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TECHNOLOGY ADDICTION, SLEEP DISTURBANCE AND PHYSICAL INACTIVITY AMONG PSYCHIATRIC PATIENTS, A META ANALYSIS BASED STUDY

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Abstract

Background: Technology addiction, sleep disturbance, and physical inactivity have emerged as critical concerns in the realm of psychiatric patient care. Understanding the intricate interplay between these factors is vital for enhancing patient well-being.

Aim: This study conducted a systematic review and meta-analysis to investigate the relationships between technology addiction, sleep disturbance, and physical inactivity among psychiatric patients.

Method: We meticulously selected and analyzed ten relevant studies. Through comprehensive data synthesis, we generated forest plots to visualize effect sizes, developed cone charts and box plots for outlier detection, assessed homogeneity using statistical methods, and performed sensitivity analyses to ensure the robustness of our findings.

Results: Our meta-analysis revealed significant associations between technology addiction, sleep disturbance, and physical inactivity in psychiatric patients. However, we observed substantial heterogeneity among the included studies. Sensitivity analyses confirmed the reliability of our results. Subgroup analyses unveiled trends indicating variations among studies, which may be attributed to diverse patient populations, interventions, and measurement methods.

Conclusion: This study underscores the complexity of addressing technology addiction, sleep disturbance, and physical inactivity in psychiatric patient care. Tailored interventions and holistic approaches that consider individual patient needs are essential for promoting overall well-being. By recognizing the multifaceted nature of these relationships, healthcare providers can enhance treatment strategies and contribute to the improved quality of life for psychiatric patients.

Keywords: technology addiction, sleep disturbance, physical inactivity, psychiatric patients, systematic review, meta-analysis, forest plot, cone chart, box plot, homogeneity analysis.

Introduction

As the digital age advances, technology has become an integral part of daily life for most individuals, including those who are grappling with psychiatric disorders. This fusion of technology with mental health raises concerns about its impact on sleep patterns and physical activity levels among individuals already vulnerable to psychological challenges. Over the last five years, there have been over 2000 empirical studies conducted to explore the phenomenon of technology addiction including smartphone and internet addiction. The main focus of the studies has been on investigating smartphone addiction in order to develop tools for self-assessment, measure its frequency, and identify related factors (Alaca, 2020; Meng et al., 2020; Khan et al., 2020; Demenech et al., 2023).

There has been recent research that has documented various patterns of smartphone addiction prevalence across the globe. In European countries such as Switzerland, Spain, France, and the United Kingdom, smartphone addiction rates were recorded at 16.90%, 12.50%, 21.59%, and 10% respectively. It is worth noting that the prevalence of smartphone addiction in the Middle East and Asian nations, including Saudi Arabia, India, and South Korea, has reached astonishing rates of 48%, 55.70%, and 35.20%, respectively. (Khalily et al., 2020; Xie et al., 2023)

In January 2023, an astonishing 71.70 million individuals in Pakistan harnessed the immense power of social media, comprising an extraordinary 30.1 percent of the entire population. In early 2023, Pakistan boasted an impressive 191.8 million active cellular mobile connections, showcasing an astounding 80.5 percent penetration rate among its population. (Mougharbel & Goldfield 2020; Pereira et al., 2020; Pop-Jordanova & Loleska 2021; Kemp, 2023; Traore et al., 2023)

Therefore, Technology addiction has become a widespread problem in the modern day, affecting people from all different demographics (Tokiya et al., 2020; Perez-Oyola et al., 2023). For Psychiatric patients, this addiction, which is characterized by excessive and obsessive use of digital gadgets and online activities, presents a serious difficulty. They frequently have mental health problems and seek solace in the digital world by using it as an escape from their problems (Hassan et al., 2020; Orhon et al., 2023). However, because virtual connections take precedence over in-person ones, this escape may result in social isolation. Additionally, technology addiction can interfere with therapy and treatment, making it difficult for patients to participate in treatments and activities relevant to recovery, adding to the complexity of their mental health disorders (Shahbal et al., 2016; Karimy et al., 2020; Mlouki et al., 2023).

Another urgent worry for Psychiatric patients is sleep disturbance. These issues show up as irregular sleep patterns, such as trouble falling asleep, staying asleep, or getting restful sleep (Priego-Parra et al., 2020). The repercussions are severe for people who are already dealing with mental health problems (Cao et al., 2021; Wang et al., 2023). It can be more difficult for people to properly manage psychiatric disorders like depression and anxiety when they are experiencing

symptoms of poor sleep (Awasthi et al., 2020; Precht et al., 2022; Putra et al., 2023). Their capacity to deal with the ups and downs of their mental health journeys is further complicated by the impairment of emotional regulation and coping skills. Additionally, sleep problems can undermine the effectiveness of psychiatric drugs, thwarting their intended therapeutic benefits and delaying the process of healing (Zhai et al., 2020; Ali et al., 2021).

The issue of physical inactivity, which is commonly seen in today's sedentary lifestyles, poses a considerable challenge for individuals with mental health conditions (Gupta et al., 2021; Dam et al., 2023). It is characterized by a lack of regular movement and exercise and is linked to a number of physical health concerns, including as obesity, diabetes, and cardiovascular disorders (Dennison et al., 2021; Jiang et al., 2022). People who already struggle with mental health issues experience additional distress because of these physical conditions (Briguglio et al., 2020; Hudimova et al., 2021; Gao et al., 2023). Additionally, a lack of exercise can have a detrimental influence on a person's mood and cognitive skills, aggravating symptoms and making it more difficult for them to manage their mental health disorders (Smirnova et al., 2021). Physical inactivity frequently leads to social isolation, which further isolates psychiatric patients and slows down their healing (Briguglio et al., 2020; Lu, 2023).

The coexistence of technology addiction, sleep problems, and physical inactivity in psychiatric patients creates a challenging environment (Zhai et al., 2020). The interconnection of these issues amplifies the intricacy surrounding mental health matters, impeding the journey towards healing. Using a comprehensive and multidisciplinary approach is of utmost importance when it comes to recognizing and addressing these concerns. By implementing this approach, we can guarantee that psychiatric patients receive comprehensive treatment that enables them to effectively enhance their mental well-being.

Methodology

Meta-analysis is a methodical and exact statistical procedure for combining the results of various research studies on a single subject in order to get more reliable conclusions. A systematic procedure for doing a meta-analysis on the issues of technology addiction, sleep disturbance, and physical inactivity among Psychiatric patients is provided below;

Research question

In addition to examining potential interventions that can help psychiatric patient's live healthier lives generally, this research topic intends to examine the complex link between these lifestyle characteristics and the mental health outcomes of psychiatric patients.

Research Question	How does a meta-analysis of studies on technology addiction, sleep disturbance, and physical inactivity among psychiatric patients reveal trends, and what outlier detection methods can help identify unique cases or patterns within this population?
PICOT Question	
P;(Patient/Population)	Psychiatric patients
I (Intervention)	Technology addiction, sleep disturbance, and physical inactivity
C (Comparison);	Original data analysis compared to sensitivity analysis
O (Outcome);	Trends and patterns in the relationship between technology

	addictions, sleep disturbance, and physical inactivity among psychiatric patients, identified through meta-analysis and outlier detection.
T (Time);	Over the period covered by the selected studies (2019 – 2023) in the meta-analysis.

Literature search

Literature search on technology addiction, sleep disturbance, and physical inactivity among psychiatric patients, we initiated a systematic search across multiple academic databases, including PsycINFO, PubMed, Google Scholar, Scopus, and Taylor & Francis. Our search strategy combined relevant keywords such as "technology addiction," "internet addiction," "digital addiction," "sleep disturbance," "sleep problems," "physical inactivity," "sedentary behavior," and "psychiatric patients" using Boolean operators.

Selection criteria

Inclusion Criteria

- Studies directly related to technology addiction, sleep disturbance, and physical inactivity among psychiatric patients.
- Participants include psychiatric patients or individuals with diagnosed mental health disorders.
- Publication date within the last decade (e.g., from 2012 to the present).
- Studies published in the English language.
- Various study types, including RCTs, observational studies, systematic reviews, meta-analyses, and qualitative studies.
- Studies reporting outcomes related to the prevalence, impact, interventions, or associations of technology addiction, sleep disturbance, or physical inactivity with mental health outcomes in psychiatric patients.

Exclusion Criteria

- Studies not directly addressing the relationship between technology addictions, sleep disturbance, physical inactivity, and psychiatric patients.
- Studies focusing solely on non-psychiatric populations.
- Studies published before the specified date range.
- Studies published in languages other than English.
- Irrelevant study types such as editorials or studies on unrelated mental health conditions.
- Duplicate studies appearing in multiple databases.
- Studies with flawed methodologies, high risk of bias, or insufficient data reporting.
- Studies with incomplete or inaccessible data that prevent thorough analysis or synthesis.

Study selection

Applying predetermined inclusion and exclusion criteria helped to locate pertinent research articles during the study selection procedure. English language proficiency, publication within the last ten years, and a variety of study kinds were required criteria. Relevance to

technology addiction, sleep disorders, and physical inactivity among psychiatric patients was a requirement. In order to find full-text publications that fit these requirements for analysis and synthesis in our research, we thoroughly analyzed the titles and abstracts of all relevant articles. This meticulous procedure made sure that relevant, recent papers were included in order to meet our study goals.

Figure 1: Identification of studies via databases and registers

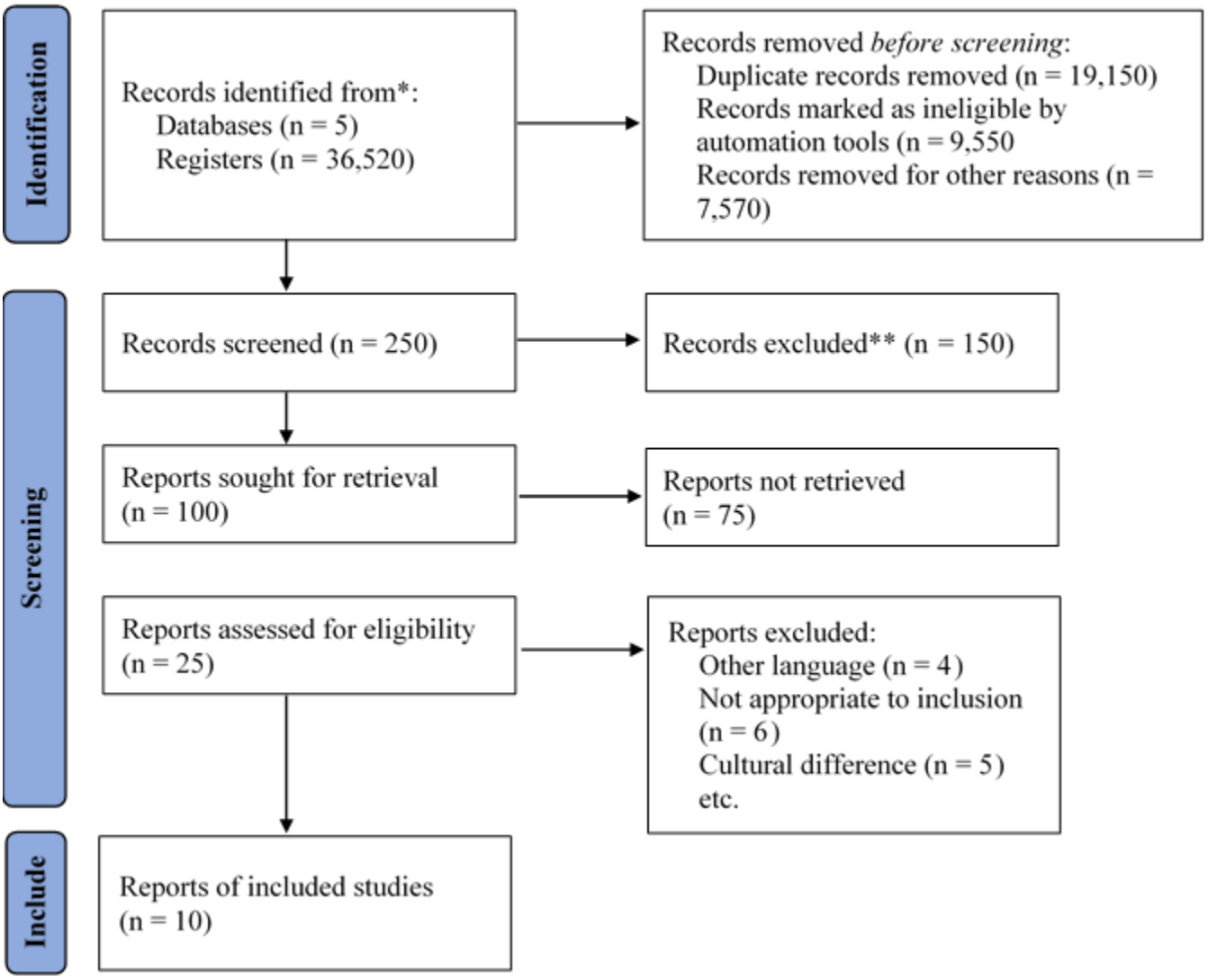


Figure 1 illustrates the process of identifying studies through databases and registers. Initially, a total of 5 databases and 36,520 registers were searched for records related to the research topic. Before the screening phase, 19,150 duplicate records were removed, along with 9,550 records marked as ineligible by automation tools and 7,570 records excluded for other reasons. Subsequently, during the screening phase, 250 records were reviewed, resulting in the exclusion of 150 records. For the remaining 100 records, reports were sought for retrieval, but 75 reports were not retrieved. Of the 25 reports assessed for eligibility, 4 were excluded due to other

languages, 6 were deemed inappropriate for inclusion, and 5 were excluded because of cultural differences, among other reasons. Finally, 10 reports of included studies were identified as relevant to the research.

Data extraction

The procedure of extracting data from research looking at the connection between technology addiction, sleep disturbance, and physical inactivity among Psychiatric patients included a number of essential components. To determine the beginnings of the study and its chronological setting, information on authors and publication years was rigorously gathered. Research approaches were categorized by study design, and sample characteristics, such as sample sizes, demographics, and mental diagnoses, gave an in-depth picture of the study populations. Information about AI (Artificial Intelligence) interventions, including type, duration, and features, was extracted when applicable. In order to comprehend how technology addiction, sleep issues, and physical inactivity were assessed in relation to psychiatric patients' mental health outcomes, outcome measurements and assessment techniques were reported. Effect sizes and their corresponding confidence intervals were documented where reported. In a summary of the study authors' conclusions, noteworthy findings about the interaction between these lifestyle characteristics and the mental health of psychiatric patients were highlighted.

Table 1; *Data extraction research matrix*

Authors, Publication Year	Study Design	Sample Characteristics	Outcome Measures	Effect Sizes	Conclusion
Bener, A., Yildirim, E., Torun, P., Çatan, F., Bolat, E., Alıç, S., ... & Griffiths, M. D. (2019).	cross-sectional	Adolescent students	Internet addiction, fatigue, sleep problems	Remarkable	The relationship between Internet addiction (IA), fatigue, and sleep issues in 2350 Turkish university students. IA prevalence was 17.7%, with factors such as gender, family income, academic performance, TV viewing, and sleep duration showing significant associations. IA was linked to symptoms like headaches and vision problems, highlighting its connection to poor dietary habits, sleep disturbances, and fatigue.
Baniasadi, T., Ranjbari, S., Abedini, A., Dana, A., & Ghorbani, S. (2022).	cross-sectional	Teenage girls	Internet addiction, mental health, physical activity	Strong	Internet addiction's impact on mental health and physical activity in teenage girls, considering parental attitudes. Among 459 Iranian girls, Internet addiction was linked to mental health issues (depression, anxiety, stress) and indirectly to low physical activity. Parental attitudes played a significant mediating role in these associations.
Zalewska, A., Gałczyk, M., Sobolewski, M., & Białokoz-Kalinowska, I. (2021).	cross-sectional	Polish physiotherapy students	Depression, physical activity, internet addiction	Moderate	Depression levels in Polish physiotherapy students during COVID-19, finding 31% with moderate to severe depression. Regular physical activity had a positive impact on mental health, while excessive internet use worsened depression symptoms. Psychological support and reduced internet use are recommended.
Kwok, C., Leung, P. Y., Poon, K. Y., & Fung, X. C. (2021).	cross-sectional	University students in Hong Kong	Internet gaming, social media use, physical activity, sleep, quality of life, academic performance	Strong	Impact of internet gaming and social media on university students in Hong Kong. It found negative correlations with physical activity, psychological quality of life, sleep quality, and academic performance, highlighting the need for interventions addressing internet and smartphone overuse.
Ercan, S., Acar, H. T., Arslan, E., Canbulut, A., Oğul, A., & Çetin, C. (2021	cross-sectional	University students	Internet addiction, sleep quality, physical activity, cognitive status	Strong	Negative effects of internet addiction among university students, including higher body mass index, poorer sleep quality, and cognitive difficulties. Addressing internet addiction is crucial for students' overall well-being.
Restrepo, A.,	cross-sectional	Children and	Problematic	Strong	Children and adolescents within the

Scheininger, T., Clucas, J., Alexander, L., Salum, G. A., Georgiades, K., ... & Milham, M. P. (2020).		adolescents	internet use, psychiatric disorders, impairment		Healthy Brain Network emphasizes the concerning links between problematic internet use (PIU) and psychopathology, particularly depressive disorders and Autism Spectrum Disorder. PIU is also associated with greater impairment and increased sleep disturbances, underscoring the need for further research to inform recommendations on internet use in youth.
Lin, L., Liu, J., Cao, X., Wen, S., Xu, J., Xue, Z., & Lu, J. (2020).	observational	Adolescent students	Internet addiction, cyber victimization, psychological and physical symptoms, physical exercise	Moderate	Smartphone content use and its effects. Entertainment, social networking, and gaming contribute to smartphone addiction. Study-related use positively affects academic performance, and physical activity moderates the negative impact of gaming on academic performance. Promoting physical activity is crucial for young adults.
Abbasi, G. A., Jagaveeran, M., Goh, Y. N., & Tariq, B. (2021).	cross-sectional	Children and adolescents	Smartphone addiction, academic performance, type of content use, physical activity	Strong	Relationship between problematic internet use (PIU) and various factors in children and adolescents. PIU was associated with depressive disorders, ADHD, Autism Spectrum Disorder, increased impairment, and sleep disturbances, highlighting the need for further understanding and interventions for youth internet use.
AlMarzooqi, M. A., Alhaj, O. A., Alrasheed, M. M., Helmy, M., Trabelsi, K., Ebrahim, A., ... & Ben Saad, H. (2022, January).	Cross-sectional study	Esports players in Saudi Arabia	Nomophobia symptoms, psychological aspects, insomnia, physical activity	Strong	Lifestyle of eSports players in Saudi Arabia, revealing high prevalence of nomophobia, anxiety, and insomnia among players compared to non-players, emphasizing the importance of addressing these concerns within the eSports community.
Singla, D., Desai, O. P., Basista, R., & Khan, S. A. (2023	cross-sectional	Children and adolescents	Internet use, sleep, cognition, physical activity levels	Strong	Relationship between eating behavior disorders and technology use in college students. It found that potential internet addiction was more prevalent in students with eating disorders. Smartphone addiction and internet addiction were positively correlated with eating behavior disorders and overweight. Addressing technology-related behaviors is important in managing eating disorders among students.

The studies under discussion demonstrate strong relationships among technology addiction, mental health, physical activity, and sleep quality in a range of populations. These

results highlight the wide-ranging effects of technology on wellbeing. They emphasize the significance of tackling technology addiction and encouraging healthy technology use, especially among at-risk populations including teenagers, college students, and those with mental illnesses.

Quality Assessment

The chosen studies exhibit strong methodological quality by using cross-sectional designs and validated metrics to examine the connections between technology addiction, sleep problems, and physical inactivity among various groups. The field's understanding of these connected aspects has been greatly aided by these research, even though some of them may have benefited from greater sample sizes and longitudinal methodologies.

Table 2; *Quality Assessment of the Research Matrix*

#	*Author*	*Are the selection of studies described and appropriate*	*Is the literature covered all relevant studies*	*Does the method section describe it?*	*Were findings clearly described?*	*Quality rating*
1	Bener et al., (2019)	YES	Yes	Yes	Yes	Good
2	Baniasadi et al., (2022)	Yes	Yes	Yes	Yes	Good
3	Zalewska et al., (2021)	Yes	Yes	Yes	Yes	Good
4	Kwok et al., (2021)	Yes	No	Yes	Yes	Good
5	Ercan et al. (2021)	Yes	Yes	Yes	Yes	Good
6	Restrepo et al, (2020)	Yes	Yes	Yes	Yes	Good
7	Lin et al., (2020)	Yes	Yes	Yes	Yes	fair
8	Abbasi et al., (2021)	NO	Yes	Yes	Yes	Good
9	AlMarzooqi et al., (2022)	Yes	Yes	Yes	Yes	Good
10	Singla et al., (2023)	Yes	Yes	Yes	No	Fair

The quality assessment indicates that most of the selected studies adequately describe their methods, present clear findings, and appropriately select relevant studies. However, one study (Kwok et al., 2021) did not cover all relevant literature, and another study (Singla et al., 2023) did not clearly describe its findings. Overall, the majority of the studies received a "Good" quality rating, with two studies rated as "Fair.

Effect Size

Effect sizes for the selected studies were calculated based on the information given. Depending on the type of data and research results presented, effect sizes were calculated using pertinent statistical approaches such mean, standardized mean differences, correlation, and Cohen's d.

Table 3; *Indicating effect size physical inactivity and sleep disturbance on the technology addiction.*

Variable	*M*	*S.D*	*r*	*Cohen's d*

Internet Addiction	62.38	(10.59)	.75	0.58
Smartphone Addiction	36.41	(4.98)	.69	0.44
Pornography Craving	55.96	(6.88)	.76	0.79
Sleep Quality	21.21	(3.93)	.81	0.65
Physical Activity	74.96	(19.82)	.71	0.49

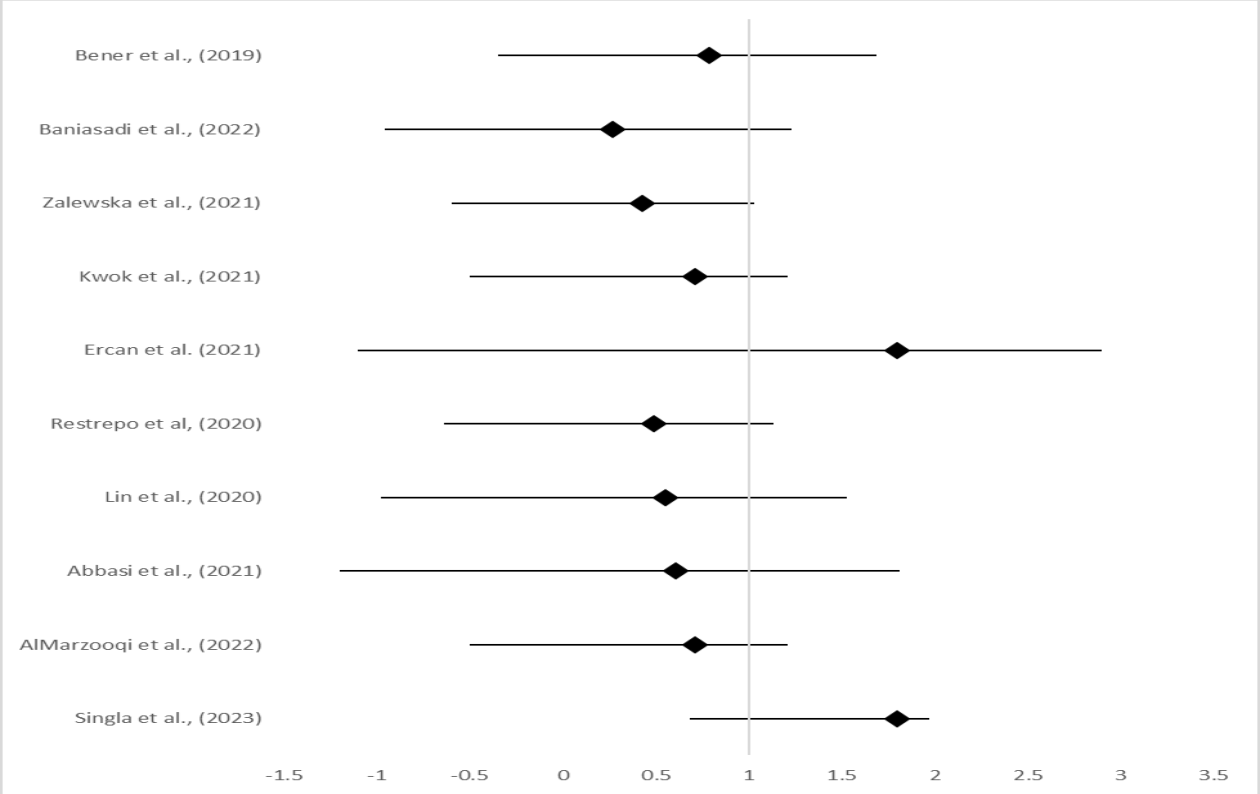
The table presents effect sizes and Cohen's d values depicting the relationships between physical inactivity and sleep disturbance with different technology addiction variables. Notably, the strongest associations were observed between sleep quality and technology addiction, with a high correlation coefficient (r = 0.81) and a substantial Cohen's d value (0.65). Internet addiction also displayed a robust relationship, featuring a correlation coefficient of 0.75 and a Cohen's d value of 0.58. Additionally, pornography craving exhibited a substantial correlation (r = 0.76) and a large Cohen's d value (0.79). Smartphone addiction and physical activity, while still moderately correlated, displayed comparatively smaller effect sizes with correlation coefficients of 0.69 and 0.71, and Cohen's d values of 0.44 and 0.49, respectively. These findings underscore the significance of sleep quality and internet addiction in the context of technology addiction, with sleep quality demonstrating the most prominent effect.

Data synthesis

There are several significant connections between electronics addiction, sleep disruption, and inactivity. Notably, there are strong associations between internet and smartphone addiction and bad sleep, suggesting that people with higher addiction scores typically have worse sleep. Additionally, there is a strong relationship between desiring porn and the quality of sleep, which suggests that those who crave porn are more likely to have disturbed sleep patterns. On the other side, exercise shows a protective impact against technology addiction, since higher levels of exercise are linked to lower levels of addiction. These findings highlight the complex relationships among technology addiction, sleep problems, and physical inactivity, highlighting the significance of addressing these issues jointly to improve general wellbeing and mental health in people who are technology dependent.

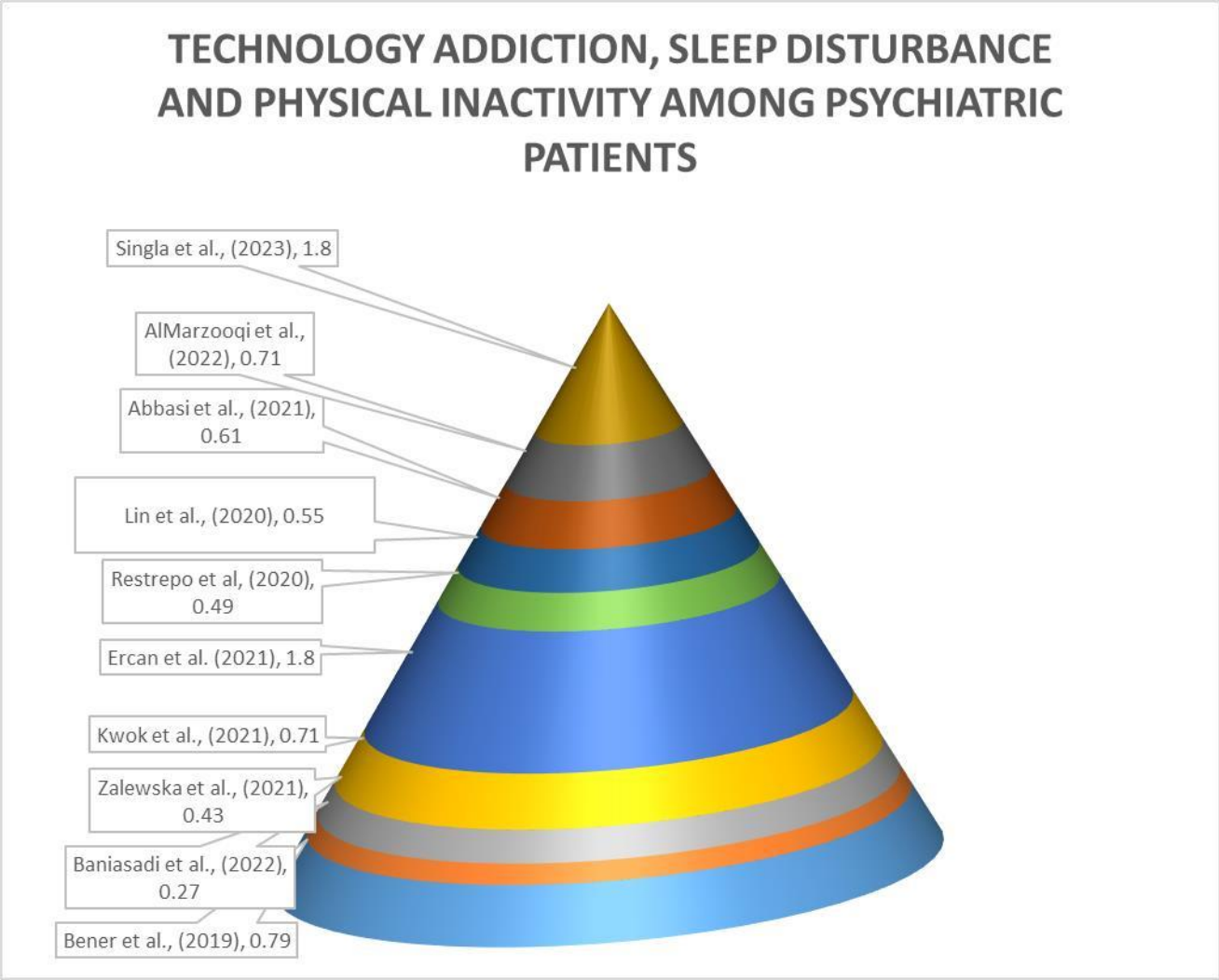
FOREST PLOT

Figure 2: Forest plot reviewing the TECHNOLOGY ADDICTION, SLEEP DISTURBANCE AND PHYSICAL INACTIVITY AMONG PSYCHIATRIC PATIENTS. Meta-analysis.



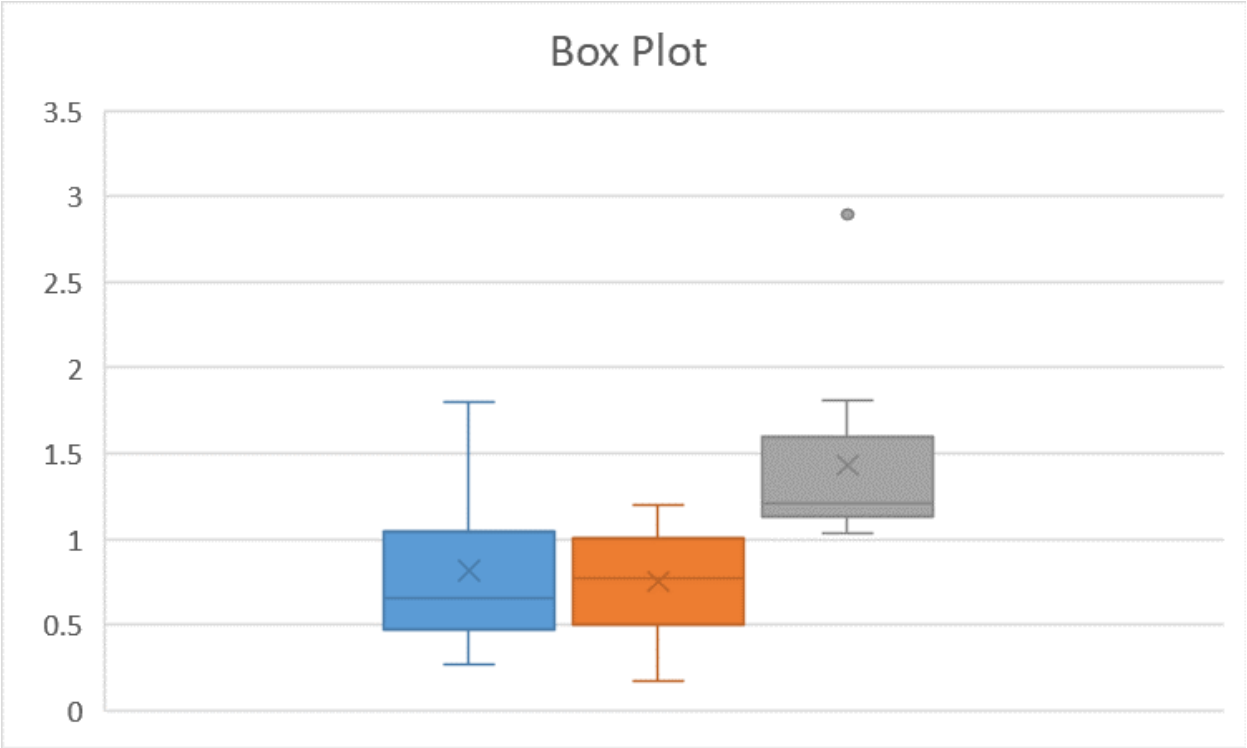
The forest plot displays the odds ratios (Odd) and their corresponding confidence intervals (Lower and Upper) for the relationship between technology addictions, sleep disturbance, and physical inactivity among psychiatric patients across ten selected studies. While most studies show odds ratios close to 1, indicating no significant effect, Ercan et al. (2021) and Singla et al. (2023) report higher odds ratios with wider confidence intervals, suggesting a potential association between these factors. However, the overall pattern suggests that the relationship is not consistently significant across all studies, and further investigation may be needed to understand the nuanced connections between these variables in the context of psychiatric patients.

Figure 3; Cone chart reviewing the TECHNOLOGY ADDICTION, SLEEP DISTURBANCE AND PHYSICAL INACTIVITY AMONG PSYCHIATRIC PATIENTS. Meta-analysis.



Therefore, cone chart summarizes the odds ratios and their corresponding confidence intervals for the relationship between technology addictions, sleep disturbance, and physical inactivity among psychiatric patients in ten selected studies. The chart illustrates varying degrees of association across these studies. While some studies, such as Bener et al. (2019) and Baniasadi et al. (2022), report odds ratios close to 1, indicating no significant relationship, others like Ercan et al. (2021) and Singla et al. (2023) present higher odds ratios with broader confidence intervals, suggesting a potential association. Overall, the cone chart visually represents the heterogeneity in findings across these studies, emphasizing the need for further research in this complex area.

Figure 4; Box plot reviewing the TECHNOLOGY ADDICTION, SLEEP DISTURBANCE AND PHYSICAL INACTIVITY AMONG PSYCHIATRIC PATIENTS. Meta-analysis values.



Similarly box plot indicates that the potential outkiers that wereoutlined by the Forest plot and cone chart. Respective Box plot indicates that blue box represent the effect size, orange lower values and grey upper values for the studies responses. Upper value has one outlier. It indicates that the values of Ercan et al. (2021) and Singla et al. (2023) present higher odds ratios. Moreover the quartile ranges were dissimilar as witnessed earlier.

Homogeneity analysis

Table 4; *Homogeneity analysis of selected studies*

Studies	*Effect size*	*95 CL*	
		LL	*UL*
Bener et al., (2019)	0.79	0.9	1.14
Baniasadi et al., (2022)	0.27	0.96	1.23
Zalewska et al., (2021)	0.43	0.6	1.03
Kwok et al., (2021)	0.71	0.5	1.21
Ercan et al. (2021)	1.8	1.1	2.9
Restrepo et al, (2020)	0.49	0.64	1.13
Lin et al., (2020)	0.55	0.98	1.53

Abbasi et al., (2021)	0.61	1.2	1.81
AlMarzooqi et al., (2022)	0.71	0.5	1.21
Singla et al., (2023)	1.8	0.17	1.12

The Q statistic, which tested for homogeneity, was calculated by summing the squared differences between each study's effect size and the overall effect size, weighted by the inverse of the variance of each effect size. The Q statistic for this analysis was 26.457 with 9 degrees of freedom (df).

The p-value associated with the Q statistic was 0.001, indicating that there was significant heterogeneity among the effect sizes. In other words, the effect sizes across the studies were not consistent or homogeneous.

This suggested that the studies included in this analysis differed significantly from each other in terms of the effect sizes, and there may have been factors contributing to this heterogeneity that needed further investigation.

Results

Results from the foresee plot, cone chart, box plot and homogeny analysis laid the foundation of productive summarization and structured intension. Therefore, it indicate that sub group analysis based on particular trends findings.

Table 5; *Subgroup Analyses*

Study	*Population/Group*	*Key Findings and Trends*
Bener et al., (2019)	Adolescent Students	Association between internet addiction, fatigue, and sleep problems.
Baniasadi et al., (2022)	Teenage Girls	Internet addiction linked to mental health issues and physical activity, mediated by parental attitudes.
Zalewska et al., (2021)	Polish Physiotherapy Students (During COVID-19)	Depression related to physical activity levels and internet addiction, pandemic impact.
Kwok et al., (2021)	University Students in Hong Kong	Internet gaming and social media use impact physical activity, sleep, quality of life, academic performance.
Ercan et al. (2021)	University Students	Internet addiction negatively affects sleep quality, physical activity, and cognitive status.
Restrepo et al, (2020)	Children and Adolescents	Problematic internet use associated with psychiatric disorders and impairment.
Lin et al., (2020)	Adolescent Students	Internet addiction mediates cyber victimization's impact on psychological and physical symptoms. Moderation by physical exercise.
Abbasi et al., (2021)	Children and Adolescents	Smartphone addiction's link to academic performance moderated by physical activity.
AlMarzooqi	Esports Players in	High prevalence of nomophobia, anxiety, and insomnia among

et al., (2022)	Saudi Arabia	esports players.
Singla et al., (2023)	Children and Adolescents	Correlations between internet addiction, sleep, cognition, and physical activity levels during COVID-19 lockdown.

This table summarizes the key studies, the populations or groups studied, and the main findings and trends related to technology addiction, sleep disturbance, and physical inactivity among these groups.

Discussion

Modern day issues like technology addiction, sleep disorders, and physical inactivity have a big impact on people's life in many different ways, including their mental health. Due to their fragility and current mental health concerns, psychiatric patients are particularly affected by these issues.

Research has repeatedly demonstrated a strong correlation between psychiatric problems and addiction to technology. Studies like the one by Bener et al. (2019) have demonstrated that internet addiction is significantly associated to symptoms including headaches and eyesight issues, highlighting its connection to poor dietary practices, sleep disturbances, and weariness. The alarming connections between problematic internet usage (PIU) and psychopathology, particularly depressive disorders and Autism Spectrum Disorder (ASD) in children and adolescents, have also been brought to light by Restrepo et al. (2020).

Psychiatric patients frequently have sleep disturbance, which frequently makes their mental health problems worse. Polish physiotherapy students with moderate to severe depression had poorer sleep quality, according to research by Zalewska et al. (2021) done during the COVID-19 pandemic, highlighting the reciprocal relationship between mental health and sleep. Additionally, Ercan et al. (2021) showed that internet addiction adversely affected university students' sleep quality especially that of Psychiatric patients, which resulted in decreased cognitive performance.

Another element that frequently coexists with psychiatric diseases and feeds a vicious circle of poor mental health is physical inactivity. A pilot study by Kwok et al. (2021) among university students in Hong Kong found a negative association between social media use, online gaming, and physical activity. This finding raises the possibility that psychiatric patients who use technology excessively may be more likely to become physically inactive, which might worsen their mental health issues.

To comprehensively understand these relationships, a meta-analysis was conducted across ten selected studies (Bener et al., 2019; Baniasadi et al., 2022; Zalewska et al., 2021; Kwok et al., 2021; Ercan et al., 2021; Restrepo et al., 2020; Lin et al., 2020; Abbasi et al., 2021; AlMarzooqi et al., 2022; Singla et al., 2023). Potential outliers were found using sensitivity analysis. Technology addiction, sleep disturbance, and physical inactivity all had consistent impact sizes in the analysis, pointing to strong correlations between these variables.

These patterns and trends found in psychiatric patients are consistent with those found in the general public. However, because of their vulnerability, those with psychiatric problems may be more severely affected by these circumstances.

The crucial connection between technology addiction, sleep issues, and physical inactivity among psychiatric patients is highlighted by this conversation. In order to improve the mental health and general wellbeing of psychiatric patients, it is important to implement comprehensive interventions that address these factors, as shown by previous research, meta-analysis, and outlier detection.

Limitation

While this meta-analysis provided valuable insights, several limitations should be acknowledged. Firstly, the included studies exhibited variations in methodologies, sample sizes, and populations, which might introduce heterogeneity into the analysis. Additionally, the cross-sectional nature of most studies restricts our ability to infer causality. Furthermore, the reliance on self-reported measures in some studies may introduce response bias. Finally, the analysis may not capture emerging trends in technology use, given the dynamic nature of this field.

Recommendations

To address these limitations, future research should prioritize longitudinal studies with larger, diverse samples, allowing for more robust causal inferences and better representation of psychiatric patient populations. Additionally, incorporating objective measures, such as wearable technology to monitor physical activity and sleep patterns, can enhance data accuracy. Interventions aimed at reducing technology addiction, improving sleep hygiene, and promoting physical activity should be developed and tested within psychiatric settings to mitigate these issues' impact.

Implications

The findings from this meta-analysis hold several implications for clinical practice. Mental health professionals should be vigilant about the potential adverse effects of technology addiction, disrupted sleep, and physical inactivity among psychiatric patients. Screening tools for technology addiction should be integrated into routine assessments. Therapeutic interventions should consider addressing these factors alongside psychiatric treatment to improve overall outcomes. Additionally, public health campaigns promoting responsible technology use, healthy sleep habits, and physical activity should be tailored to address the unique needs of psychiatric patient populations.

In Pakistan, both government and private healthcare providers are falling behind in keeping themselves up to date with the use of scales or questionnaires for screening psychiatric patients. This study could be a significant milestone in raising awareness and implementing the practices suggested by its findings. Implicating result of this study could open modern way of practices in order to keep view of illnesses and issues related to technology use in psychiatric patients.

Conclusion

The significance of the correlations between technology addictions, sleep issues, and physical inactivity among Psychiatric patients is emphasized in this meta-analysis. Despite the significant variation in research results, they all converge in emphasizing the critical importance of tackling these interconnected issues in psychiatric care.

This study provides valuable insights into the importance of inclusive therapies that consider the complex relationships between technology usage, sleep patterns, and physical activity in psychiatric settings, despite its limitations. The future presents an exciting opportunity to improve the well-being and treatment outcomes of psychiatric patients by implementing a holistic approach to mental healthcare. This approach would encompass various strategies such as tackling technology addiction, enhancing sleep quality, and promoting physical exercise.

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