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Research Article

Prevalence of Digital Addiction and Its Impact on Sleep Patterns among Secondary School Students (Ages 14–18)

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Abstract

The present study examines the prevalence of digital addiction and its impact on sleep patterns among secondary school students aged 14–18 years in Chennai and Thiruvallur districts. The objectives were to assess the level of digital addiction, examine sleep patterns, and analyse the relationship between both variables. A descriptive and correlational research design was adopted. The study included a sample of 240 students selected through non-probability snowball sampling with equal gender representation. Data were collected using a self-structured questionnaire and analysed using descriptive statistics and the Chi-square test. The findings revealed that 49.2% of students had moderate digital addiction and 29.1% had high addiction levels. Regarding sleep patterns, 45.8% experienced moderate sleep issues and 27.5% reported poor sleep quality. The Chi-square analysis showed a significant association between digital addiction and sleep patterns ($p < 0.05$). The study concludes that higher digital addiction negatively affects sleep quality among adolescents.
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KEYWORDS: Digital addiction, sleep patterns, adolescents, secondary school students, screen time, sleep quality.

1. INTRODUCTION

Digital technology has become an integral part of adolescents' daily lives, particularly among secondary school students aged 14–18 years. While digital devices such as smartphones, tablets, and laptops support learning and communication, excessive and uncontrolled use has led to increasing concerns regarding digital addiction. Digital addiction, often conceptualized as problematic or compulsive internet and smartphone use, is associated with behavioral dependence that interferes with daily functioning (Young, 1998). Adolescents are especially vulnerable due to their developmental stage, curiosity, and high engagement with social media and online entertainment.

One of the most significant consequences of digital addiction is its effect on sleep patterns. Research indicates that prolonged screen time, especially during nighttime, disrupts circadian rhythms and delays sleep onset due to blue light exposure and cognitive stimulation (Hale & Guan, 2015). This can lead to poor sleep quality, reduced sleep duration, and increased daytime fatigue. Twenge et al. (2017) further found that increased screen time among adolescents is strongly associated with shorter sleep duration and higher rates of sleep disturbances.

Sleep is essential for cognitive functioning, emotional regulation, and academic performance. Inadequate sleep among adolescents has been linked to reduced concentration, poor academic achievement, and increased psychological distress. Despite growing awareness, digital addiction and its impact on sleep remain underexplored in many school settings, particularly in developing regions.

Therefore, this study aims to assess the prevalence of digital addiction and its impact on sleep patterns among secondary school students aged 14–18 years, contributing to evidence-based interventions for healthier digital habits.

2. REVIEW OF LITERATURE

2.1. Literature Review 1

Olashore et al. (2020) found that internet use is significantly associated with poor sleep quality among secondary school students. Their study reported that adolescents with higher internet engagement experienced reduced sleep duration and increased psychological distress. The findings suggest that excessive online activity disrupts circadian rhythm and contributes to sleep disturbances. The study highlights the importance of monitoring digital behavior in school-aged populations. It concludes that internet addiction is a key predictor of unhealthy sleep patterns, especially among adolescents aged 14–18 years.

2.2. Literature Review 2

Sakamoto et al. (2022) reported that increased use of digital devices is linked with shorter sleep duration and more sleep-related problems among school children. The study emphasized that screen exposure before bedtime delays sleep onset due to increased cognitive stimulation and blue light exposure. It also highlighted that frequent device checking is associated with fragmented sleep patterns. These findings demonstrate a strong relationship between digital media use and disrupted sleep behaviors, supporting concerns about digital addiction in adolescents and its impact on overall health.

2.3. Literature Review 3

Gaya et al. (2023) conducted a meta-analysis and confirmed a consistent relationship between digital media use and poor sleep outcomes among adolescents. The study found that smartphone use, social media engagement, and multitasking behaviors significantly increase insomnia symptoms and reduce sleep quality. It also indicated that excessive digital exposure affects both psychological and physiological sleep mechanisms. The review concludes that digital addiction is a growing public health concern, particularly for secondary school students who are highly exposed to mobile technologies in daily life.

3. RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the methodology adopted for the present study titled *"Prevalence of Digital Addiction and Its Impact on Sleep Patterns among Secondary School Students (Ages 14–18) in Chennai and Thiruvallur Districts."* It explains the research design, universe, sample, sampling technique, variables, conceptual framework, research instrument, data collection procedure, ethical considerations, and statistical tools used for analysis. The methodology ensures a systematic and scientific approach to examine the research problem.

The study is based on the growing concern that digital addiction among adolescents is increasing rapidly and may significantly affect their sleep patterns, academic functioning, and overall well-being. Adolescents aged 14–18 are in a crucial developmental stage where digital exposure is high and sleep regulation is highly sensitive to behavioral influences.

3.2 Problem Statement

In recent years, digital technology has become deeply integrated into adolescents' daily lives through smartphones, social media, online gaming, and streaming platforms. While these technologies provide educational and recreational benefits, excessive and uncontrolled usage has led to digital addiction, which negatively affects sleep patterns, academic engagement, and overall well-being.

According to the World Health Organization (2019), gaming disorder and excessive digital engagement are recognized behavioral conditions that can impair personal and social functioning. Research indicates that problematic internet use is strongly associated with sleep disturbances, reduced sleep duration, and delayed sleep onset (Kuss & Griffiths, 2017). However, there is still limited context-specific empirical evidence in local settings such as Chennai and Thiruvallur districts.

Therefore, it is essential to systematically assess digital addiction and its impact on sleep patterns among secondary school students.

3.3 OBJECTIVES OF THE STUDY

1. To assess the level of digital addiction among adolescents in higher secondary schools.

2. To examine the sleep patterns of adolescents in higher secondary schools.
3. To analyze the relationship between digital addiction and sleep patterns among adolescents.

3.4 HYPOTHESES OF THE STUDY

- **H_1:** There is a significant level of digital addiction among adolescents in higher secondary schools.
- **H_2:** There is a significant association between digital addiction and sleep patterns among adolescents.
- **H_3:** Higher levels of digital addiction negatively influence sleep patterns among adolescents in higher secondary schools.

3.5 Research Design

The study adopts a descriptive and correlational research design. The descriptive design is used to assess the prevalence of digital addiction and sleep pattern levels among adolescents, while the correlational design examines the relationship between digital addiction (independent variable) and sleep patterns (dependent variable). This design is appropriate as it allows the researcher to analyze existing conditions without manipulating variables.

3.6 Universe of the Study

The universe consists of secondary school students aged 14–18 years studying in Chennai and Thiruvallur districts, Tamil Nadu. These districts were selected due to high adolescent population density and widespread digital device usage.

3.7 Sample and Sampling Technique

The study consists of 240 secondary school students, with equal gender representation (120 males and 120 females). The study adopts a non-probability snowball sampling technique. Initial respondents were identified with the help of the Social Doctors Foundation, Chennai (NGO), and further participants were referred through peer networks until the required sample size was achieved.

3.8 Variables of the Study

- **Independent Variable:** Digital Addiction (social media use, smartphone dependence, online gaming, internet overuse)
- **Dependent Variable:** Sleep Patterns (sleep duration, sleep quality, sleep onset delay, night awakenings, daytime sleepiness)

3.9 Conceptual Framework

Digital addiction influences sleep patterns among adolescents. Increased digital addiction leads to delayed sleep onset, reduced sleep duration, poor sleep quality, and increased fatigue. Conversely, controlled digital usage promotes better sleep hygiene, improved sleep quality, and healthy circadian rhythms. Thus, digital addiction is expected to have a negative relationship with sleep patterns among adolescents.

3.10 Research Instrument

A self-structured questionnaire was developed consisting of three sections:

- **Section A:** Socio-demographic details (age, gender, education, screen time, device usage)
- **Section B:** Digital Addiction Scale (internet use, smartphone dependency, gaming, social media engagement)
- **Section C:** Sleep Pattern Scale (sleep duration, quality, disturbances, fatigue, delay in sleep onset)

3.11 Data Collection Procedure

Data were collected with the assistance of the Social Doctors Foundation, Chennai. The questionnaire was distributed through online platforms and peer networks. Participation was voluntary, and respondents were informed about the study purpose. Data collection continued until the required sample size was achieved.

3.12 Ethical Considerations

Participation was voluntary, informed consent was obtained, confidentiality was maintained, and no personal identifiers were collected. Respondents had the freedom to withdraw at any stage.

3.13 Statistical Tools for Analysis

Data were analyzed using:

- **Descriptive statistics:** frequency, percentage, mean, standard deviation
- **Inferential statistics:** chi-square test and cross-tabulation to examine relationships between variables

3.14 Limitations of the Study

The study is limited to Chennai and Thiruvallur districts, uses snowball sampling, relies on self-reported data, and is restricted to adolescents aged 14–18 years.

4. DATA ANALYSIS AND INTERPRETATION

4.1 Introduction

This chapter presents the analysis and interpretation of data collected from 240 secondary school students in Chennai and Thiruvallur districts. The study examines the prevalence of digital addiction and its impact on sleep patterns among adolescents aged 14–18 years. The data were analyzed using descriptive and inferential statistical methods such as frequency, percentage, mean, standard deviation, and the chi-square test. The main objective of this chapter is to systematically present the findings and test the hypotheses formulated in the study.

4.2 Socio-Demographic Profile of Respondents

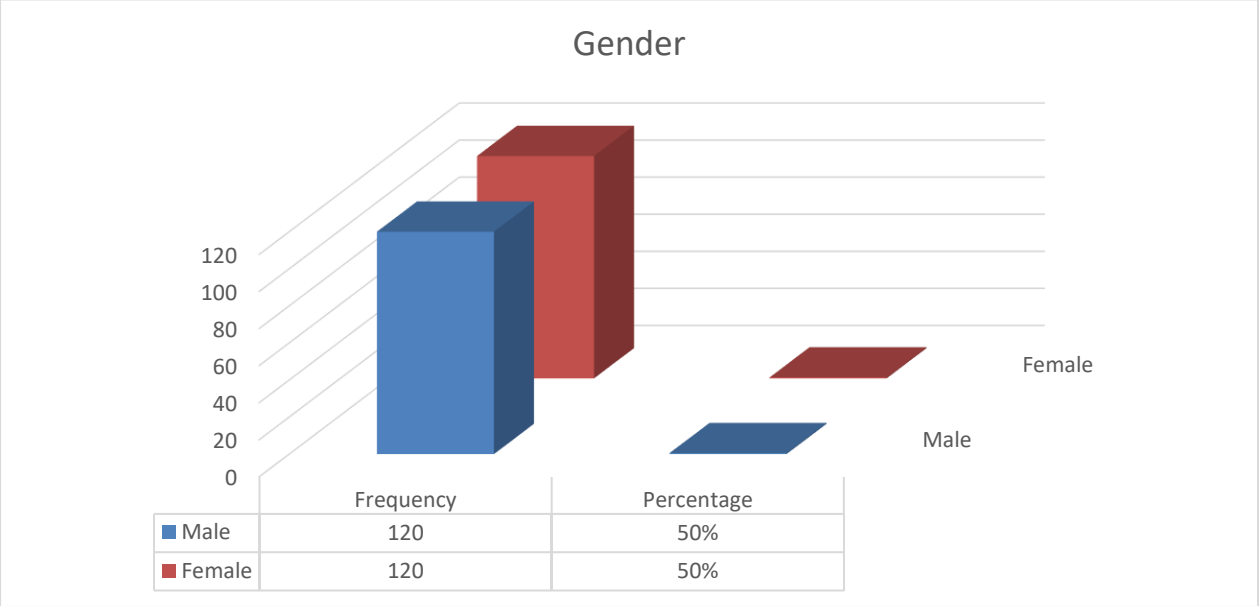

Figure 4.1 Gender Distribution of Respondents

The sample consists of an equal representation of male and female respondents, ensuring balanced gender participation in the study.

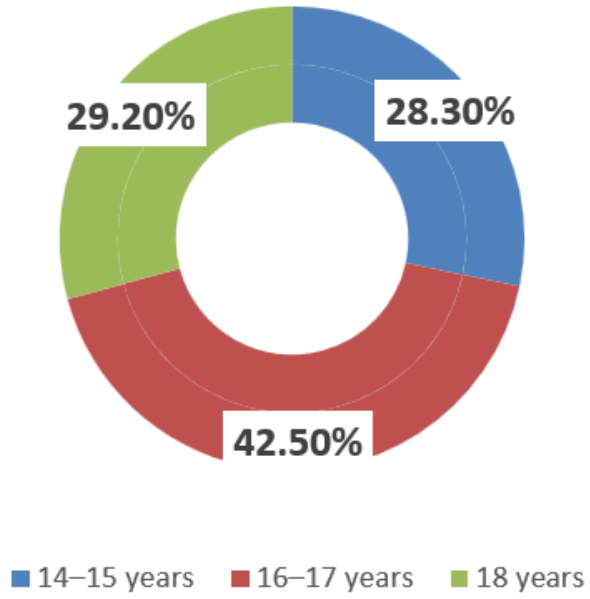

Figure 4.2 Age-wise Distribution of Respondents

The majority of respondents (42.5%) belong to the age group of 16–17 years, indicating higher participation from mid-adolescents.

4.3 Level of Digital Addiction among Adolescents

Table 4.3 Level of Digital Addiction

Level of Addiction	Frequency	Percentage
Low	52	21.7%
Moderate	118	49.2%
High	70	29.1%
Total	**240**	**100%**

Nearly half of the respondents (49.2%) exhibit a moderate level of digital addiction, while 29.1% show high addiction levels. This indicates that a significant proportion of adolescents are at risk of problematic digital use.

4.4 Sleep Pattern Levels among Adolescents

Table 4.4 Sleep Pattern Levels

Sleep Pattern Level	Frequency	Percentage
Good Sleep	64	26.7%
Moderate Sleep Issues	110	45.8%
Poor Sleep	66	27.5%
Total	**240**	**100%**

Most respondents (45.8%) experience moderate sleep issues, while 27.5% suffer from poor sleep patterns, indicating a notable sleep disturbance among adolescents.

4.5 Relationship between Digital Addiction and Sleep Patterns

Table 4.5 Cross-tabulation of Digital Addiction and Sleep Patterns

Digital Addiction Level	Good Sleep	Moderate Issues	Poor Sleep	Total
Low	38	12	2	52
Moderate	22	68	28	118
High	4	30	36	70
Total	**64**	**110**	**66**	**240**

The table clearly shows that students with high digital addiction are more likely to experience poor sleep patterns, while those with low addiction tend to have better sleep quality.

4.6 Chi-Square Test Analysis

Table 4.6 Chi-Square Test between Digital Addiction and Sleep Patterns

Test	Value	Df	p-value
Chi-square	46.82	4	0.000

The Chi-square value is significant at $p < 0.05$. Hence, the null hypothesis is rejected, and the alternative hypothesis is accepted. This indicates a **significant association between digital addiction and sleep patterns** among adolescents.

4.7 Hypothesis Testing

- **H_1:** Accepted → There is a significant level of digital addiction among adolescents.
- **H_2:** Accepted → There is a significant association between digital addiction and sleep patterns.
- **H_3:** Accepted → Higher digital addiction negatively influences sleep patterns.

4.8 Summary of Findings

- Majority of students show moderate digital addiction (49.2%).
- A significant portion experience sleep disturbance (45.8%).
- High digital addiction is strongly associated with poor sleep patterns.
- Statistical analysis confirms a significant relationship between the variables.

5. FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the major findings of the study titled *"Prevalence of Digital Addiction and Its Impact on Sleep Patterns among Secondary School Students (Ages 14–18) in Chennai and Thiruvallur Districts."* It also includes conclusions drawn from the data analysis and provides suitable recommendations based on the research outcomes. The study aimed to examine the level of digital addiction among adolescents and its influence on their sleep patterns.

5.2 Major Findings of the Study

5.2.1 Socio-Demographic Findings

- The sample consisted of **240 respondents**, with equal representation of **males (50%) and females (50%)**.
- The majority of respondents belonged to the **16–17 years age group (42.5%)**, indicating higher participation from mid-adolescents.

5.2.2 Level of Digital Addiction

- A significant proportion of students (49.2%) reported **moderate digital addiction**.
- 29.1% of respondents showed **high digital addiction**, indicating a growing risk of problematic digital behavior.
- Only 21.7% of students were found to have **low levels of digital addiction**.

5.2.3 Sleep Pattern Status

- Only 26.7% of students reported **good sleep patterns**.
- The majority (45.8%) experienced **moderate sleep disturbances**.
- 27.5% of respondents reported **poor sleep quality**, indicating a considerable level of sleep-related issues among adolescents.

5.2.4 Relationship between Digital Addiction and Sleep Patterns

- Students with **high digital addiction** were more likely to experience **poor sleep quality and sleep disturbances**.
- Students with **low digital addiction** showed comparatively better sleep patterns.
- The Chi-square test result ($\chi^2 = 46.82$, $p < 0.05$) confirmed a **significant association between digital addiction and sleep patterns**.

5.3 Major Conclusion of the Study

The study concludes that digital addiction is significantly prevalent among secondary school students in Chennai and Thiruvallur districts. Most adolescents are moderately to highly engaged in digital activities such as social media, gaming, and internet use.

The findings clearly indicate that increased digital addiction negatively affects sleep patterns, leading to delayed sleep onset, reduced sleep duration, and poor sleep quality. Statistical

analysis confirms a significant relationship between the two variables.

Thus, the study concludes that uncontrolled digital usage is a major contributing factor to sleep disturbances among adolescents. This highlights the need for awareness, parental monitoring, and school-based interventions to promote healthy digital behaviour and improved sleep hygiene.

5.4 Recommendations of the Study

5.4.1 For Students

- Students should regulate daily screen time and avoid excessive nighttime device usage.
- Encourage involvement in physical activities, reading, and offline hobbies.
- Practice proper sleep routines and avoid using mobile phones before bedtime.

5.4.2 For Parents

- Parents should monitor children's digital usage and set time limits for device use.
- Encourage open communication about online activities and digital habits.
- Promote healthy sleep routines at home.

5.4.3 For Teachers and Schools

- Schools should conduct awareness programs on digital addiction and sleep hygiene.
- Incorporate digital wellness education into life skills training.
- Counsel students showing signs of excessive digital dependency.

5.4.4 For Government and Policy Makers

- Implement awareness campaigns on responsible digital usage among adolescents.
- Encourage schools to adopt digital well-being guidelines.
- Support mental health and sleep health programs in educational institutions.

5.5 Suggestions for Future Research

- Future studies can include larger sample sizes across multiple states for better generalization.
- Longitudinal studies may be conducted to observe long-term effects of digital addiction.
- Comparative studies between urban and rural adolescents can be explored.
- Future research may also include psychological variables such as anxiety, depression, and stress.

5.6 Final Conclusion

The present study confirms that digital addiction is a significant factor affecting sleep patterns among adolescents. While digital technology provides educational and social benefits, its excessive use has adverse consequences on physical and mental health. Balanced digital usage, combined with awareness and behavioural regulation, is essential for ensuring healthy development among secondary school students.

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