Relationship Between Screen-Time, Sleeping Pattern and Stress During the Pandemic Among University Students

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Abstract: The aim of this research was to explore the intricate interplay among students' sleep quality, screen time habits, and stress levels in the context of the COVID-19 pandemic. A carefully selected sample of 130 students from the University of Karachi participated in this study, providing valuable data crucial for analysis. To gather comprehensive information about the participants and their screen time habits, a demographic questionnaire was employed. The Pittsburgh Sleep Quality Index (Buysse, D.J. 1988) was utilized to evaluate the participants' sleep quality, while the COVID Stress Scale (Tayler et al., 2020) served as a measure of the stress experienced by students during the ongoing pandemic. The findings of this research revealed compelling insights into the relationship between stress levels during the pandemic and the sleep quality of university students. Notably, the results indicated a negative correlation between pandemic-induced stress and the sleep quality of the participants. Furthermore, the study revealed a weak positive correlation between pandemic-related stress and increased screen-time usage among university students. Additionally, a weak positive correlation was observed between screen-time usage and the Pittsburgh Sleep Quality Index. Significantly, the analysis also unveiled a noteworthy disparity in scores between male and female students on the Pittsburgh Sleep Quality Index, implying varied sleep quality experiences based on gender during this challenging period. In summary, the study underscores the significant impact of the pandemic on students, highlighting how the elevated stress levels have detrimentally affected their sleep quality and increased their reliance on screen-based activities. These findings offer valuable insights into the multifaceted challenges faced by students during these unprecedented times.

Keywords: Screen-Time, Sleeping Pattern, Pandemic Stress, University Students

1.Introduction

The present study aims to explore the correlation between screen time, sleeping patterns, and stress experienced by university students during the pandemic. While stress and sleep have been extensively defined in numerous

research studies over the years, the concept of screen time is relatively more recent compared to stress and sleep. It gained significance due to the recognized adverse effects associated with prolonged exposure to screen media. However, in this particular study, the focus isn't on extensively detailing these physiological effects. Instead, the primary objective is to ascertain the nature of the relationship among these variables. The study seeks to determine whether these factors are positively correlated, exhibit a negative association, or possess no discernible relationship with each other.

Peiro´-Velert et al.'s (2014) examination underscores the escalating concern surrounding the impact of screen media on individuals' daily routines, a subject that has garnered significant attention in the last decade. This heightened attention primarily stems from the pronounced health implications associated with screen usage practices. Notably, prolonged exposure to screens has been closely linked to disrupting energy balance, thereby heightening the risk factors for prevalent health issues like obesity (Crespo et al., 2001), cardiovascular ailments (Martinez-Gomez et al., 2011), and metabolic irregularities (Hardy et al., 2010) across various age groups within society.

Furthermore, empirical evidence strongly suggests that excessive screen time tends to encroach upon the time allocated for physical activity (Bercedo et al., 2005). For instance, a recent investigation by Foti, Eaton, Lowry, and McKnight (2011) demonstrated that adolescents who indulged in four or more hours of television viewing per day were more inclined to attain adequate sleep levels. Conversely, those who devoted at least two hours daily to activities like playing video games on a computer or engaging in non-school-related computer usage displayed a diminished likelihood of maintaining a consistent and healthy sleep pattern.

In contemporary discourse, the notion of screen time encompasses a spectrum of issues, spanning from calibration and assessment to correlation. The Oxford English Dictionary (2020) defines screen time as "time spent utilizing a device such as a computer, television, or gaming console." Conversely, the World Health Organization's latest guidelines pivot on the concern of sedentary screen time, categorizing it as "Time spent passively watching screen-based entertainment (TV, computer, smartphones), excluding active screen-based games requiring physical exertion or movement." Notably, the World Health Organization's delineation excludes screen activities like exergaming, credited with challenging the stereotype of gaming as a sedentary pursuit. This nuanced difference in definitions underscores the varied perspectives and considerations associated with screen time evaluation, wherein certain activities are excluded from assessments focusing on sedentary behaviors.

Data from the National Sleep Foundation's survey highlighted that as of 2011, up to 27% of Americans reported sleeping for under 6 hours per night (Carskadon, 2011). Recent surveys conducted in Australia indicated a decline in average sleep duration from 8 hours in 2000 to 7 hours in 2010 (Olds et al., 2010). There exists a prevalent trend among university students to stay awake until late at night and rise later in the morning. The number of sleeping hours among young adults in the United States has decreased over the past two decades. Particularly among medical students, the weight of academic responsibilities could potentially contribute to poor sleep quality, a trend observed in modern societies (Azad et al., 2015). These students often experience irregularities or poor sleep quality, characterized by shifting sleep schedules, notably later bedtimes on weekends, and shorter sleep durations during weekdays, leading to sleep deprivation on workdays.

The concept of screen time has evolved into a multifaceted issue encompassing aspects such as assessment, categorization, and its impact. Defined by the Oxford English Dictionary (2020) as "time spent using a device such as a computer, television, or gaming console," screen time, according to the latest guidelines from the World Health Organization, primarily concerns sedentary screen-based activities. It delineates this as "Time spent passively watching screen-based entertainment (TV, computer, smartphones), excluding active screen-based games requiring physical exertion or movement." This distinction highlights the complexity of evaluating screen time, where certain activities, such as engaging in physically demanding screen-based games, are excluded from assessments centered on sedentary behaviors.

Analysis from the National Sleep Foundation's survey revealed that in 2011, approximately 27% of Americans reported sleeping for less than 6 hours per night (Carskadon, 2011). Contrarily, recent studies conducted in Australia showcased a decline in the average duration of sleep, dropping from 8 hours in 2000 to 7 hours in 2010 (Olds et al., 2010). There appears to be a prevailing tendency among university students to maintain late-night

schedules and rise later in the morning. Over the past two decades, the duration of sleep among young adults in the United States has dwindled. Notably, the academic workload on medical students might contribute to compromised sleep quality, as observed in modern societies (Azad et al., 2015). These students often grapple with irregular sleep patterns, marked by later sleep timings on weekends and shortened sleep durations during weekdays, potentially leading to sleep deficits on workdays.

1.1 Operational Definition of the Terms

1.1.1 Screen-Time Use
Defined as the duration spent engaging with electronic media or utilizing electronic devices such as mobile phones, televisions, and personal computers. This encompasses the total time allocated to interacting with these devices for various purposes (Vizcaino, M., Buman, M., DesRoches, C. T, Wharton, C. M., 2019).

1.1.2 Sleep Quality
Refers to the quantitative and qualitative assessment of an individual's sleep patterns, including the duration of sleep obtained in a day and the time taken to fall asleep after getting into bed. It encompasses aspects related to both the duration and the subjective experience of sleep (Buyse, D.J, 1988).

1.1.3 Pandemic Stress
Represents the degree of heightened concern or anxiety experienced by an individual regarding the possibility of contracting the virus due to information obtained through various media sources. It reflects the emotional and psychological impact of the pandemic-related information on an individual's well-being (Taylor, S., et. al., 2020).

1.1.4 COVID-19
Refers to the illness caused by a novel strain of coronavirus. The term itself is an abbreviation, where 'CO' stands for corona, 'VI' for virus, 'D' for disease, and '19' signifying the year it was discovered (2019). Formerly known as '2019 novel coronavirus' or '2019-nCoV', this disease was officially named COVID-19 by the Centers for Disease Control and Prevention (CDC) in 2020.

1.2 Significance of the Study
The study works around the problematic behaviors of students regarding their sleep and stress during the pandemic. The examination attempts to find whether there is some significance in the relation between Sleep Quality and Stress during the Pandemic, and also with Screen-Time Using behavior. This helps to find the factor regarding sleeping problems among students. The studies also attempts to find if the Screen-Time disturbs the good quality of sleep among the students, as it is beneficial for them to have a good sleep for their good health (Mental as well Physical). While students also use such devices for academic purpose too. The current study will be helpful for the betterment of the students, as it seeks the Stress and Screen-Time usage will negatively impact the sleeping behavior of the students. It would be good to know if these behaviors affect the Sleep quality of students and then their maladaptive behavior may affect their academic career. Overall the current examination will be helpful not only for students but for their parents to control their habits and teachers also to focus on what should be done regarding the issue.

2. Literature Review
The role of the Internet in the academic lives of students, be it undergraduate or post-graduate, is deemed indispensable. Previous research strongly supports the idea that screen time usage significantly impacts the academic performance of adolescents (Busch et al., 2014). Additionally, texting while studying has been shown to detrimentally affect students' homework completion (Junco and Cotten, 2011).
Luke's study in 2016 highlighted students' perceptions of messaging as a disruptive and excessive habit,

contributing to poor sleep hygiene. Specifically, the ease of access to the Internet, more than the devices themselves, emerged as a major factor causing distraction. Interestingly, students acknowledged the positive effects of screen use, such as enhanced accessibility and connectivity. Recognizing this duality necessitates finding a balance. Participants consistently suggested self-control as a means to mitigate the negative aspects of screen time usage.

While prior research has advocated for interventions to aid students in better managing their time and mental workload (Junco and Cotten, 2011), participants in this study identified practical ways they and others intend to exercise restraint. Their insights bridge an existing information gap by offering pragmatic suggestions and tools to tackle this burgeoning issue. While somewhat intuitive, these findings underscore the necessity for increased awareness and mindfulness in regulating screen-time usage (Kaye, Orben, Ellis, Hunter, & Houghton, 2020).

A study conducted in Saudi Arabia revealed a negative correlation between staying up late, reduced overall nighttime sleep, daytime sleepiness, and poor academic performance among university students (Bahammam AS, et al., 2012). Another investigation indicated that 21% of poor sleepers experienced academic failure within a year, while only 11% of regular sleepers encountered similar issues (Curcio, et al., 2006). Overall health conditions significantly impact sleep quality, with stress being identified as the most prevalent factor.

2.1 Problem Statement

There are many studies done on students in past. Many of which are focused on the problems of students regarding their sleep quality. Because it is proven that sleep does not only affect your physical health but mental health as well. Apart from sleep one of the major problems of students is the use of electronic devices whether it is for educational purpose or just for entertainment only. For that the use of electronic media is also have frown day by day. In the race of using electronic media students are not behind any other users of such devices. From almost 30 years of academic researches, researchers are also trying to find the impact of these media on student's social life, academic life and overall health conditions also.

Stress can be found common in almost every individual. Specifically in educational institutes stress is much seen in students as well teachers. It is a common factor in everyone's life, people have felt stress in more than one situation in their life. In students it is inevitable as there are several deadlines to meet in single semester.

In the situation of pandemic the people all around the globe felt panic and were also restricted to their houses unless necessary to go out. In this situation the electronic media was the only way of connection with loved ones.

No doubt in situation like this everyone was stress and concern oneself or the other. With restrictions, the media was only way of learning or entertaining. Although without much activities it was also difficult maintain sleeping routine.

2.2 Research Objectives

The following are the objectives for the present study:
- To examine the Screen-Time usage among students of University of Karachi
- To examine the Sleep Quality among students of University of Karachi
- To examine the Level of Stress faced by students during the Pandemic
- To find the relationship between Screen-Time usage, Sleep Quality and Stress during the Pandemic among students of University of Karachi
- And finally to find the difference on the basis of gender between Screen-Time, Sleep Quality and Stress.

2.3 Research Hypothesis

From the literature review following four hypotheses was made:

H1: There would be positive correlation between Pittsburgh Sleep Quality Index and COVID Stress Scale.

H2: There would be positive correlation between Pittsburgh Sleep Quality Index and Screen-Time Usage.

H3: There would be positive correlation between COVID Stress Scale and Screen-Time Usage.

H4: There would be difference among the scores of male and female students on both scales.

3.Methodology

This study adopts a quantitative correlational approach to investigate the interrelationship among screen time usage, sleep quality, and stress levels during the COVID-19 pandemic. The research focuses on students enrolled at the University of Karachi. Data collection occurred during a brief period when the university was open (9th November to 19th November, 2020). Statistical analyses, including Pearson correlation and t-tests, were conducted using SPSS version 25.00 to explore the obtained data.

3.1 Sample

The study encompassed a randomly selected sample of 130 University of Karachi students, comprising 72 males and 58 females. Participants were drawn from various faculties within the university, with ages ranging from 17 to 26.

3.2 Measurement Tools

3.2.1 COVID-19 Stress Scale

A 36-item scale developed by Steven Taylor et al. (May 2020) to assess stress levels associated with the COVID-19 pandemic. The scale includes 6 subscales: Danger, Socio-economic Consequences, Traumatic Stress, among others. For this study, 3 subscales (Xenophobia, Contamination, Compulsive Checking) were omitted. The scale demonstrated a reliable test-retest reliability of 86.4 Cronbach's alpha.

3.2.2 Pittsburgh Sleep Quality Index (PSQI)

Utilized to evaluate students' sleeping patterns, this self-report questionnaire comprises 19 items and produces 7 components, yielding a global score. Developed in 1988 by Buysse and colleagues at the University of Pittsburgh, the PSQI captures various aspects of sleep, such as subjective sleep quality, sleep latency, sleep duration, among others. Each item is scored on a 0–3 interval scale, with the global PSQI score ranging from 0 to 21, where lower scores signify better sleep quality. The scale demonstrated high reliability (Cronbach's alpha of 91.7) and accuracy (81.2).

3.3 Procedure

To conduct this research, questionnaires were disseminated among students at the University of Karachi using a random sampling method. All participating students were provided with the necessary questionnaires and instructions, and they willingly contributed their responses. Prior to their involvement, all participants received a comprehensive overview of the study's significance. They were encouraged to seek clarification or pose any questions pertaining to the statements within the scales to ensure their understanding.

Upon completion of the data collection phase, rigorous analysis was undertaken using statistical methods. Correlation analysis and t-tests were performed utilizing SPSS version 25.00 to examine the collected data, unveiling correlations between variables and identifying potential significant differences between groups.

4.Results

4.1 Correlation Analysis

Table 1: Correlation Analysis

Scales	M	SD	1	2	3
1. Screen Time Usage	2.65	1.218	1	.012	.012
2. COVID-19 Stress Scale	29.36	13.033	-	1	.357[**]

| 3. Pittsburg Sleep Quality Index | 5.29 | 2.830 | | 1 |

**. Correlation is significant at the 0.01 level (2-tailed).

In Table 1, the Pearson correlation analysis reveals that there exists a statistically significant positive relationship (p < 0.01) between the COVID-19 Stress Scale and the Pittsburgh Sleep Quality Index. This indicates that as stress levels related to the COVID-19 pandemic increase, sleep quality tends to decrease, or conversely, as stress levels decrease, sleep quality tends to improve among the participants in this study.

However, the correlation between Screen Time Usage and both the COVID-19 Stress Scale and Pittsburgh Sleep Quality Index is deemed very weak (0.012) and not statistically significant. This suggests an absence of a substantial linear relationship between screen time usage and stress levels or sleep quality within this sample of 130 individuals.

Therefore, while a significant association exists between COVID-19 stress and sleep quality among the participants, the findings indicate that screen time usage does not demonstrate a noteworthy correlation with either stress levels or sleep quality in this particular study.

4.2 Descriptive Statistics

Table 2.1: Descriptive Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Screen Time Use	Male	72	2.53	1.198	.141
	Female	58	2.81	1.235	.162
COVID-19 Stress Scale	Male	72	27.85	12.725	1.500
	Female	58	31.24	13.275	1.743
Pittsburg Sleep Quality Index	Male	72	4.72	2.502	.295
	Female	58	6.00	3.067	.403

4.3 Independent Sample T-Test

Table 2.2: Independent Samples Test

	t-test for Equality of Means					
					95% Confidence Interval of the Difference	
	t	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Screen Time Use	-1.318	.190	-.283	.214	-.707	.141
COVID-19 Stress Scale	-1.483	.141	-3.394	2.289	-7.923	1.135
Pittsburg Sleep Quality Index	-2.617	.010	-1.278	.488	-2.244	-.312

4.3.1 Screen Time Usage
The t-test reveals a non-significant difference between male and female groups in Screen Time Usage (t = -1.318, p = 0.190). Although there's a slight negative mean difference (-0.283), suggesting lower screen time use in males, this difference is not statistically significant. The 95% Confidence Interval (-0.707 to 0.141) includes zero, indicating a lack of significant difference between the groups.

4.3.2 COVID-19 Stress Scale
Similarly, the t-test indicates no statistically significant difference in COVID-19 Stress Scale scores between male and female groups (t = -1.483, p = 0.141). Despite a negative mean difference (-3.394) favoring slightly lower stress scores in males, the 95% Confidence Interval (-7.923 to 1.135) includes zero, signifying a non-significant difference between the groups.

4.3.3 Pittsburgh Sleep Quality Index
In contrast, a statistically significant difference is found in Pittsburgh Sleep Quality Index scores between male and female groups (t = -2.617, p = 0.010). The negative mean difference (-1.278) indicates lower sleep quality scores in males. The 95% Confidence Interval (-2.244 to -0.312) does not include zero, confirming the statistical significance of the difference in sleep quality between the two groups.

These results suggest that while there's no significant difference in Screen Time Usage and COVID-19 Stress Scale scores between male and female participants, a significant difference exists in the Pittsburgh Sleep Quality Index scores, with males demonstrating lower sleep quality compared to females.

4.4 Discussion
The COVID-19 pandemic has profoundly reshaped the daily lives of university students, presenting challenges that extend far beyond academic realms. This study delves into the intricate relationships among sleep quality, COVID-19 stress, screen-time usage, and gender, offering illuminating insights drawn from existing research to provide a comprehensive understanding.

The first hypothesis aimed to establish a positive correlation between sleep quality, assessed by the Pittsburgh Sleep Quality Index (PSQI), and levels of COVID-19-induced stress. Our analysis yielded a statistically significant positive correlation (r = 0.357**, p < 0.01) between these variables. This outcome mirrors previous research findings highlighting the close association between heightened stress and compromised sleep quality.

Numerous studies have consistently emphasized how increased stress levels, particularly during crises, disrupt sleep patterns, resulting in poorer sleep quality (Altena et al., 2020). These findings underscore the imperative of acknowledging and addressing the pandemic's psychological toll on university students. Implementing interventions targeted at stress reduction and sleep enhancement can significantly bolster overall well-being during these trying times.

Although Hypothesis 2 suggested a positive correlation between sleep quality (PSQI) and screen-time usage, our analysis revealed an exceedingly weak and non-significant association (r = 0.012, p = 0.190) between these variables. Contrary to common belief, our findings highlight the nuanced nature of the relationship between screen time and sleep quality.

Emerging evidence suggests that the impact of screen time on sleep quality is influenced by individual habits and sleep patterns. While excessive screen exposure, especially before bedtime, can disrupt sleep due to factors like blue light exposure and cognitive stimulation (Hale & Guan, 2015), individual differences play a crucial role in shaping this impact.

Similarly, Hypothesis 3 proposed a positive correlation between COVID-19 stress levels and screen-time usage. However, our analysis revealed a minimal and non-significant correlation (r = 0.012, p = 0.190) between these variables. This indicates that, on average, screen-time usage did not significantly influence reported COVID-19 stress levels among students.

These results emphasize the complexity of the relationship between screen-time usage and stress, influenced by diverse screen activities and individual coping strategies (Primack et al., 2017). While some students may use screens as coping mechanisms or to alleviate social isolation, others might experience stress due to constant exposure to pandemic-related information online.

In exploring gender-based disparities in sleep quality, COVID-19 stress levels, and screen-time usage (Hypothesis 4), the analysis revealed a significant gender difference in sleep quality (t = -2.617, p = 0.010). Female students reported higher sleep quality scores than male students, consistent with prior research demonstrating superior sleep quality among females.

Studies consistently highlight gender differences in sleep patterns, with females often exhibiting better sleep quality and lower disturbances compared to males (Leger et al., 2012). These variations may be attributed to hormonal differences and sleep architecture.

However, no significant gender disparities were observed in COVID-19 stress levels or screen-time usage. This underscores the necessity of considering various facets of well-being and evaluating the potential effectiveness of gender-specific interventions in addressing sleep-related issues.

5. Conclusion

This study sought to explore the correlations between sleep quality, stress, and screen-time among University of Karachi students amid the pandemic. Our analysis uncovered a noteworthy inverse relationship between sleep quality and stress levels among participants. Moreover, a significant disparity in the Pittsburgh Sleep Quality Index scores emerged between male and female participants, indicating poorer sleep quality predominantly among female students.

Additionally, the investigation revealed a non-significant positive relationship between stress and screen-time, suggesting that heightened stress levels were not significantly linked to increased screen-time usage. Similarly, no substantial correlation was found between screen-time and sleep quality (PSQI).

The overarching conclusion drawn from this research underscores the prevalence of sleeping difficulties experienced by University of Karachi students, especially in stressful circumstances like the ongoing pandemic. Female students, in particular, exhibited a notable propensity for poorer sleep quality compared to their male counterparts.

Furthermore, our research aimed to elucidate the impact of stress on sleep quality, unveiling a significant negative relationship. This indicates that prolonged exposure to stressful situations, such as those precipitated by the pandemic, detrimentally affected the sleep quality of students.

Regarding the association between screen-time and sleep quality, the absence of a significant correlation was attributed to students' reliance on conventional academic resources, such as handouts and books, rather than exclusive dependence on screen media for their studies. This suggests that screen-time might be more closely associated with social media usage rather than academic activities among the student population in this study.

These findings underscore the intricate dynamics among stress, sleep quality, and screen-time usage among University of Karachi students during challenging periods. Further investigations could delve into specific screen-based activities and their distinct impact on sleep patterns to devise targeted interventions for improving sleep quality amidst stressful circumstances.

5.1 Limitations and Suggestions

The present study was confined solely to the University of Karachi, and data collection during the pandemic presented considerable challenges. As a result, our study sample was limited to 130 undergraduate participants. Future research in this domain should aim for larger sample sizes, encompassing diverse university populations, including both undergraduate and postgraduate students. Ensuring an equal gender distribution among participants would enhance the validity and generalizability of results.

The study revealed a correlation between heightened stress levels and sleep-related problems among students, particularly in unprecedented situations like a pandemic-induced shutdown of educational institutions. This

cessation of educational activities and the confinement of students to their homes significantly impacted their routine and mental well-being.

To address these issues, proactive measures should be taken by parents and educators to introduce programs conducive to students' well-being. Implementing activities, especially physical ones, that engage students can divert their focus from excessive screen media usage to healthier pursuits. These activities not only assist students in coping with stressful circumstances but also contribute to improving their sleep quality.

Encouraging physical exercise not only supports mental health but also aids in regulating sleep patterns. Such interventions could be structured within educational curricula or extracurricular programs, fostering a holistic approach to student well-being.

In summary, future research endeavors in this domain should expand beyond singular university settings, encompassing diverse student populations. Additionally, proactive measures introduced by parents and educators, incorporating physical activities and alternative engagements, can effectively mitigate the negative impact of stressful situations on students' sleep quality and mental health.

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