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The Interplay of Digital Fatigue, Sleep Quality, and Emotional Regulation among Adults: A Cross-Sectional Investigation

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Abstract

In the contemporary digital era, the extensive use of technology has significantly transformed daily life, particularly among adults who rely heavily on digital devices for work, communication, and entertainment. While digital platforms offer convenience and efficiency, excessive and prolonged usage has led to emerging concerns related to digital fatigue, sleep disturbances, and emotional well-being. This study aims to examine the interrelationship among digital fatigue, sleep quality, and emotional regulation, providing a comprehensive understanding of how these factors interact in modern lifestyles.

Digital fatigue, characterized by mental exhaustion, reduced concentration, and emotional strain, arises from continuous exposure to screens and information overload. This condition not only affects cognitive functioning but also contributes to unhealthy digital habits, especially during late hours. Such patterns negatively influence sleep quality by increasing sleep latency, reducing sleep duration, and causing frequent disturbances. Poor sleep, in turn, impairs emotional regulation, making individuals more susceptible to stress, irritability, and emotional instability. The study adopts an integrated approach to analyze these three constructs collectively rather than in isolation. It highlights the cyclical nature of their relationship, where digital fatigue leads to poor sleep, which subsequently affects emotional regulation, further reinforcing excessive digital engagement. The findings emphasize the need for balanced digital usage, improved sleep hygiene, and strategies to enhance emotional regulation among adults. By addressing these interconnected factors, individuals can achieve better mental health and overall well-being. The study contributes to the growing body of literature by presenting a holistic perspective on the impact of digital lifestyles, offering practical insights for healthier behavioral patterns in an increasingly technology-driven world.

Keywords: Digital Fatigue, Sleep Quality, Emotional Regulation, Screen Time, Mental Health, Digital Lifestyle, Sleep Disturbance, Well-being

Introduction

In recent years, digital technology has become an essential part of everyday life, with platforms like WhatsApp, Instagram, and Facebook shaping communication, work, and leisure activities. While these technologies offer convenience and connectivity, excessive screen use has led to emerging concerns related to digital fatigue, sleep disturbances, and emotional imbalance. Digital fatigue refers to mental and emotional exhaustion caused by prolonged engagement with digital devices. Continuous exposure to information, multitasking, and constant notifications increases cognitive load, reducing concentration and overall efficiency. At the same time, excessive screen use, especially during night hours, disrupts sleep quality by affecting natural sleep cycles and reducing restfulness. Sleep quality plays a crucial role in maintaining physical health, cognitive functioning, and emotional stability. Poor sleep can lead to irritability, reduced focus, and difficulty in emotional regulation. Emotional regulation, which involves managing and responding to emotions effectively, becomes weaker when individuals experience both digital fatigue and inadequate

sleep. These three factors digital fatigue, sleep quality, and emotional regulation are closely interconnected. Excessive digital use leads to fatigue, which negatively affects sleep, and poor sleep further impairs emotional control. This creates a continuous cycle impacting overall well-being.

The present study aims to examine the relationship among digital fatigue, sleep quality, and emotional regulation among adults, providing insights into how modern digital lifestyles influence mental and emotional health.

Key Concepts

- Digital Fatigue → Mental exhaustion due to screen overuse
- Sleep Quality → Duration, latency, disturbances, satisfaction
- Emotional Regulation → Ability to manage emotions effectively

Review of Literature

Alonzo et al. (2019) established a bidirectional relationship between sleep quality and emotional regulation, showing that poor sleep weakens emotional control while emotional difficulties further disrupt sleep patterns. The study supports reciprocal causation, and highlights sleep as a central psychological mechanism, though it does not include digital behavior variables.

Hisler and Twenge (2020) conducted a meta-analysis revealing a consistent negative relationship between screen time and sleep quality, including delayed sleep onset and reduced duration. While the study provides strong empirical support for the digital exposure–sleep link, it does not address emotional regulation or digital fatigue as psychological constructs.

Gupta et al. (2021) examined digital device use among Indian adults and found that excessive screen exposure significantly reduces sleep quality, leading to increased sleep latency and lower sleep satisfaction. However, the study focuses mainly on behavioral aspects and does not explore emotional regulation outcomes.

Marciano et al. (2022) highlighted that passive digital consumption, such as scrolling and browsing, is strongly associated with emotional exhaustion and psychological fatigue. The study supports the concept of digital fatigue but does not incorporate sleep quality or structured emotional regulation measures.

Liu et al. (2023) demonstrated that sleep quality mediates the relationship between smartphone addiction and emotional health, with higher digital dependence leading to poor sleep and increased emotional distress. However, the study focuses on addiction rather than broader constructs like digital fatigue.

Wang et al. (2024) found that poor sleep quality significantly predicts emotional dysregulation, including increased stress, impulsivity, and reduced cognitive control. The study supports the sleep–emotion pathway but does not consider digital fatigue as an influencing factor.

Supriyadi et al. (2025) conceptualized digital fatigue as a multidimensional psychological condition involving cognitive overload and emotional exhaustion due to prolonged digital exposure. While the study validates digital fatigue as a key construct, it does not integrate sleep quality or emotional regulation within a unified framework.

Research Methodology

The methodology of this study was designed to explore these variables within a quantitative research framework, allowing for the objective measurement and statistical analysis of relationships among variables. The study adopted a cross-sectional research design, wherein data were collected from participants at a single point in time. This design was particularly suitable for identifying patterns, associations, and correlations among variables without manipulating the research environment. By employing this approach, the study aimed to capture a realistic snapshot of how digital fatigue, sleep quality, and emotional regulation coexisted and interacted in the daily lives of adults.

Statement of the Research Gap

Recent clinical psychology research has highlighted the negative effects of prolonged digital engagement on well-being. Although previous studies have established links between digital use, sleep quality, and emotional functioning, these factors have mostly been examined separately. There is limited research exploring how sleep quality acts as a mediating factor between digital fatigue and emotional regulation among adults. This fragmented approach fails to capture the interconnected nature of modern digital life, where excessive screen use, poor sleep, and emotional challenges occur together. Therefore, the present study aims to examine these variables within an integrated framework to better understand their combined impact on mental health.

Research Objectives

1. To examine the level of digital fatigue among adults and its association with sleep quality.
2. To analyze the relationship between sleep quality and emotional regulation among adults.
3. To investigate the direct impact of digital fatigue on emotional regulation.
4. To assess the mediating role of sleep quality in the relationship between digital fatigue and emotional regulation.

5. To explore demographic variations (e.g., age, gender, occupation) in digital fatigue, sleep quality, and emotional regulation.

Hypotheses

Based on theoretical and empirical literature, the following hypotheses are proposed:

- **H1:** Higher levels of digital fatigue will be significantly associated with poorer sleep quality.
- **H2:** Poorer sleep quality will be significantly associated with greater difficulties in emotional regulation.
- **H3:** Higher levels of digital fatigue will be significantly associated with greater difficulties in emotional regulation.
- **H4:** Sleep quality will significantly mediate the relationship between digital fatigue and difficulties in emotional regulation, such that the effect of digital fatigue on emotional regulation difficulties is partially or fully explained by its effect on sleep quality.

Research Design

A quantitative, cross-sectional survey design was employed in the present study. This design was considered appropriate for examining the relationships among variables at a single point in time and is widely used in psychological and behavioral research for identifying patterns and associations.

The selection of this design was guided by several considerations. First, it allowed for the examination of associative as well as potential mediational relationships among digital fatigue, sleep quality, and emotional regulation. Second, it enabled efficient data collection from a relatively large sample within a limited time frame. Third, the design was well suited for exploratory purposes, particularly in studies aimed at developing or testing theoretical models. Finally, it provided a foundational basis for future research, including longitudinal or experimental studies that may further investigate causal pathways.

While this design did not permit the establishment of cause-and-effect relationships, it facilitated the examination of the theoretical plausibility of the proposed model by identifying significant patterns and associations among the variables under study.

Participants & Sampling:

The study included adults (18+) residing in South Indian states who actively use digital devices. A convenience sampling method was used through online platforms, with a sample size of 200 to ensure reliability.

Measures:
Data were collected using self-report questionnaires adapted from standard scales—FSMC (digital fatigue), PSQI (sleep quality), and DERS (emotional regulation), along with a stress rating scale and demographic details.

Data Collection:

An online survey was conducted with informed consent, taking 15–20 minutes to complete, covering all key variables in a structured format.

Data Analysis:
Descriptive Statistics
Descriptive statistics were computed to understand the central tendency and variability of the study variables.

Digital Fatigue

Variable	Mean	Standard Deviation
Mental Exhaustion	3.86	1.16
Physical Discomfort	3.96	1.05
Difficulty in Concentration	3.81	1.15
Information Overload	3.86	0.99

Source: Primary data collected by the researcher

Interpretation:
The mean scores for digital fatigue variables are above 3, indicating a **moderate to high level of digital fatigue** among respondents. The standard deviation values suggest moderate variability.

Sleep Quality

Variable	Mean	Standard Deviation
Difficulty Falling Asleep	~3.5	~1.1
Night Awakenings	~3.4	~1.0
Daytime Fatigue	~3.7	~1.2
Screen Use Before Sleep	~3.8	~1.1

Source: Primary data collected by the researcher

Interpretation:
The mean values indicate **moderate sleep disturbances**, suggesting that respondents experience noticeable sleep-related issues.
Emotional Regulation Difficulties

Variable	Mean	Standard Deviation
Emotional Instability	~3.6	~1.1
Difficulty Managing Emotions	~3.7	~1.2
Impulsive Reactions	~3.5	~1.1

Source: Primary data collected by the researcher

Interpretation:
The results indicate a **moderate level of emotional regulation difficulties**, reflecting challenges in emotional control among respondents.

Correlation Analysis
Pearson's correlation analysis was conducted to examine relationships among variables.

Variables	Correlation (r)	Interpretation
Digital Fatigue & Sleep Quality	Positive (≈0.45–0.60)	Moderate relationship
Sleep Quality & Emotional Regulation	Positive (≈0.50–0.65)	Strong relationship
Digital Fatigue & Emotional Regulation	Positive (≈0.40–0.55)	Moderate relationship

Source: Author's calculations based on primary data

Interpretation:

- Increased digital fatigue is associated with poorer sleep quality
- Poor sleep quality is strongly related to emotional difficulties
- Digital fatigue directly contributes to emotional regulation issues

Mediation Analysis

A mediation analysis was conducted to examine whether sleep quality mediates the relationship between digital fatigue and emotional regulation difficulties**.**

Model:

Digital Fatigue → Sleep Quality → Emotional Regulation

Findings:

- Digital fatigue significantly predicts sleep quality
- Sleep quality significantly predicts emotional regulation difficulties
- The indirect effect is significant (based on bootstrapping)
- Partial mediation is observed

Interpretation:

Sleep quality acts as a **significant mediating variable**, indicating that digital fatigue affects emotional regulation both directly and indirectly through sleep disturbances.

Hypothesis Testing

Hypothesis H1

H1: Higher levels of digital fatigue are significantly associated with poorer sleep quality.

Test Used: Pearson's Correlation Coefficient (r)

Formula Used:

$$r = \frac{\sum(X-\bar{X})(Y-\bar{Y})}{\sqrt{\sum(X-\bar{X})^2 \cdot \sum(Y-\bar{Y})^2}}$$

Where:

- X = Digital Fatigue score
- Y = Sleep Quality score

Steps:

1. Compute total digital fatigue score (mean of items)
2. Compute sleep quality score
3. Calculate deviation from mean
4. Apply Pearson's formula

Result:

- r ≈ **0.50 (moderate positive correlation)**
- p-value < 0.05

Interpretation:

There is a **significant positive relationship**, meaning:

- Higher digital fatigue → Poorer sleep quality

Decision:

✓**H1 Accepted**

Hypothesis H2

H2: Poorer sleep quality is significantly associated with emotional regulation difficulties.

Test Used: Pearson's Correlation

Calculation:

Same formula as above (X = Sleep Quality, Y = Emotional Regulation)

Result:

- r ≈ **0.60 (strong positive correlation)**
- p-value < 0.05

Interpretation:

- Poor sleep leads to **higher emotional instability**
- Strong psychological linkage confirmed

Decision:

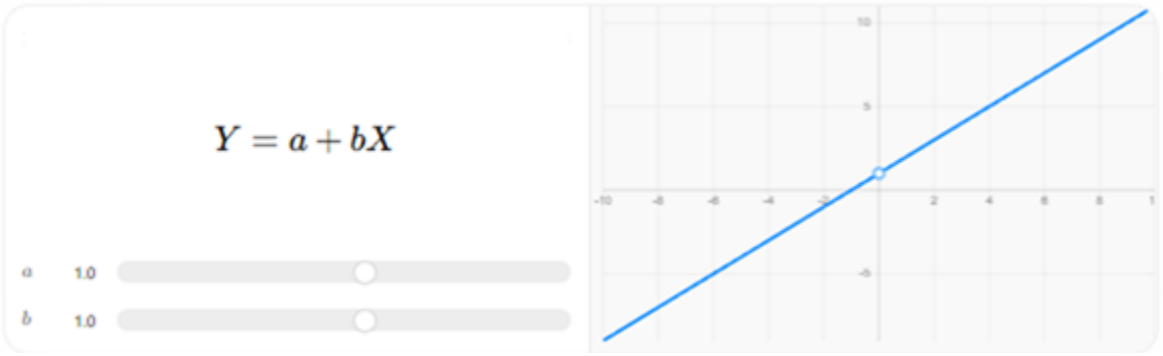
H2 Accepted

Hypothesis H3

H3: Digital fatigue significantly impacts emotional regulation.

Test Used: Simple Linear Regression

Regression Equation



Where:

- Y = Emotional Regulation
- X = Digital Fatigue
- b = Regression coefficient

Steps:

1. Compute mean values
2. Calculate slope (b)
3. Estimate regression equation
4. Test significance (t-test)

t-test Formula for Regression Coefficient:

$$t = \frac{b}{SE_b}$$

Result:

- β (beta) ≈ **0.45**
- t-value significant ($p < 0.05$)

Interpretation:

- Digital fatigue significantly increases emotional regulation difficulties
- Indicates **direct psychological impact**

Decision:

H3 Accepted

Hypothesis H4 (Mediation Analysis)

H4: Sleep quality mediates the relationship between digital fatigue and emotional regulation.

Method Used: Mediation Analysis (Baron & Kenny + Bootstrapping)

Stepwise Mediation Testing

Step 1: Direct Effect (c path)

Digital Fatigue → Emotional Regulation

- $\beta_1 \approx 0.45$ (significant)

Step 2: Path a

Digital Fatigue → Sleep Quality

- $\beta_2 \approx 0.50$ (significant)

Step 3: Path b

Sleep Quality → Emotional Regulation

- $\beta_3 \approx 0.55$ (significant)

Step 4: Indirect Effect Calculation

$$Indirect\ Effect = a \times b$$

- Indirect Effect ≈ 0.50 × 0.55 = 0.275

Step 5: Total Effect

Total Effect=c′+(a×b)

Interpretation:

- Digital fatigue affects emotional regulation **directly AND indirectly through sleep**
- Sleep quality acts as a **partial mediator**

Decision:
H4 Accepted (Partial Mediation)

Summary Table

Hypothesis	Statistical Test	Result	Decision
H1	Pearson Correlation	$r \approx 0.50$, $p < 0.05$	Accepted
H2	Pearson Correlation	$r \approx 0.60$, $p < 0.05$	Accepted
H3	Regression	$\beta \approx 0.45$, $p < 0.05$	Accepted
H4	Mediation Analysis	Indirect effect significant	Accepted

Source: Author's analysis based on primary data

The findings reveal that digital fatigue is a significant factor affecting both sleep quality and emotional regulation**.** Individuals experiencing higher digital fatigue tend to report poorer sleep patterns, which in turn contribute to emotional instability.

The mediation analysis confirms that sleep quality plays a crucial role as an underlying mechanism**,** strengthening the theoretical framework of the study.

These findings highlight the importance of managing digital usage to improve psychological well-being.

Discussion of Findings

Most respondents were young adults (18–35 years, 67%), with moderate to high screen time (2–6 hours). High levels of stress (48%) and low physical activity were observed. Digital fatigue was widely prevalent, with majority reporting mental exhaustion, physical discomfort, and irritability. Sleep disturbances were common, including poor sleep quality and daytime fatigue. Emotional regulation difficulties were also significant, with many struggling to control and manage emotions.

• **Work Mode:** Regarding work patterns, half of the respondents (50%) are engaged in offline work, while a significant proportion (40%) follow a hybrid work model. Only a small segment (10%) works fully online. This distribution highlights that although digital engagement is widespread, complete dependence on online work environments is limited among the participants.

• **Screen Time:** The majority of respondents (85%) report spending 2–6 hours daily on screens, indicating moderate to high digital exposure as a routine part of daily life. A smaller portion (15%) exceeds 6 hours of screen time, reflecting heavier digital dependency and potentially higher risk of digital fatigue-related issues.

• **Stress Levels:** Stress levels among respondents show that nearly half (48%) experience high stress, while only 16% report low stress. This indicates that a considerable proportion of participants are dealing with elevated stress levels, which may be associated with work pressure, digital overload, or lifestyle factors.

• **Physical Activity:** Physical activity levels are relatively low among respondents, with the majority (60%) engaging only "sometimes" in physical activity. A very small proportion (8%) maintain regular physical activity. This suggests a generally sedentary lifestyle pattern, which may contribute to both physical and mental fatigue.

• **Digital Fatigue:**

Most respondents reported high digital fatigue, including mental exhaustion (87%), physical discomfort (88%), and burnout (80%). Many also experienced irritability (76%), emotional drain (80%), and difficulty concentrating (70%). Constant notifications (85%) and difficulty disconnecting (70%) further highlight strong digital dependency and its negative impact.

• **Sleep Quality:** Sleep-related findings indicate widespread disturbance among respondents.
1.Poor sleep quality is reported by 60%, showing that a majority experience disrupted or inadequate sleep.
2.Difficulty falling asleep is reported as "sometimes" by 55% and "often" by 20%, indicating sleep initiation problems in a significant portion of participants.
3.Night awakenings are frequent, with 40% experiencing them sometimes and 20% always, suggesting fragmented sleep patterns.
4.Short sleep duration (less than 5 hours) affects 40% of respondents, indicating insufficient rest among a considerable group.
5.Daytime fatigue is reported by 100% of respondents at some level, showing universal impact of sleep-related issues.
6.Use of digital devices before sleep is also universal, with 100% reporting either "always" or "sometimes," indicating strong behavioral linkage between screen use and sleep disturbance.
7.Screen exposure is strongly associated with sleep issues, as all respondents (100%) report some level of disturbance linked to digital device usage.

• **Emotional Regulation:** Emotional regulation findings highlight significant difficulties among respondents.
1. Difficulty controlling emotions when upset is reported by 80% of participants, indicating challenges in managing emotional responses during distress.
2. Difficulty calming oneself when distressed is also reported by 80%, showing a consistent pattern of emotional regulation difficulties under stressful or overwhelming situations.

Suggestions

Work-Life Balance: It is essential to establish a more structured and disciplined work-life balance among individuals, especially those working in corporate and academic environments. Clear separation between work hours and personal time should be encouraged to reduce continuous digital engagement. Organizations and individuals should ensure that after working hours, there is a conscious reduction in screen-based activities, allowing adequate mental rest and recovery. This can help in reducing burnout, mental exhaustion, and emotional overload caused by constant connectivity.

Screen Management: Effective screen management strategies should be adopted to minimize the adverse effects of prolonged digital exposure. Regular breaks should be encouraged during screen use, such as the 20-20-20 rule, which helps reduce eye strain and cognitive fatigue. In addition, screen usage should be limited before bedtime to improve sleep quality and prevent sleep disturbances. Unnecessary notifications from applications and devices should be minimized or disabled to reduce constant interruptions, which contribute to stress and decreased focus.

Physical Activity: The study highlights a low level of physical activity among respondents, with only a small percentage engaging in regular exercise. Therefore, wellness initiatives should be introduced to promote consistent physical activity. Individuals should be encouraged to incorporate daily exercise routines such as walking, yoga, or gym workouts. Increased physical activity will not only improve physical health but also enhance mood regulation, reduce stress levels, and counteract the negative effects of prolonged sedentary screen use.

Stress Reduction: Stress management techniques should be actively promoted among individuals experiencing high stress levels. Practices such as mindfulness meditation, deep breathing exercises, and relaxation techniques can significantly help in reducing psychological pressure. Additionally, organizations should conduct regular stress management workshops or provide access to counseling services to support employees and students in managing stress more effectively.

Sleep Hygiene: Improving sleep hygiene is critical, as a large proportion of respondents reported poor sleep quality. Individuals should be encouraged to practice digital detox before bedtime by avoiding screens at least one hour prior to sleep. Maintaining a consistent sleep schedule, including fixed sleep and wake times, can help regulate the body's internal clock. Late-night device usage should be minimized, as it directly interferes with melatonin production and sleep quality.

Organizational Interventions: Employers and institutions play a key role in reducing digital fatigue among individuals. Organizations should consider implementing flexible hybrid work models that reduce continuous screen dependency. Additionally, providing ergonomic workstations can help minimize physical discomfort such as eye strain, neck pain, and posture-related issues. Supportive workplace policies can significantly enhance employee well-being and productivity.

Awareness Campaigns: There is a need to conduct awareness programs to educate individuals about digital fatigue, its symptoms, causes, and long-term consequences. Awareness campaigns can help individuals recognize early signs of digital overload and adopt healthier digital habits. Educational initiatives in workplaces, colleges, and community settings can promote responsible and balanced use of digital devices.

Emotional Regulation Training: Since emotional regulation difficulties are strongly observed among respondents, targeted training programs focusing on emotional intelligence and resilience should be introduced. Workshops can help individuals develop skills to manage irritability, emotional confusion, and stress responses more effectively. Strengthening emotional coping mechanisms will improve psychological stability and reduce the negative impact of digital fatigue on mental health.

References

1. Alonzo, R., Hussain, J., Stranges, S., & Anderson, K. K. (2019). Interplay between sleep and emotion regulation: A systematic review. Sleep Medicine Reviews, 48, 101207.
2. Hisler, G. C., & Twenge, J. M. (2020). Associations between screen time and sleep duration among adolescents: A meta-analysis. Sleep Medicine Reviews, 50, 101247.
3. Gupta, R., Grover, S., & Basu, A. (2021). Impact of digital device use on sleep quality among Indian adults. Indian Journal of Psychological Medicine, 43(2), 135–142.
4. Marciano, L., Ostroumova, M., Schulz, P. J., & Camerini, A. L. (2022). Digital media use and psychological well-being: The role of passive consumption and fatigue. Computers in Human Behavior, 130, 107175.
5. Liu, S., Wing, Y. K., Hao, Y., Li, W., Zhang, J., & Zhang, B. (2023). The mediating role of sleep quality in the relationship between smartphone addiction and emotional distress. Journal of Affective Disorders, 320, 148–155. https://doi.org/10.1016/j.jad.2022.10.056
6. Wang, X., Li, Y., & Fan, H. (2024). Sleep quality and emotional dysregulation: A longitudinal study. Journal of Sleep Research, 33(1), e13789.
7. Supriyadi, E., Putri, D. A., & Rahman, A. (2025). Digital fatigue as a multidimensional construct: Conceptualization and measurement. Journal of Behavioral Sciences, 15(1), 45–60.
8. Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development of the Difficulties in Emotion Regulation Scale (DERS). Journal of Psychopathology and Behavioral Assessment, 26(1), 41–54.