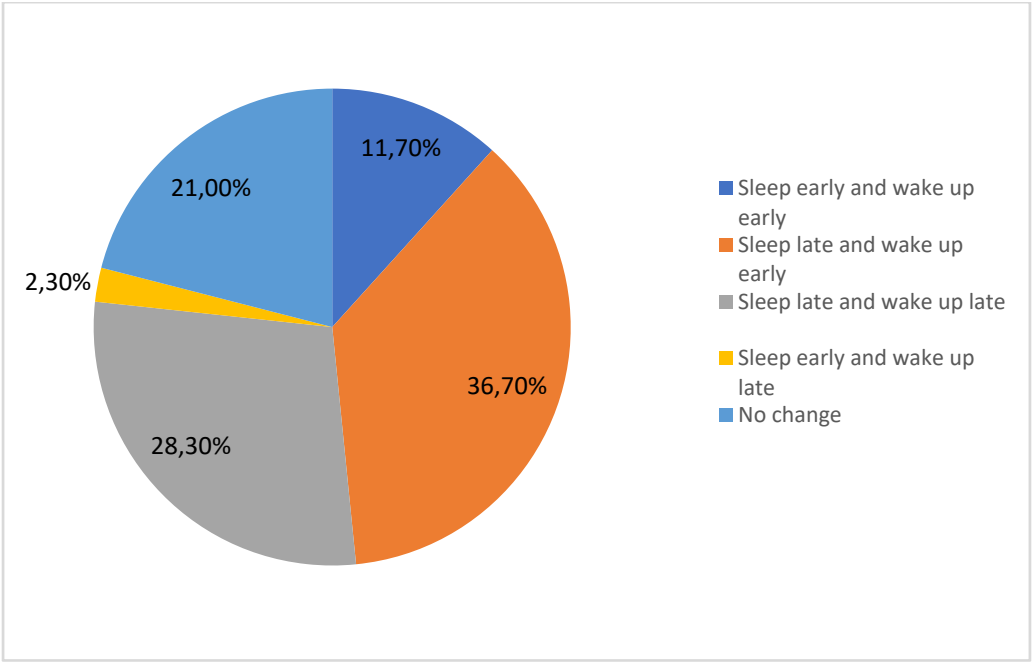

Figure 8: How would you describe your sleep cycle since the Covid-19 pandemic

(Figure 8) Participants were asked to describe their sleep cycles since the Covid-19 pandemic. 36.7% (n=110) stated that they sleep late and wake up early; 28.3% (n=85) stated that they sleep late and wake up late; 21% (n=63) stated that they had no change in their sleep cycle; 11.7% (n=35) stated that they sleep early and wake up early, and 2.3% (n=7) stated that they sleep early and wake up late.

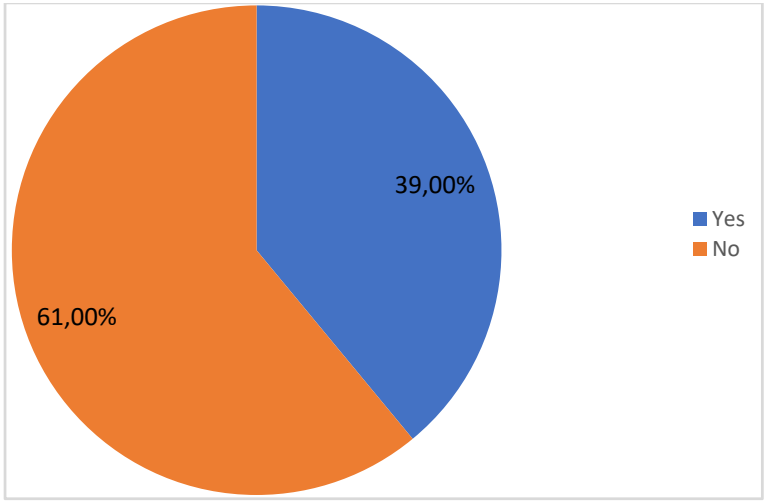

Figure 9: Do you have a night time routine before you sleep?

(Figure 9) Participants were asked whether they had a nighttime routine before going to sleep. Of the 300 responses, 61% (n=183) stated that they did not have a nighttime routine and 39% (n=117) stated that they do have a nighttime routine.

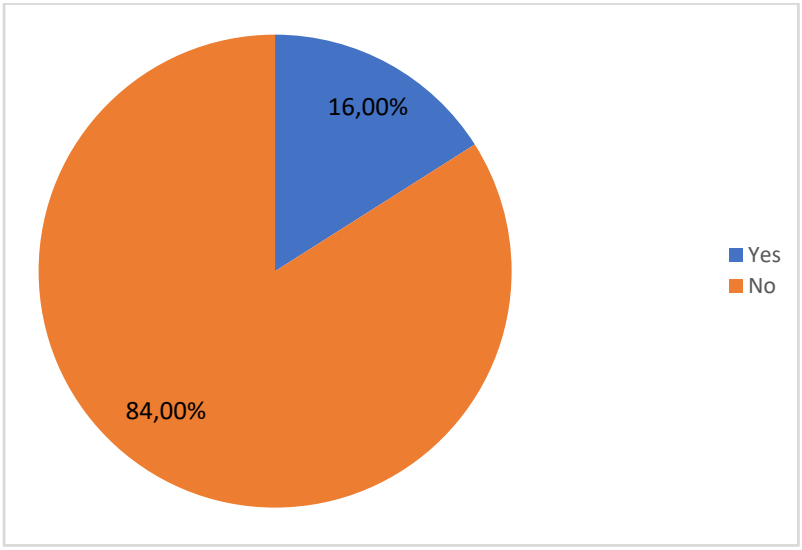

Figure 10: Do you stop using electronics at least an hour before you sleep?

(Figure 10) Participants were asked whether they stopped using electronics at least an hour before sleeping. Of the 300 responses, 84% (n=252) stated that they do not stop using electronics at least an hour before they sleep, and 16% (n=48) stated that they do stop using electronics at least an hour before they sleep

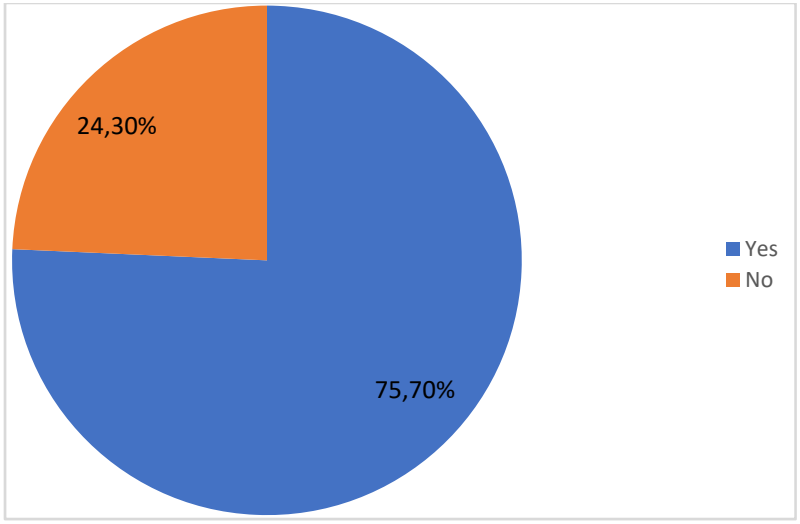

Figure 11: Has your screen time increased since the Covid-19 pandemic started?

(Figure 11) Participants were asked if their screen time had increased since the Covid-19 pandemic. Of the 300 responses, 75.7% (n=227) stated that their screen time had increased since the pandemic, and 24.3% (n=73) stated that their screen time did not increase since the pandemic.

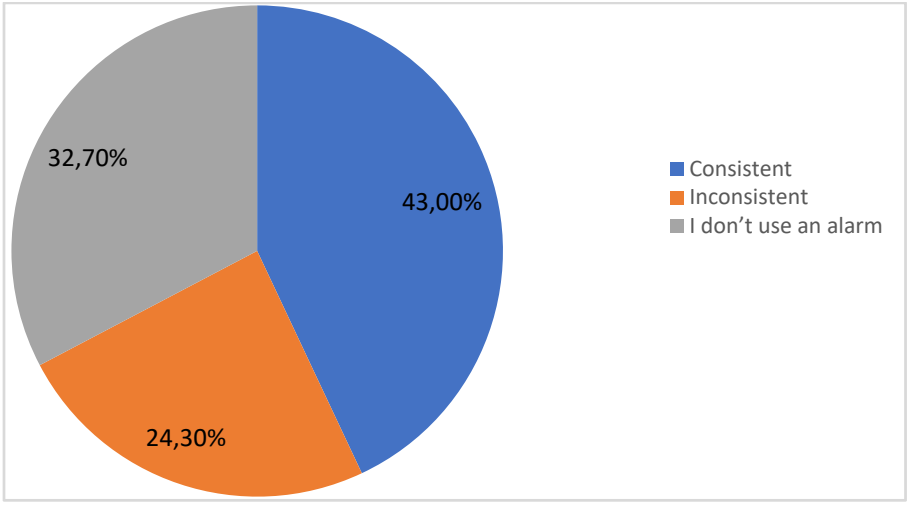

Figure 12: How has your alarm usage changed since the Covid-19 pandemic?

(Figure 12) Participants were asked how their alarm usage has changed since the Covid-19 pandemic. Of the 300 responses, 43% (n=129) stated that their alarm usage was consistent; 32.7% (n=98) stated that they do not use an alarm, and 24.3% (n=73) stated that their alarm usage was inconsistent.

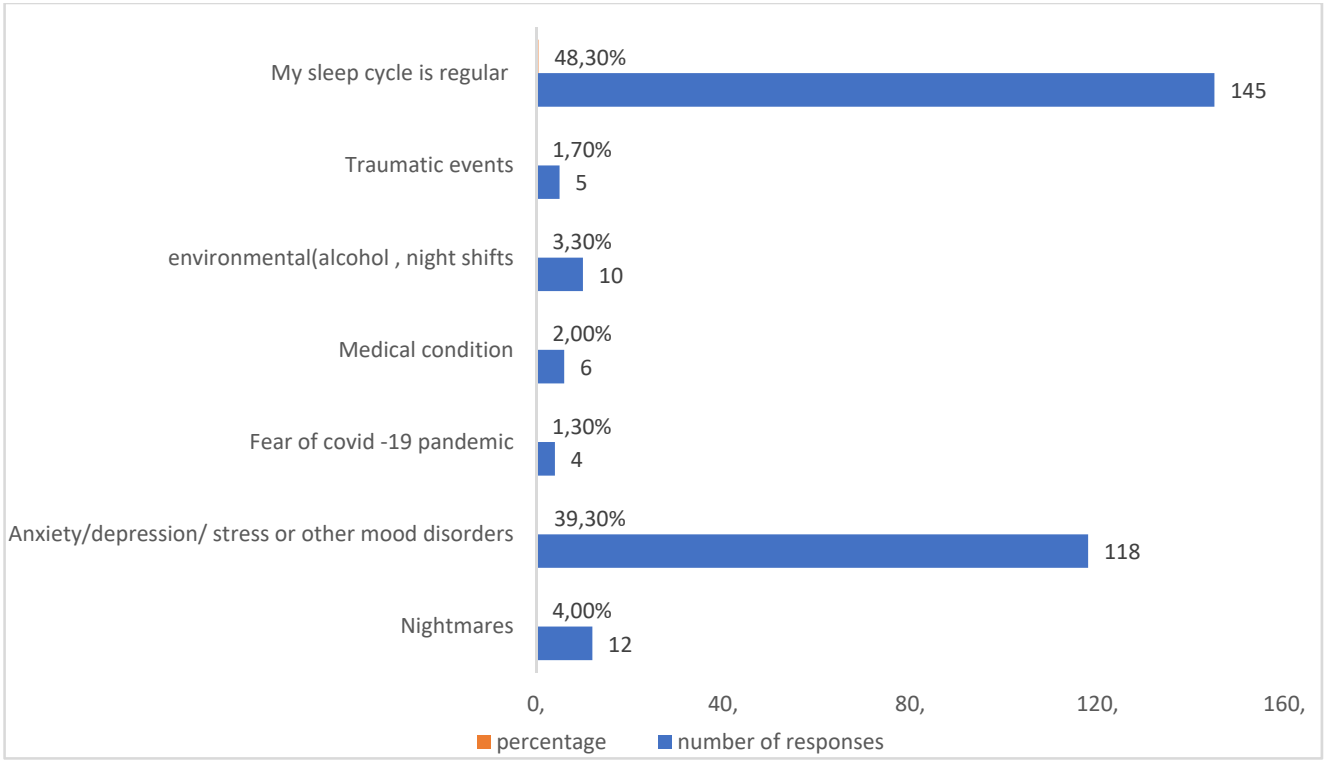

Figure 13: Reason for sleep deprivation

When asked a question about the reason for sleep deprivation, most of the participants, 39.3% (n=118) stated the reason as anxiety/ depression / stress and other mood disorders. Some participants 1.3% (n=4) had fear of COVID-19, others had some medical conditions 2% (n=6), nightmares 4% (n=12) , lifestyle like alcohol consumption and night shifts 3.3% (n=10) and some traumatic events1.7% (n=5) causing sleep disturbances.

Athens Insomnia Scale

The Athens Insomnia Scale comprising eight questions, was included in the survey to assess whether the participants had insomnia.

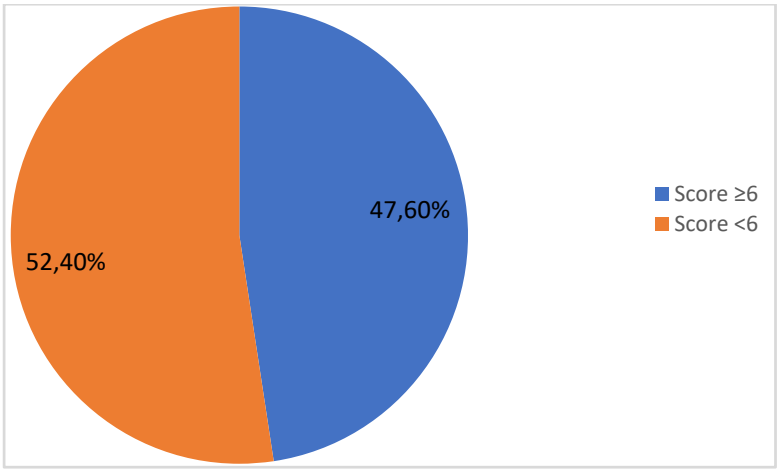

Figure 14: Athens insomnia scale

(Figure 14) Of the 300 responses, 52.4% (n=157) had a score of <6, which is below the minimum cutoff indicating that they do not have insomnia, and 47.6% (n=143) had a score of ≥6, which meets the minimum cutoff indicating that they do have insomnia

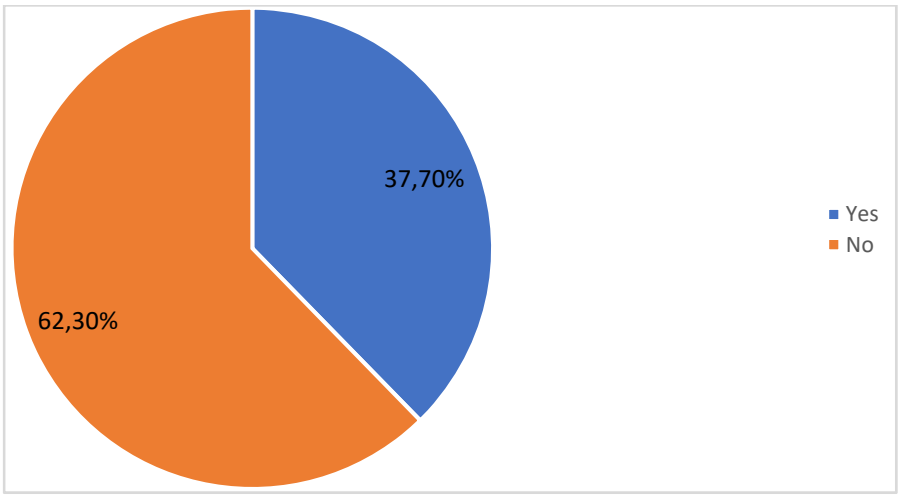

Figure 15: Do you practice mid-day napping?

(Figure 15) 62.3% (n=187) do not have the practice of mid-day napping.

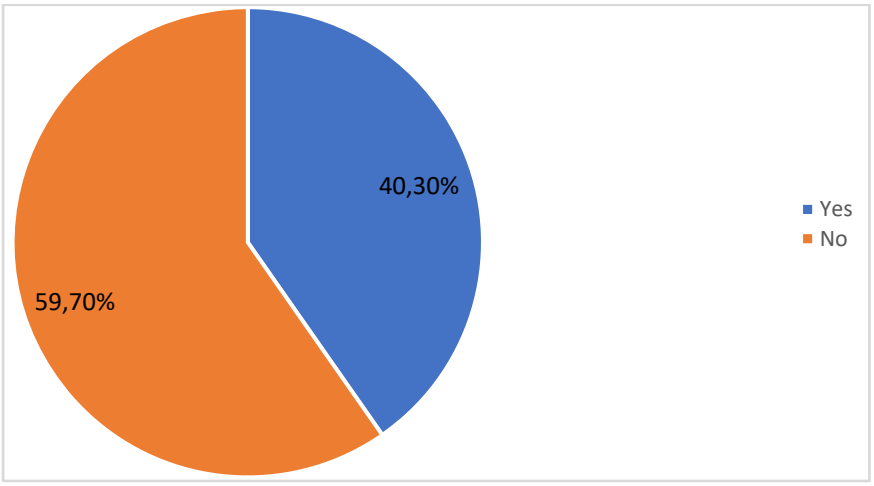

Figure 16: Feel drowsier since Covid 19 pandemic?

(Figure 16) 40.3% (n=121) of participants feel drowsier since the Covid -19 pandemic.

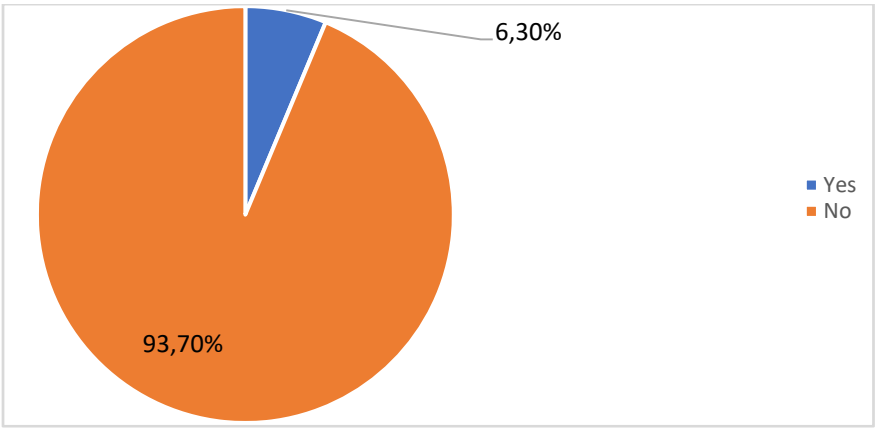

Figure 17: Family history of sleep disorder

(Figure 17) The majority of the participants, 93.7% (n=281), do not have a family history of sleep disorders. 6.3% (n=19) have a family history of sleep disorder.

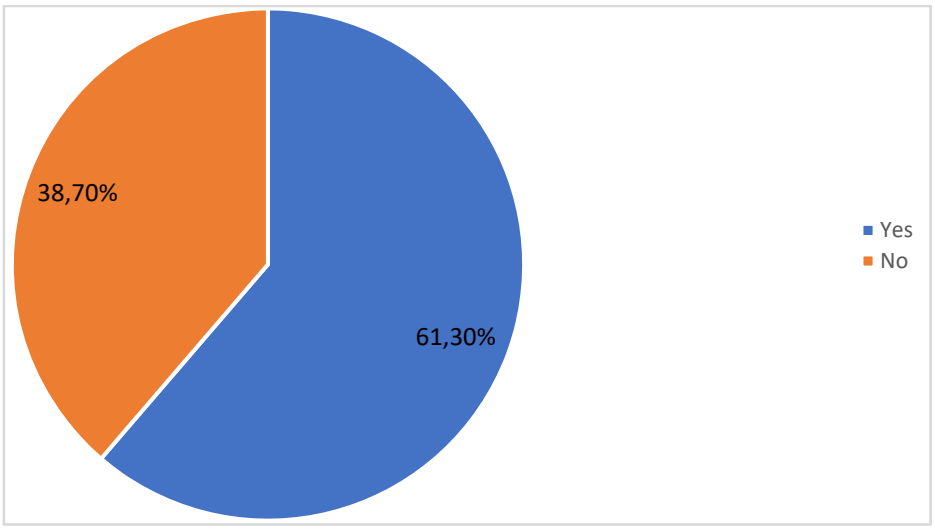

Figure 18: Adequate exposure of sunlight in the morning

(Figure 18) 61.3% (n=184) have adequate exposure to sunlight in the morning on balconies or through windows

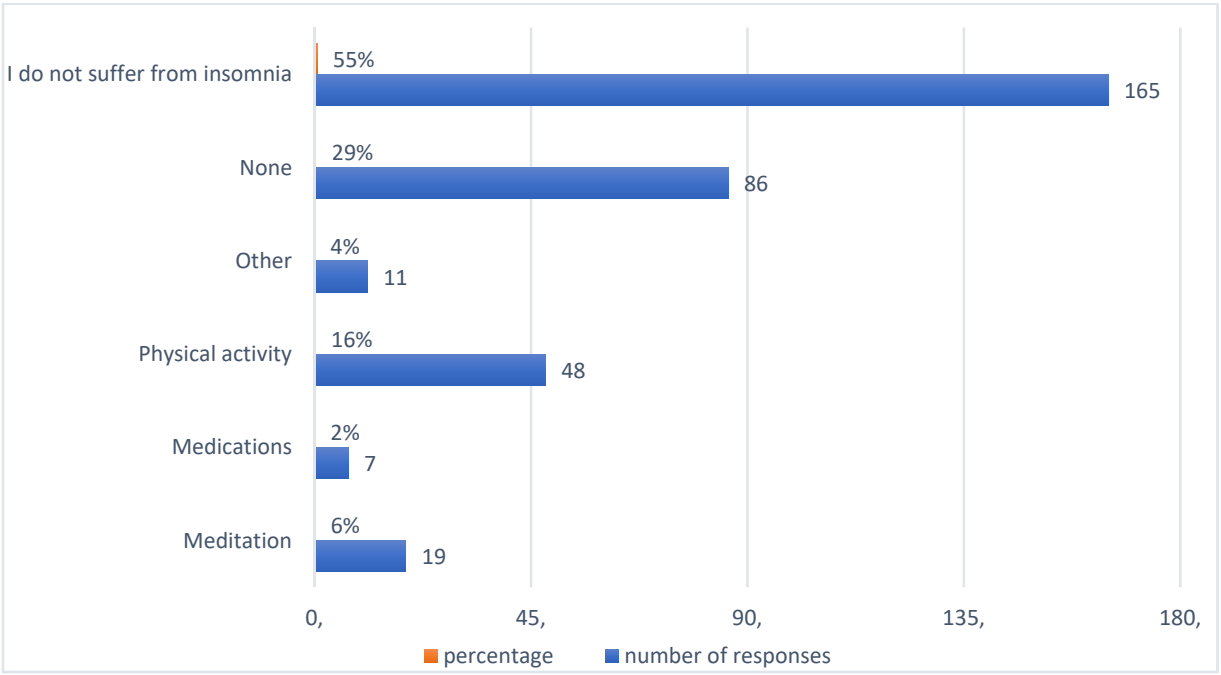

Figure 19 : Measures taken against insomnia

(Figure 19) When asked the question about measures taken against insomnia, some participants 28.7% (n=86) did not take any measures but others 6.3% (n=19) responded as meditation; 16% (n=48) as physical activity; 2.3% (n=7) as medication, and 3.7% (n=11) as other methods.

IV. DISCUSSION

The effect of the Covid-19 pandemic on the physical and mental well-being of individuals has been unprecedented. Recent studies have shown adverse impacts on sleep among populations, several studies indicating the massive prevalence of sleep

disturbances globally. Given the present circumstances, with enormous psychological pressures, this condition is likely to worsen. The purpose of this study is to observe changes in sleep patterns since the onset of the Covid-19 pandemic.

In this study, most participants reporting altered sleep patterns belonged to the age group 21-30. This is in concordance with data from the Coconel Group showing an increase in the prevalence of sleep disturbance in young people aged 18–34 years compared with older ones. It can be attributed to stress from academic workload, separation from school, and fears of contagion and health. [1] [2]

Environmental and social changes induced by the pandemic affected sleep timing and duration in several recent studies across different populations. There is a wide range of socio-demographic factors that account for sleep disturbances.

Owing to the drastic lifestyle changes brought about by the lockdown, it has become increasingly difficult to maintain regular daily routines, especially with respect to consistent sleep schedules.

24.3%(n=73) of participants have reported inconsistent alarm usage. Waking up at the same time every day is essential to maintaining the body's circadian rhythm, which may be altered due to factors such as reduced exposure to sunlight, reduced physical activity, and changes in the working schedule during the lockdown. [4] [6]

Studies have well established the link between sunlight and circadian rhythms. [7]

Exposure to morning sunlight is necessary to induce the production of cortisol, the stress hormone responsible for alertness. Exposure to evening sunlight is necessary to induce the production of melatonin, which prepares the body for sleep. Since the lockdown, spending all-time indoors has made regular sunlight exposure difficult. Our survey found that 38.7%(n=116) of participants did not have regular adequate sunlight exposure in the mornings and the evenings.

The pervasiveness of anxiety symptoms in college students during the COVID-19 epidemic was more prominent than that reported in the mainstream population. The cause might be due to the suddenness and unpredictability of the epidemic, which affected normal academic planning [6] .These studies reinforce the findings in this survey, where most participants reporting sleep disturbances were students and health care workers.

When participants were asked about the possible reasons for their sleep disturbances, 39.3%(n=118) of participants reported the cause to be anxiety, depression, stress, and the general psychological distress resulting from the lockdown. 4% (n=12) of participants stated that it was due to nightmares. 3.3%(n=10) thought that it was due to a shift in their regular habits-night shifts, increased alcohol and caffeine intake, etc. 2% of people claimed that it was due to medical conditions. 1.7%(n=5) of them thought it stemmed from a traumatic event, such as losing a family member, relative, or friend. 1.3%(n=4) claimed it was due to paranoia due to the pandemic.

Our study found that 21.3%(n=64) of the participants said they consume alcohol. Alcohol consumption has been known to have adverse effects on sleep. Studies have shown that it can suppress REM cycles, causing an imbalance between the stages of sleep, and consequently, sleep disruptions and overall decreased quality of sleep. [19]

Studies have also shown that alcohol induces relaxation of the upper airway dilator muscles (decreasing airway patency), increasing nasal and pharyngeal resistance, leading to sleep apnea, snoring, and consequently, disturbed sleep. It prolongs the time required to arouse or awaken after an apnea occurs. [20]

Our survey found that 46.87% of the people who answered 'yes' to being asked if they consume alcohol have insomnia. People who chronically consume alcohol often report insomnia symptoms, one of which is sleepiness during the day. This creates a vicious cycle consisting of 'needing' alcohol at night to fall asleep and stimulating substances like caffeine during the day to stay awake, only to offset the effects of the stimulants by consuming alcohol again. [8] [9]

Participants were asked about their daily caffeine intake. 52.7%(n=158) of the participants consume 1 or 2 servings of caffeine daily, and 11.7%(n=35) consume more than two servings of caffeine daily.

Caffeine, a stimulant of the central nervous system, delays the onset of sleep by blocking the adenosine receptor. It also decreases sleep quality and satisfaction. It notably reduces the duration of slow-wave sleep, causing fatigue the next day. It has also been found to have a disrupting effect on the body's circadian rhythm. [10]

While caffeine consumption has short-term performance benefits, overuse can lead to insomnia or worsen preexisting symptoms.

7% (n=21) of the participants, according to our study, were smokers. People who are in the habit of smoking at night do so because they want to feel relaxed. However, nicotine, much like caffeine, is a stimulant. It increases alertness, raises the heart rate, and delays sleep onset; decreases sleep quality, and duration of deep sleep. [11] [12]

One study used polysomnography to find that smokers had greater sleep latency, higher REM sleep density, greater sleep apnea, more leg movement during sleep, and shorter sleep duration. [13]

In a study by Rezai & Grandner, participants across all age groups reported an increase in their sleep duration. A significant proportion of participants mentioned delayed bedtime and wake time. The delay in bedtime is most likely the result of behavioral changes brought on by the pandemic and lockdown, as well as the younger population's natural inclination to sleep late. In the absence of any external reasons that justify this behavior, the delay in going to bed and putting off sleep time is referred to as Bedtime Procrastination.

When participants were asked about electronic usage an hour before sleeping, 84% (n=252) stated that they do not stop using electronics at least an hour before sleeping. A recent study concluded that during the pandemic, screen time use has approximately doubled since the pandemic.

75.7% (n=227) of our participants stated that their screen time has increased since the pandemic. Numerous studies have linked increased screen time and disturbed sleep together. Smartphones, tablets, and virtually any piece of technology emitting short-wavelength blue light interferes with the normal production of melatonin, ultimately negatively impacting sleep due to a disrupted sleep-wake cycle. [14] [15] [16] [17]

Participants were also asked about insomnia and what measures they take to combat it. 45% (n=135) of participants said that they have insomnia. As a measure to combat the same, 6.3%(n=19) said they choose to practice meditation, 16% (n=48) perform physical activity, and 2.3%(n=7) of them choose to take medication.

39% (n=117) of participants practiced a nighttime routine before bedtime.

On the other hand, 55% (n=165) of them claimed that they did not have insomnia. Interestingly, among these participants, 30.9%(n=51) scored 6 and above on the Athens insomnia scale, showing that they were unaware. Globally, insomnia often has several comorbidities. People with insomnia are five times more likely to experience depression and anxiety when compared to people without insomnia. Insomniacs are also at twice the risk of developing diabetes and congestive heart failure. They have greater mortality and greater risks of alcohol and substance abuse. Even with the large number of people affected, it often goes undiagnosed and untreated. [18]

Patients suffering from COVID-19 reported poor quality of sleep as detailed by two studies. After 30 days of follow-up, a substantial prevalence of insomnia was noted in recovered COVID-19 patients. Patients should be advised to seek help if they are having trouble sleeping. Recognizing and treating insomnia patients as soon as possible is essential to avoid long-term adverse implications.[3] [5]

V. Conclusion

The pandemic and the lockdown led to quite a few changes in the sleep cycles of individuals . 36.7% stated that they sleep late and wake up early; 28.3% stated that they sleep late and wake up late; 21% stated that they had no change in their sleep cycle; 11.7% stated that they sleep early and wake up early, and 2.3% stated that they sleep early and wake up late. A majority of the participants reported that they do not suspend the use of electronics at least an hour before they sleep. 75.7% stated that their screen time increased since the pandemic. All these indicating poor quality of sleep. A majority of the participants reported anxiety/ depression/ stress /and other mood disorders for their sleep deprivation. Exposure to morning sunlight was monitored .Despite the majority claiming to not have insomnia, on employing the Athens scale to calculate individuals' insomnia scores, 47.6% of the participants were observed to have insomnia. Therefore, this study has enabled to observe that there has been a definite impact in the sleep cycles of certain individuals since the beginning of the pandemic

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