

“A Study to Evaluate the Effectiveness of a Digital Detox Intervention on Smartphone Addiction, Sleep Quality, And Psychological Well-Being Among Undergraduate Nursing Students Selected Area of Haveri City, Karnataka”

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Abstract—Background: Smartphone use has become an integral part of daily life among nursing students. Excessive smartphone use is associated with smartphone addiction, poor sleep quality, stress, anxiety, reduced academic performance, and impaired psychological well-being. Digital detox interventions have emerged as promising strategies to promote healthy digital habits and improve mental health among young adults. However, limited evidence exists regarding their effectiveness among undergraduate nursing students in India.

Objectives of study: To evaluate the effectiveness of a digital detox intervention on smartphone addiction, sleep quality, and psychological well-being among undergraduate nursing students.

Methodology: A quantitative pre-experimental one-group pretest-posttest design was adopted. The study was conducted among undergraduate nursing students selected through simple random sampling. Baseline assessment included socio-demographic variables, Smartphone Addiction Scale-Short Version (SAS-SV), Pittsburgh Sleep Quality Index (PSQI), and WHO-5 Well-being Index. Participants underwent a structured digital detox intervention for four weeks. Post-test assessment was conducted immediately after completion of the intervention. Descriptive and inferential statistics were used to analyse the data. Paired t-test was applied to compare pre-test and post test scores, and Chi-square test was used to determine associations between outcome variables and selected demographic characteristics.

Results: Following the intervention, participants demonstrated a statistically significant reduction in smartphone addiction scores ($p<0.001$). Sleep quality significantly improved, reflected by lower PSQI scores ($p<0.001$). Psychological well-being scores increased

significantly after the intervention ($p<0.001$). Significant associations were observed between smartphone addiction and selected demographic variables including daily screen time and academic year ($p<0.05$).

Conclusion: The digital detox intervention was effective in reducing smartphone addiction while improving sleep quality and psychological well-being among undergraduate nursing students. Incorporating structured digital wellness programs into nursing education may promote healthier technology use and enhance student's mental health.

Index Terms—Digital detox; Smartphone addiction; Sleep quality; Psychological well-being; Nursing students; Digital wellness; Mental health.

I. INTRODUCTION

The rapid advancement of digital technology has transformed communication, education, entertainment, and healthcare across the world. Smartphones have become indispensable tools for university students, particularly nursing students, who frequently use mobile devices for academic learning, online classes, clinical information retrieval, and social networking. Although smartphones facilitate educational activities, excessive and uncontrolled usage has resulted in increasing concerns regarding Smartphone addiction.

Smartphone addiction is characterized by compulsive smartphone use despite negative physical, psychological, and social consequences. Studies have shown that excessive smartphone use negatively

affects concentration, academic performance, interpersonal relationships, sleep quality, emotional regulation, and overall well-being.

Sleep quality is essential for cognitive functioning, emotional stability, learning ability, and physical health. Nursing students often experience academic stress, irregular schedules, and prolonged screen exposure, increasing the risk of poor sleep quality. Additionally, prolonged smartphone usage contributes to anxiety, depression, loneliness, stress, and reduced psychological well-being.

Digital detox refers to a planned reduction or temporary abstinence from digital devices to restore healthy technology habits and improve mental and physical health. Structured digital detox interventions include screen-time monitoring, scheduled offline activities, mindfulness practices, sleep hygiene education, and behavioural modification techniques. Despite increasing smartphone dependence among nursing students, evidence regarding the effectiveness of digital detox interventions in improving psychological outcomes remains limited in India. Therefore, this study aims to evaluate the effectiveness of a structured digital detox intervention on smartphone addiction, sleep quality, and psychological well-being among undergraduate nursing students.

II. OBJECTIVES

To evaluate the effectiveness of a digital detox intervention on Smartphone addiction, sleep quality, and psychological well-being among undergraduate nursing students.

Research hypothesis

Research Hypotheses (H₁)

- H₁: There will be a statistically significant reduction in the mean smartphone addiction scores among undergraduate nursing students after the digital detox intervention compared to their pre-test scores.
- H₂: There will be a statistically significant improvement in the mean sleep quality scores among undergraduate nursing students after the digital detox intervention compared to their pre-test scores.

- H₃: There will be a statistically significant improvement in the mean psychological well-being scores among undergraduate nursing students after the digital detox intervention compared to their pre-test scores.
- H₄: There will be a statistically significant association between the pre-test smartphone addiction, sleep quality, and psychological well-being scores and selected demographic variables of undergraduate nursing students.

Null Hypotheses (H₀)

- H₀₁: There will be no statistically significant difference in the mean smartphone addiction scores before and after the digital detox intervention among undergraduate nursing students.
- H₀₂: There will be no statistically significant difference in the mean sleep quality scores before and after the digital detox intervention among undergraduate nursing students.
- H₀₃: There will be no statistically significant difference in the mean psychological well-being scores before and after the digital detox intervention among undergraduate nursing students.
- H₀₄: There will be no statistically significant association between the pre-test smartphone addiction, sleep quality, psychological well-being scores, and selected demographic variables of undergraduate nursing students.

Assumptions

- Undergraduate nursing students use smartphones regularly for both academic and personal purposes.
- Excessive smartphone use negatively influences sleep quality and psychological well-being.
- A structured digital detox intervention can reduce smartphone addiction and promote healthier smartphone-use behaviors.
- Improvement in smartphone usage habits will lead to better sleep quality and enhanced psychological well-being.
- The participants will provide honest and accurate responses to the study questionnaires.
- The selected standardized tools are valid and reliable for measuring smartphone addiction, sleep quality, and psychological well-being.

- Participants will comply with the digital detox intervention protocol throughout the study period.
- External factors influencing smartphone use, sleep quality, and psychological well-being will remain relatively constant during the intervention period.

Delimitations

The Study will be delimited to;

The study will be limited to undergraduate nursing students studying in selected nursing colleges of Haveri City, Karnataka.

III. MATERIALS AND METHODS

Research Approach

Quantitative research approach was used for this study.

Research Design

A quantitative pre-experimental one-group pretest-posttest research design was adopted.

Variable:

- Dependent variables: Smartphone Addiction, Sleep Quality, Psychological Well-being
- Independent variables: Digital Detox Intervention
- Demographic variable: Age, gender, year of study, residence, family type, family income, smartphone usage duration, purpose of smartphone use, sleep duration, etc.
- Inclusion Criteria:
 - Undergraduate nursing students
 - Age 18–25 years
 - Smartphone users for more than one year
 - Willing to participate
 - Available during data collection

Exclusion criteria

- Students with diagnosed psychiatric disorders
- Students currently receiving psychological therapy
- Students absent during intervention
- Students unwilling to participate

Setting of the study

The study was conducted among undergraduate nursing students of selected nursing colleges in Haveri city, Karnataka.

Study Population

The study population consisted of undergraduate B.Sc. Nursing students.

Sampling Technique

Simple random sampling technique was employed to recruit eligible participants.

Sample size

Sample size: 100 students

Sample size was calculated using power analysis considering 95% confidence level and 80% power.

Description of the instruments

The data collection instrument is divided in to 2 parts:
Part I: Structured questionnaire for socio-demographic variables

Part II: Smartphone Addiction Scale-Short Version (SAS-SV)

Part III: Pittsburgh Sleep Quality Index (PSQI)

Part IV: WHO-5 Well-being Index

Data analysis

Data will be analyzed by using descriptive and inferential statistics.

Data were analysed using SPSS Version 26.

Descriptive statistics:

- Frequency
- Percentage
- Mean
- Standard deviation

Inferential statistics:

- Paired t-test
- Chi-square test
- Pearson correlation
- Significance level set at $p < 0.05$.

IV. RESULTS AND DISCUSSION

Socio-demographic Characteristics of Undergraduate Nursing Students

Table 1. Distribution of participants according to socio-demographic characteristics (N = 100)

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	18–19	28	28.0
	20–21	47	47.0

	22-23	25	25.0
Gender	Male	22	22.0
	Female	78	78.0
Academic Year	First Year	24	24.0
	Second Year	26	26.0
	Third Year	25	25.0
	Fourth Year	25	25.0
Residence	Urban	58	58.0
	Rural	42	42.0
Monthly Family Income	< ₹20,000	18	18.0
	₹20,001-40,000	35	35.0
	₹40,001-60,000	28	28.0
	> ₹60,000	19	19.0
Daily Smartphone Use	<3 hours	12	12.0
	3-5 hours	34	34.0
	6-8 hours	38	38.0
	>8 hours	16	16.0
Daily Screen Time	<4 hours	15	15.0
	4-6 hours	31	31.0
	7-9 hours	37	37.0
	>9 hours	17	17.0
Sleep Duration	<6 hours	30	30.0
	6-7 hours	42	42.0
	7-8 hours	21	21.0
	>8 hours	7	7.0

4.1 Smartphone Addiction Before and After Digital Detox Intervention

Table 2. Comparison of pre-test and post-test smartphone addiction scores (SAS-SV) (N = 100)

Assessment	Mean	SD	Mean Difference	Paired t-value	p-value	Cohen's d
Pre-test	38.62	7.84				
Post-test	28.14	6.21	10.48	14.86	<0.001*	1.34

*Statistically significant at $p < 0.05$

4.2 Sleep Quality Before and After Digital Detox Intervention

Table 3. Comparison of pre-test and post-test PSQI scores (N = 100)

Assessment	Mean	SD	Mean Difference	Paired t-value	p-value
Pre-test	9.18	2.76			
Post-test	5.91	2.18	3.27	11.52	<0.001*

*Statistically significant at $p < 0.05$

4.3 Psychological Well-being Before and After Digital Detox Intervention

Table 4. Comparison of pre-test and post-test WHO-5 well-being scores (N = 100)

Assessment	Mean	SD	Mean Difference	Paired t-value	p-value
Pre-test	46.82	11.24			
Post-test	67.45	10.18	20.63	15.94	<0.001*

*Statistically significant at $p < 0.05$

4.4 Association Between Smartphone Addiction and Selected Socio-demographic Variables:

Table 5. Association between post-test smartphone addiction level and selected variables (N = 100)

Variable	χ^2 Value	Df	p-value	Interpretation
Age	4.28	2	0.118	Not Significant
Gender	5.84	1	0.016*	Significant
Academic Year	8.16	3	0.043*	Significant
Residence	2.31	1	0.129	Not Significant
Family Income	7.48	3	0.058	Not Significant
Daily Smartphone Use	18.65	3	<0.001*	Significant
Screen Time	20.83	3	<0.001*	Significant
Sleep Duration	10.72	3	0.013*	Significant

*Statistically significant at $p < 0.05$

4.5 Correlation between Smartphone Addiction, Sleep Quality, and Psychological Well-being

Table 6. Pearson correlation coefficients among study variables (N = 100)

Variables	Smartphone Addiction (SAS-SV)	Sleep Quality (PSQI)	Psychological Well-being (WHO-5)
Smartphone Addiction	1.000	0.624*	-0.571**
Sleep Quality	0.624**	1.000	-0.492**
Psychological Well-being	-0.571**	-0.492*	1.000

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

Interpretation of the Results:

- Table 1: Most participants were 20–21 years old (47%), female (78%), from urban areas (58%), and reported using smartphones for 6–8 hours daily (38%).
- Table 2: Smartphone addiction scores significantly decreased after the digital detox intervention (paired $t = 14.86$, $p < 0.001$), with a large effect size (Cohen's $d = 1.34$).
- Table 3: Sleep quality significantly improved following the intervention, as reflected by lower PSQI scores ($p < 0.001$).
- Table 4: Psychological well-being significantly increased after the intervention ($p < 0.001$).
- Table 5: Smartphone addiction showed significant associations with gender, academic year, daily smartphone use, screen time, and sleep duration, whereas age, residence, and family income were not significantly associated.
- Table 6: Smartphone addiction was positively correlated with poor sleep quality and negatively correlated with psychological well-being. Better sleep quality was also associated with higher psychological well-being.

Discussion:

- The present study demonstrated that the structured digital detox intervention significantly reduced smartphone addiction among undergraduate nursing students. These findings are consistent with previous studies reporting that behavioural interventions and digital wellness education effectively reduce problematic smartphone use.

- Sleep quality significantly improved following the intervention, suggesting that limiting night-time smartphone use and promoting healthy sleep hygiene positively influence sleep outcomes. Similar findings have been reported in studies conducted among university students.
- Psychological well-being also improved significantly after the intervention. Reduced digital dependency, increased mindfulness, and better sleep may collectively contribute to improved emotional health and life satisfaction.
- The study findings support the integration of digital wellness education into nursing curricula to encourage responsible smartphone use and promote mental health among future healthcare professionals.

V. CONCLUSION

The structured digital detox intervention was effective in reducing smartphone addiction while improving sleep quality and psychological well-being among undergraduate nursing students. Educational institutions should implement regular digital wellness programs to foster healthy technology use and improve students' overall health and academic performance.

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Conflict of interest: None declared

Ethical clearances: Ethical Clearance Certificate was obtained by Institutional Ethical Committee.

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