

Sleep Disorders Prevalence and Impact on university Students in Saudi Arabia

**Alashary Adam Eisa Hamdoon, Yazan Alsaab, Ziad Al-Maliki, Mohammed Rawas, Abdulrahman
AlAbbas, Anas Dablood.**

Department of public health, College of health sciences at AlLeith, UmmAl-Qura University, Kingdom of Saudi Arabia

ABSTRACT: Sleep is essential for various aspects of human life, significantly affecting cognitive abilities, emotional regulation, and physical health. In Saudi Arabia, university students face increased sleep disruption due to academic pressures, daily routines, and reliance on electronic devices. This study analyzes sleep disorders in this demographic, emphasizing both behavioral and psychological factors through a quantitative cross-sectional method using a structured questionnaire. It included demographics, sleep patterns, caffeine consumption, and perceptions about sleep's impact on academic and personal performance. Results revealed that many students experience poor sleep quality, with approximately 75% reporting irregular sleep hours attributed to late mobile phone usage and blue light exposure. High caffeine intake particularly in the evening correlated with prolonged sleep onset and lower sleep satisfaction. Students with less than seven hours of sleep exhibited poorer academic performance and higher levels of anxiety and restlessness. Furthermore, nearly 40% reported anxiety or disturbing dreams, indicating a connection between emotional distress and insufficient sleep. Despite 77% acknowledging the benefits of adequate sleep for health, not all practiced healthy sleep habits. This highlights the urgent need for universities and health authorities to implement initiatives promoting healthy sleep behaviors. Recommendations include minimizing screen time before bed, reducing caffeine intake in the evening, and establishing regular sleep routines to enhance academic performance, emotional well-being, and overall health. The study concludes that sleep quality is crucial for mental wellness, academic success, and life satisfaction, reinforcing the importance of fostering healthier sleep habits among students.

KEYWORDS: Sleep Disorders, public health, university Students, Saudi Arabia.

I. INTRODUCTION

Sleep is a vital biological necessity affecting all aspects of human health, facilitating energy restoration, hormone regulation, memory consolidation, and emotional stability. However, contemporary lifestyle changes have markedly hindered adequate sleep, particularly among university students, who face challenges from academic pressures, social expectations, digital media exposure, and erratic routines. Research indicates a significant prevalence of sleep issues in Saudi university students, with high percentages reporting poor sleep quality and insomnia symptoms. Factors contributing to sleep disturbances include late-night smartphone use, blue light exposure, and caffeine consumption, which are associated with reduced melatonin production and prolonged sleep latency. The consequences of insufficient sleep extend to serious health concerns such as obesity and cardiovascular disease, as well as psychological issues like anxiety and diminished academic performance. Despite awareness of sleep's importance for well-being, many students neglect proper sleep, highlighting the need for strategies to improve sleep practices among this demographic. This research aims to investigate the impacts of poor sleep quality on health and academic success, with the goal of proposing recommendations for enhancing sleep habits and overall well-being.

II. MATERIALS AND METHODS

This study employs a cross-sectional quantitative design to explore the relationship between sleep quality and general health among university students in Saudi Arabia. It involves a diverse sample size of approximately 200-300 participants, selected randomly. Data collection is conducted through a structured questionnaire covering demographics, sleep quality (using the Pittsburgh Sleep Quality Index), health and lifestyle factors, and psychological aspects (measured via the DASS21 scale). The questionnaire is distributed electronically, ensuring participant confidentiality and informed consent. Data analysis is performed using SPSS version 26, employing descriptive and

inferential statistics with a significance level set at less than 0.05. The study adheres to ethical standards, is approved by the University's Research Ethics Committee, and allows participants to withdraw at any time.

III. LITERATURE REVIEW

III.I. Definition of Sleep

Scientific studies define sleep as a biological and cyclical state characterized by reduced sensory activity and partial disconnection from the external environment, while maintaining vital neural and hormonal regulation within the brain. Walker (2017) emphasized that sleep is a physiological necessity as vital as eating or breathing, allowing the body to restore both physical and cognitive energy. Other studies have shown that regions such as the brainstem and thalamus play critical roles in the transition between wakefulness and sleep.

III.II. The importance of sleep

A considerable body of research has examined the significance of sleep in supporting cognitive, emotional, and physiological functions. Durmer and Dinges (2005) found That sleep deprivation negatively impacts attention, decision- making, and working memory. Van Cauter and Spiegel (1999) demonstrated that adequate sleep is essential for maintaining hormonal balance and immune function, while Killgore (2010) concluded that sleep quality directly influences performance in daily tasks and higher-order mental processes.

III.III. Sleep stages

The foundational classification of sleep stages was proposed by Rechtschaffen and Kales stages (2011) Facilitates (1968) and later revised by the American Academy of Sleep Medicine (2007). These are typically divided into non-rapid eye movement (NREM) sleep—which includes N1, N2, and N3—and rapid eye movement (REM) sleep. Carskadon and Dement highlighted that each stage serves different restorative functions: NREM sleep physical recovery, while REM sleep is essential for learning and memory consolidation.

III.IV. Brain Activity During Sleep

Neuroimaging studies, such as those conducted by Maquet (2000), have shown that the brain remains highly active during sleep, particularly in REM stages, when emotional processing and memory integration occur. Diekelmann and Born (2010) further demonstrated that sleep supports the reorganization and consolidation of knowledge by reactivating neural networks involved in learning during wakefulness.

III.V. The Role of Hormones in Regulating Sleep

Research has established that melatonin, secreted by the pineal gland, plays a fundamental role in regulating the sleep-wake cycle (Brzezinski, 1997). Additionally, hormones such as cortisol and growth hormone influence metabolism and energy restoration during deep sleep (Van Cauter et al., 2000). These findings emphasize the endocrinological integration necessary for maintaining healthy sleep architecture.

III.VI. The Biological Clock and Its Role in Sleep

According to Czeisler et al. (1999), the human circadian rhythm, controlled by the suprachiasmatic nucleus (SCN) in the hypothalamus, regulates daily biological activities, including the timing of sleep and wakefulness. Reppert and Weaver (2002) found that environmental cues such as light exposure and temperature significantly influence circadian rhythm synchronization, thereby impacting sleep quality and duration.

III.VII. Causes of Sleep Delay

Cainand Gradisar (2010) reported that excessive use of electronic devices—especially before bedtime—can delay sleep onset due to blue light exposure that suppresses melatonin secretion. Similarly, Exelmans and Van den Bulck (2016) identified psychological factors such as stress and anxiety as contributors to delayed sleep, suggesting a strong link between emotional state and circadian misalignment.

III.VIII. Sleep Disorders

Research on sleep disorders has identified multiple conditions that disrupt sleep quality, including insomnia, sleep apnea, narcolepsy, and restless leg syndrome. Sateia (2014) highlighted that such disorders are associated with cardiovascular disease, mood disorders, and decreased cognitive function. The American Academy of Sleep Medicine

(2014) emphasized early diagnosis and behavioral interventions as key strategies for improving sleep and overall health.

III.IX. Sleep Contraindications and Factors Affecting Sleep Quality

Studies have identified several factors that negatively affect sleep quality. Goel et al. (2009) demonstrated that stimulants such as caffeine and nicotine interfere with normal sleep cycles. Prolonged light exposure and irregular bedtime routines further exacerbate poor sleep quality. Hirshkowitz et al. (2015) confirmed that unhealthy daily habits—such as lack of physical activity or inconsistent sleep schedules—lead to chronic sleep insufficiency and physiological fatigue.

III.X. Factors Influencing Sleep Quality

Sleep quality is influenced by both internal factors, such as physical pain, stress, mental health issues, and chronic conditions, and external factors, including inconsistent sleep schedules and poor sleep environments. Internal challenges like anxiety and depression disrupt patterns, while external elements like blue light exposure, caffeine, and environment negatively impact restorative sleep. Additionally, shift work and certain medications can worsen insomnia.

III.XI. Relationship between Psychological State and Sleep Quality

The connection between sleep and mental health is bidirectional, meaning that psychological wellbeing influences sleep and vice versa. Conditions such as depression and anxiety often lead to insomnia or fragmented sleep, while persistent stress triggers overthinking and emotional tension that delay sleep onset. On the other hand, adequate and restorative sleep supports emotional regulation and the processing of memories, particularly during REM sleep. Sleep deprivation reduces the brain's ability to manage emotions and may worsen symptoms of mood disorders. Interventions such as Cognitive Behavioral Therapy for Insomnia (CBT-I) have been shown to improve both sleep quality and psychological health.

III.XII. Dream Disorders and Nightmares

Nightmare disorder involves recurrent, disturbing dreams that cause distress and awaken the sleeper, often occurring during the REM phase in the latter part of the night. These dreams are vivid and can be recalled clearly upon waking. Nightmare disorders may vary in duration and frequency and are often linked to mental health conditions such as post-traumatic stress disorder, anxiety, and depression. In contrast, night terrors occur during nonREM sleep, usually in the first half of the night, and are characterized by intense fear or screaming, with little or no recollection afterward.

III.XIII. Sleep as a Medical Subspecialty

Sleep medicine is a recognized subspecialty focused on diagnosing and treating sleep-related disorders. It integrates several fields including internal medicine, neurology, psychiatry, pediatrics, and otolaryngology. Physicians trained in sleep medicine evaluate, monitor, and manage various sleep disturbances such as insomnia, narcolepsy, sleep apnea, and circadian rhythm disorders. They employ diagnostic tools like polysomnography and provide treatments ranging from behavioral therapy and medication to medical devices. To become board-certified, doctors typically complete at least one year of fellowship training after residency in their primary specialty.

III.XIV. Tips to Improve Sleep Quality

Improving sleep quality involves both behavioral and psychological factors affecting the sleep-wake cycle. A consistent bedtime and wake-up routine help regulate the body's internal clock, leading to better rest and sleep satisfaction. Students with regular sleep schedules are more likely to have restorative sleep, while sufficient sleep duration (six to seven hours) is linked to better concentration and academic performance. Proper sleep hygiene, effective time management, and regular physical activity can aid in managing study demands. Additionally, addressing psychological factors like worry and depressive moods is crucial for enhancing sleep, emphasizing the need for stress management and mental well-being.

III.XV. overview of university students in Saudi Arabia

Research conducted among university students in Saudi Arabia reveals a high prevalence of poor sleep quality and insufficient sleep duration, particularly during academic semesters. A cross-sectional study among medical students at King Khalid University reported that approximately 88 percent of participants experienced poor sleep quality. Sleep duration tends to decrease notably during the academic term compared to vacation periods. For instance, female

students at a university in Riyadh averaged nearly nine hours of sleep during the summer, but this declined to just over seven hours by the fourth week of the academic year. Persistent sleep deprivation, defined as sleeping fewer than seven hours per night, has been associated with increased risks of psychological distress and decreased academic performance. Students who sleep less than six hours typically show reduced concentration, daytime fatigue, and lower academic productivity. These findings emphasize that inadequate sleep is both a widespread and concerning issue among Saudi university students.

III.XVI. Financial and Living Aspects

Financial and living aspects are significant factors that can directly or indirectly affect the sleep quality and general health of university students. Financial pressures, such as tuition and living costs, can lead to increased stress and anxiety levels, negatively impacting sleep patterns [1]. Although the study by Alomri et al. (2024) [1] did not directly address financial and living aspects, it indicated that factors such as lifestyle and socioeconomic status might influence the prevalence of excessive daytime sleepiness among students. Similarly, the study by Alasimi et al. (2025) [2] did not explicitly cover these aspects, But demographic and socioeconomic factors are often interrelated and affect general health and sleep patterns.

III.XVII. Academic Life

Academic life significantly pressures university students, impacting sleep quality and academic performance. A study by Alomri et al. (2024) found a correlation between sleep disorders, like excessive daytime sleepiness and insomnia, and lower GPAs among Saudi students. Students with these conditions exhibited notably lower GPAs compared to peers without them. Additionally, those with Restless Legs Syndrome (RLS) struggled to achieve higher grades. Similarly, Alasimi et al. (2025) confirmed insomnia's detrimental effect on GPA in respiratory therapy students across Saudi Arabia and the U.S., indicating that insomnia hinders academic success and educational attainment.

III.XVIII Aspirations and Future of University Students

The aspiration and future of university students are significantly influenced by their Sleep quality and general health. Many students worry about securing employment in a competitive job market, which increases their stress levels [1]. Sleep disorders can lead to mental health problems, affecting students' ability to achieve their academic and professional goals [1]. The study by Alomri et al. (2024) [1] emphasized the importance of sleep awareness programs, providing resources for sleep management, and encouraging consistent sleep schedules to improve students' academic performance and overall well-being. The study by Alasimi et al. (2025) [2] also recommends targeted interventions to support healthy sleep habits and academic well-being among students.

III.XIX. The Concept of Public Health

Public health is defined as the science and art of preventing disease, prolonging life, And promoting physical and mental health through organized community efforts (Winslow,1920). In the context of university students, public health encompasses physical, mental, and social wellbeing, which are influenced by various factors, including sleep quality. Adequate and good quality sleep is essential for maintaining public health, and any disturbance in it can lead to negative health consequences [1, 2].

III.XX. The Effect of Lack of Sleep on Human Health

Lack of sleep leads to a wide range of negative effects on human health. It can weaken The immune system, making individuals more prone to infections [1]. It also increases the risk of cardiovascular diseases, high blood pressure, diabetes, and obesity [1]. On the mental health front, lack of sleep is associated with an increased risk of depression, anxiety, and other mood disorders, as well as impaired concentration, memory, and cognitive abilities [1, 2]. Insufficient sleep impairs the regular performance of brain functions, leading to compromised attention, memory retention, decisionmaking capabilities,problem-solving skills, and critical thinking [2].

III.XXI Diseases That Affect Sleep Quality

Several health conditions such as Obstructive Sleep Apnea, Restless Legs Syndrome, and chronic insomnia significantly impair sleep quality. Research indicates high prevalence rates of these disorders among Saudi university students, with insomnia affecting 78.4% and excessive daytime sleepiness at 56.6%. Psychological factors like stress, anxiety, and depression also play a crucial role in sleep quality, exacerbated by academic pressures. Studies show that health science students are particularly vulnerable due to their heavy academic burdens and lifestyle stresses.

III.XXII. The social and environmental impact on sleep

Sleep is significantly influenced by various social and environmental factors, particularly for university students who often face poor sleep quality due to academic pressures, social activities, and lifestyle choices. Stress related to academic performance and irregular sleep schedules can negatively affect sleep hygiene, while external factors such as noise, light exposure, and the use of electronic devices before bedtime frequently disrupt sleep patterns.

III.XXIII. Regarding sleep and mental health

There is a bidirectional relationship between sleep and mental health, where poor sleep quality is linked to issues such as anxiety and depression. Individuals with mental health conditions often experience sleep disturbances, and insufficient sleep can exacerbate feelings of irritability, anxiety, and depression, ultimately impacting overall psychological well-being.

III.XXIV. Sleep is crucial for brain health

Sleep plays an essential role in maintaining healthy cognitive functions, including memory, attention, and decision-making. Sleep deprivation can impair these processes, leading to decreased academic performance, while adequate sleep supports memory consolidation and emotional regulation.

III.XXV. In terms of disease prevention

Insufficient sleep is associated with various health risks, including obesity, diabetes, cardiovascular diseases, and weakened immune function. Chronic sleep deprivation can lead to long-term health problems, emphasizing the importance of proper sleep for overall health maintenance and its value as a preventive tool in modern healthcare strategies.

III.XXVI. Improvement strategies for maintaining overall health

Improving sleep-hygiene is a key strategy for maintaining good health. This includes keeping a consistent sleep schedule, creating a restful sleep environment, and reducing screen time before bed. Interventions such as cognitive-behavioral therapy for insomnia and educational programs on sleep hygiene can significantly benefit individuals experiencing sleep difficulties.

III.XXVII. Sleep quality is directly linked to quality-of-life indicators

Good-sleep quality has strong positive impacts on life satisfaction, well-being, and overall health. Conversely, poor sleep can reduce quality of life and increase stress levels. Longitudinal studies indicate that improvements in sleep quality are associated with enhanced life satisfaction and psychological well-being.

III.XXVIII Age differences in the effect of sleep

Research reveals that sleep needs and patterns vary across age groups. Younger adults, particularly university students, typically report more sleep difficulties than older adults, influenced by lifestyle and academic pressures. As individuals age, their sleep patterns may stabilize, yet they may encounter new challenges related to sleep quality.

III.XXIX. Sleep serves as a preventive tool in modern medicine

Research suggests that integrating sleep assessment and education into routine healthcare can improve overall health outcomes and reduce the risk of mental and physical health issues. Promoting good sleep hygiene and addressing sleep disorders should be a priority in health interventions, especially for high-stress populations like university students. The document underscores the critical role of sleep in various aspects of health and well-being, particularly among university students. Understanding and addressing these factors can lead to better health outcomes and enhanced quality of life.

IV. RESULTS

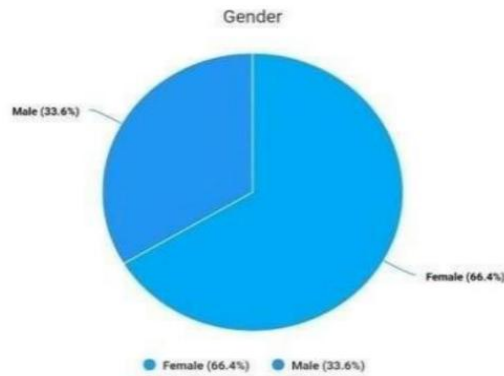


Fig1. The gender distribution analysis indicates a significant imbalance, with females making up 66.4% and males 33.6% of the sample. This suggests that the findings may predominantly reflect female perspectives, highlighting the need to consider gender differences in sleep patterns and behaviors when interpreting the results.

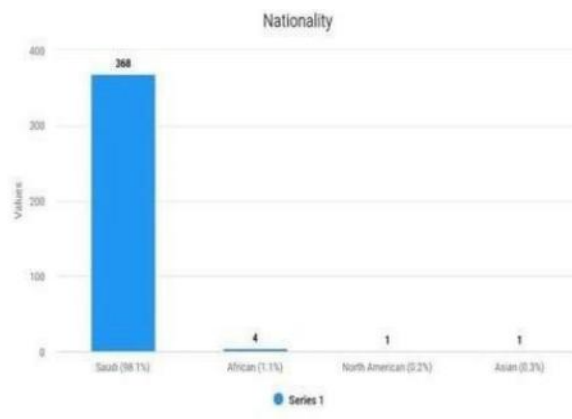


Fig 2. The Nationality distribution, indicates a pronounced and high level of homogeneity, with an overwhelming 98.1% of respondents being Saudi nationals (368 out of the total sample).

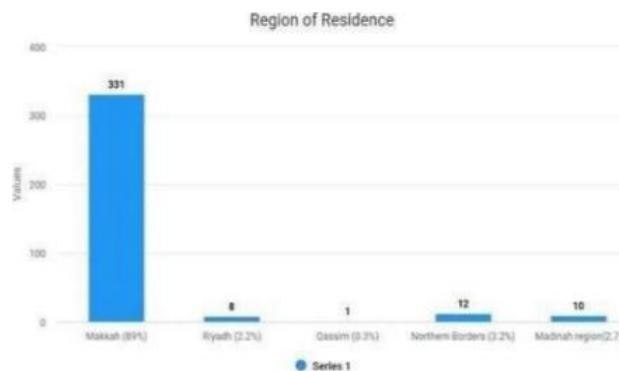


Fig 3. illustrates that 89% of respondents reside in the Makkah region, with only small percentages in other areas: Northern Borders (3.2%), Madinah (2.7%), Riyadh (2.2%), and Qassim (0.3%).

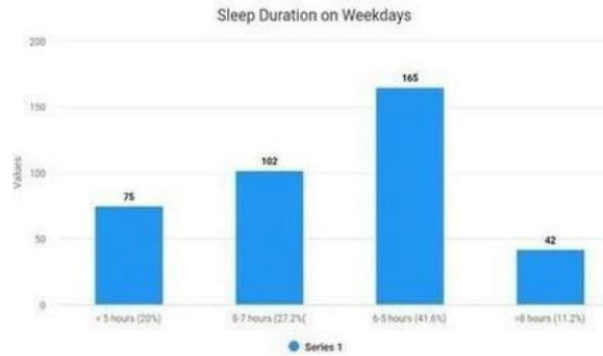


Fig 4. analyzes weekday sleep duration, revealing that 41.6% of respondents sleep between 6 to 7 hours, while 11.2% exceed 8 hours and 20% sleep less than 6 hours. Although most respondents fall within the recommended range, the 20% sleeping under 6 hours raises concerns about potential sleep deprivation.

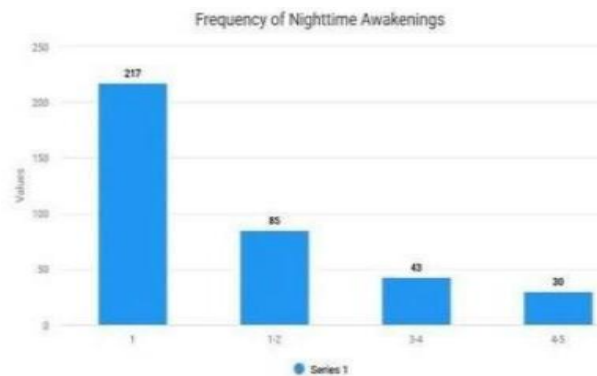


Fig5. The data shows that 90% of respondents wake up at least once during the night, with 65% waking up two or more times. This indicates a major issue with sleep continuity, as interrupted sleep prevents adequate deep sleep stages, leading to fatigue despite sufficient total sleep duration.

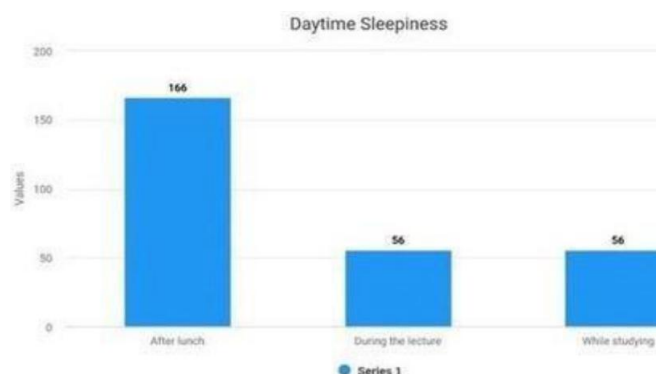


Fig 6. Daytime Sleepiness As depicted in the chart The majority of respondents (44.3%) report feeling sleepy after lunch, which is biologically Normal. However, 15% feel sleepy immediately after waking up, suggesting poor sleep Quality or insufficient rest, a condition known as sleep inertia.

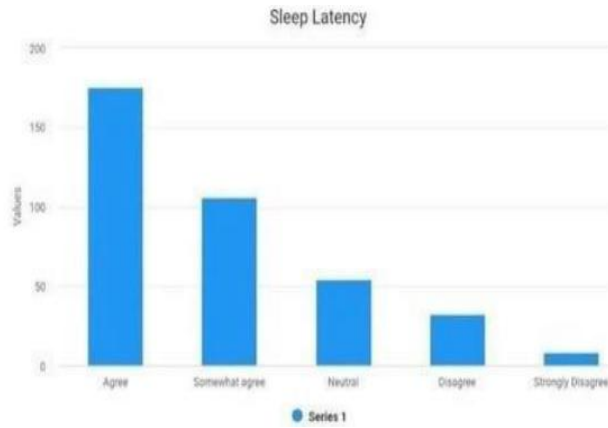


Fig7. Approximately 75% of respondents report difficulties falling asleep, indicating prolonged sleep latency, a primary symptom of insomnia, which aligns with other findings on sleep initiation challenges.

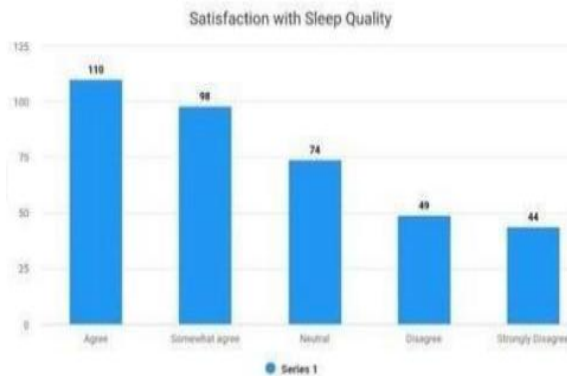


Fig8. Satisfaction with Sleep Quality As depicted this fig Analysis reveals that 41% of respond ensured is satisfied with their sleep quality, while Only 19.7% express satisfaction.

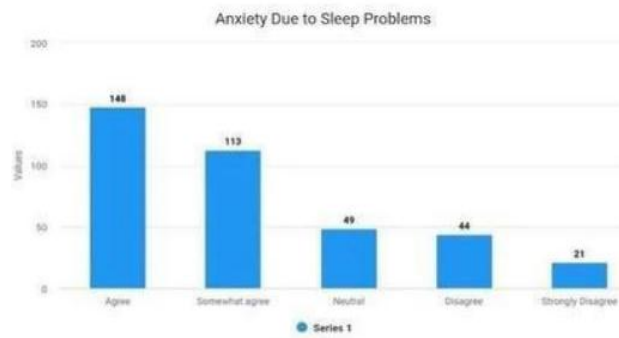


Fig9. Approximately 65.6% of respondents feel anxious due to sleep problems, highlighting the bidirectional relationship between sleep and mental health, where poor sleep contributes to anxiety and vice versa.

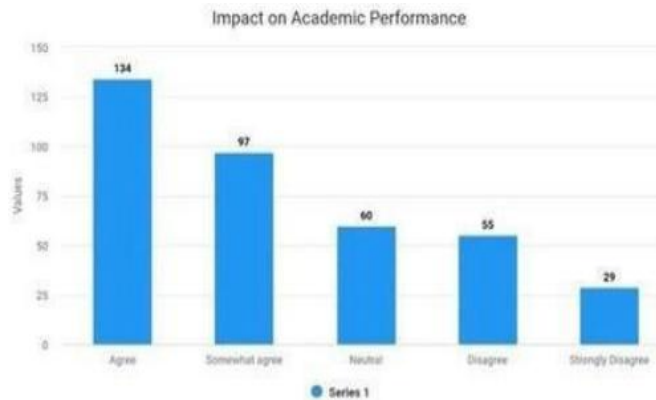


Fig10. Over 60% of respondents indicate that poor sleep quality has negatively impacted their academic performance, highlighting the importance of sleep among the student population surveyed.

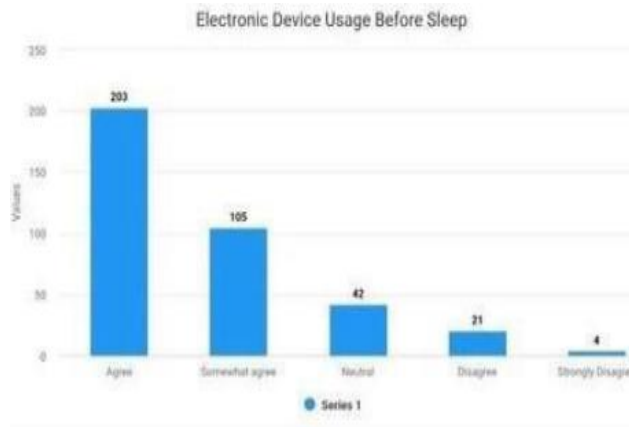


Fig11. indicates that a significant majority (82.1%) of individuals use electronic devices before sleep, contributing to sleep difficulties due to blue light's suppression of melatonin.



Fig 12. indicates that approximately 50% of the sample maintains a somewhat consistent sleep schedule, whereas 30% exhibit irregular patterns. These irregular sleep patterns can disrupt circadian rhythms and lead to sleep problems.

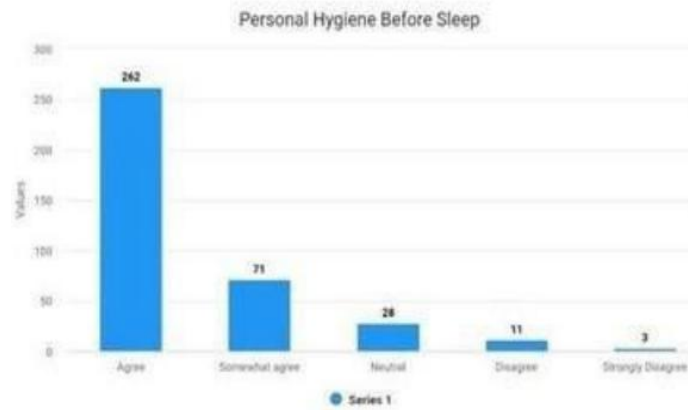


Fig13. Personal Hygiene Before Sleep As depicted in the fig Most respondents (88.8%) maintain personal hygiene before sleep, which can serve as a positive bedtime ritual promoting relaxation.



Fig14. Approximately 61.9% of respondents report experiencing awakenings due to nightmares, which are potentially linked to anxiety or stress and may lead to fragmented sleep.

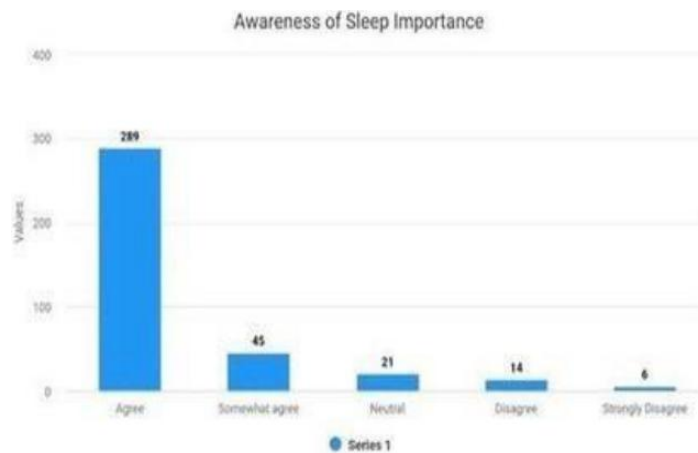


Fig15. Nearly 89.1% of respondents recognize the importance of getting at least eight hours of sleep for mental and physical health, yet their actual sleep behaviors reveal a gap between awareness and practice.

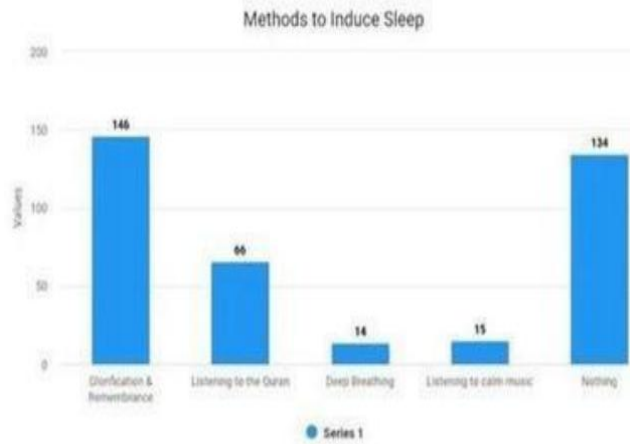


Fig16. Religious practices, including glorification and remembrance (38.9%) and listening to the Quran (17.6%), are the primary methods for inducing sleep, influenced by cultural factors. Notably, 35.7% of individuals do not use any specific method to aid sleep.

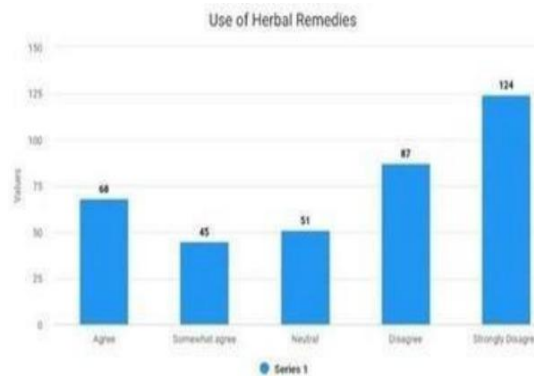


Fig 17. Use of Herbal Remedies as clearly depicted More than half of the respondents (56.3%) do not use herbal remedies to aid sleep, Indicating a preference for spiritual practices or no intervention over herbal solutions.

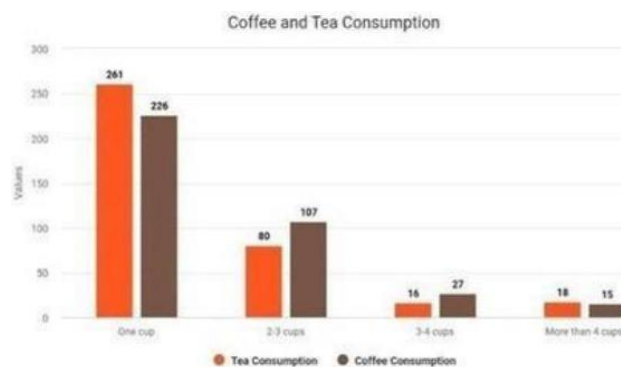


Fig 18. indicates that the majority of respondents consume moderate amounts of caffeine, with 60.3% drinking one cup of coffee and 69.6% drinking one cup of tea daily.

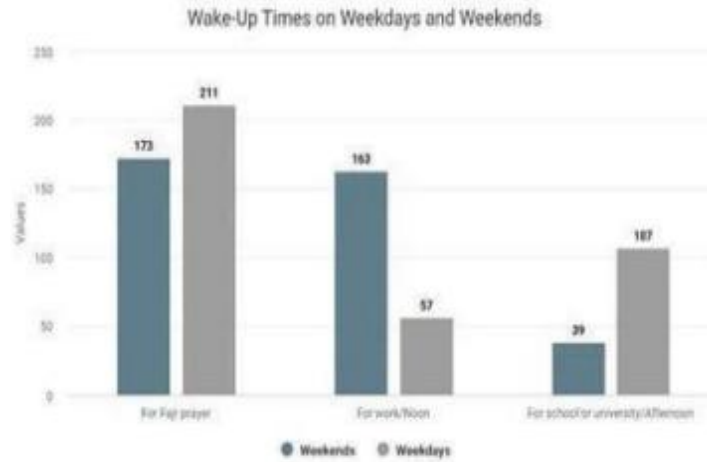


Fig 19. Wake-Up Times on Weekdays and Weekends as clearly depicted in this fig, Weekday wakeup times are primarily early for Fajr prayer (56.3%) or school/work obligations. On weekends, wake-up times vary significantly.

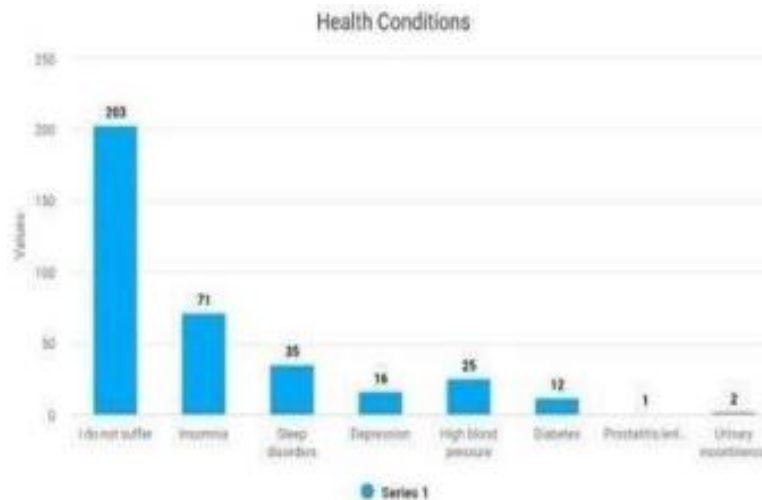


Fig 20. reveals that 28.2% of participants experience insomnia or other sleep disorders, whereas 54.1% indicate no health problems, emphasizing the notable impact of sleep-related issues within the sample.

V. DISCUSSION

The study reveals that many university students in Saudi Arabia suffer from moderate to poor sleep quality, echoing previous research. It establishes a strong association between poor sleep and mental health issues, particularly anxiety and depression. Pre-sleep behaviors, especially the use of electronic devices, are highlighted as significant risk factors for sleep quality. While students recognize the importance of sleep, their behaviors often do not align with this awareness. Factors like caffeine intake and technology use further disrupt sleep. Despite some limitations, such as reliance on self-reported data and a cross-sectional design, the study underscores the need for integrating sleep education and psychological support in health programs. Overall, it stresses that sleep health is vital for academic performance and emotional well-being.

VI. RECOMMENDATION

Stress management programs for college students should incorporate mindfulness, relaxation training, and cognitive-behavioral techniques to reduce perceived stress. Encouraging participation in meaningful activities, such as volunteering and mentorship, can enhance students' sense of purpose. Educational workshops focused on sleep hygiene are essential, promoting consistent sleep schedules and reducing screen time. Access to counseling services is crucial for addressing mental health and sleep-related issues, alongside the establishment of peer support groups. Regular assessments of student wellbeing and stress levels are necessary to identify those at risk and provide timely interventions. The study underscores that perceived stress negatively impacts sleep quality, emphasizing the need for universities to implement holistic mental health strategies to enhance overall student health and academic performance.

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