Frontiers in Health Informatics
ISSN-Online: 2676-7104
www.healthinformaticsjournal.com
2024; Vol 13: Issue 6
Open Access

The Impact of Smartphone Addiction on Adolescents' Quality of Life: A Systematic Review

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Cite this paper as: Lalit Rajpurohit, Dr. KC Yadav (2024) The Impact of Smartphone Addiction on Adolescents' Quality of Life: A Systematic Review. Frontiers in Health *Informatics*, *13(6)* 681-692

ABSTRACT

Background: The pervasive use of smartphones among students has led to growing concerns about smartphone addiction and its potential negative impact on adolescents' quality of life (QoL). This systematic review aims to synthesize existing research on the relationship between smartphone addiction and various dimensions of QoL, health-related quality of life (HRQoL), and well-being among students.

Methods: A systematic search was conducted across PubMed, Scopus, Web of Science, and PsycINFO databases to identify relevant studies published between January 2010 and August 2024. Inclusion criteria were original research articles that specifically assessed smartphone addiction and its impact on students' QoL. After screening and eligibility assessment, 12 studies with a total of 7130 participants were included in the review.

Results: The majority of studies reviewed reported a significant negative association between smartphone addiction and overall QoL, particularly in domains related to physical health, psychological well-being, and social relationships. Students with higher levels of smartphone addiction tended to experience poorer HRQoL and lower well-being. In addition, lower QoL was found to predict higher levels of smartphone addiction in some studies, suggesting a potential cyclical relationship. However, some studies presented inconsistent findings, which could be attributed to differences in populations, cultural contexts, and measurement tools.

Conclusions: The findings of this review highlight the detrimental impact of smartphone addiction on adolescents' QoL, HRQoL, and well-being. These results emphasize the need for interventions aimed at promoting healthier smartphone use among students. Future research should focus on longitudinal studies to establish causality and further explore the mechanisms underlying the relationship between smartphone addiction and quality of life.

Keywords: Smartphone addiction, Adolescents, Quality of life, Health-related quality of life, Well-being, Systematic review.

INTRODUCTION

Smartphone addiction among adolescents has emerged as a significant public health concern, with various studies highlighting its widespread prevalence and detrimental impact on their quality of life.[1] Adolescents, due to their developmental stage, are particularly susceptible to the psychological and social consequences of excessive smartphone use[2]. The high prevalence of smartphone addiction, with some studies reporting rates as high as 62.6% among Filipino high school students, underscores the urgency of addressing this issue.[3] The addiction is linked to a variety of negative outcomes, including impaired mental health, reduced social interactions, and diminished academic performance.[4] Adolescents who are addicted to smartphones are more likely to suffer from anxiety,

depression, and loneliness, while also experiencing disruptions in their physical well-being, particularly sleep quality.[5,6]

The psychological impact of smartphone addiction is profound, often leading to emotional disturbances such as anxiety and depression.[7] These issues are further compounded by decreased self-esteem and poor emotional regulation, which can severely affect an adolescent's overall mental health.[8] the excessive use of smartphones can disrupt social interactions, leading to increased feelings of loneliness and a reduction in both the quality and quantity of social relationships. This social isolation is particularly concerning during adolescence, a critical period for soc1ial development.[9]

Academically, smartphone addiction poses significant challenges. The constant distraction provided by smartphones can lead to a decline in academic focus and achievement, with studies showing that adolescents who are highly addicted to smartphones tend to have lower academic performance and are more likely to exhibit symptoms of Attention Deficit Hyperactivity Disorder (ADHD).[10–12] Lifestyle factors such as poor sleep quality and irregular sleep patterns are prevalent among adolescents with smartphone addiction, further exacerbating their academic difficulties.[6]

Gender differences also play a role in how smartphone addiction impacts adolescents. Research indicates that female adolescents are more prone to smartphone addiction and its associated negative outcomes compared to their male counterparts[13]. This disparity may be attributed to different patterns of smartphone use and socialization, with females more likely to engage in social media and communication apps that can contribute to higher levels of addiction.

Overall, smartphone addiction among adolescents is a pressing issue that negatively impacts their quality of life in multiple dimensions, including psychological well-being, social interactions, and academic performance.[14] As smartphone usage continues to rise, particularly among younger populations, it is crucial to implement targeted interventions and educational programs that promote healthier smartphone use and enhance the overall well-being of adolescents. Addressing this issue requires a multifaceted approach that considers the psychological, social, and academic factors contributing to smartphone addiction and its impact on adolescents.

Despite the increasing awareness of smartphone addiction, there remains a need for a comprehensive examination of its impact on students' quality of life across different cultures and educational settings. This systematic review aims to synthesize existing research on the relationship between smartphone addiction and various dimensions of students' quality of life, including physical health, mental well-being, academic performance, and social relationships. By examining studies from diverse geographical regions and educational contexts, this review seeks to provide a global perspective on the extent and implications of smartphone addiction among students.

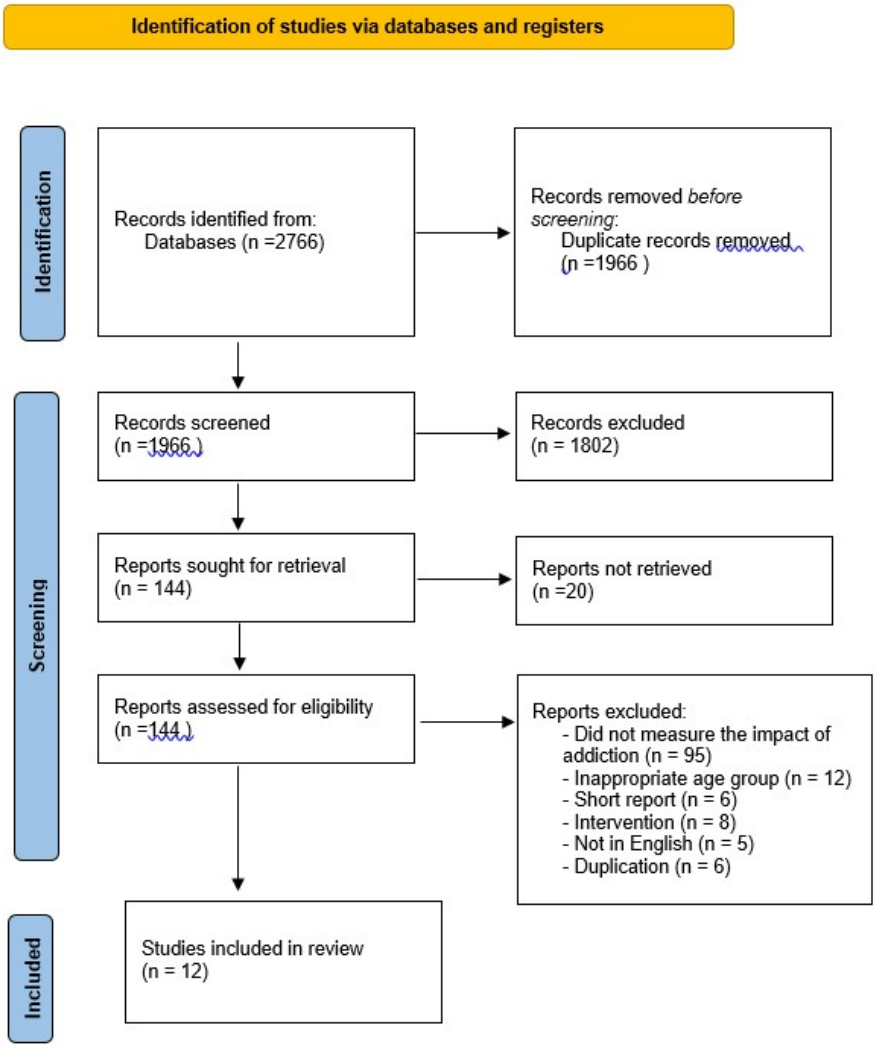

FIGURE 1: PRISMA flow diagram depicting the selection of reports and studies

Methodology

Study Design

This systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The primary objective was to synthesize existing research on the impact of smartphone addiction on the quality of life among students, focusing on various dimensions, including physical health, mental well-being, academic performance, and social relationships.

Search Strategy

A comprehensive literature search was performed across multiple electronic databases, including PubMed, Scopus, Web of Science, and PsycINFO, to identify relevant studies published between January 2010 and August 2024. The search terms used included a combination of keywords such as "smartphone addiction," "mobile phone addiction," "quality of life," "students," "academic performance," "mental health," and "physical health." Boolean operators (AND, OR) were employed to refine the search strategy and ensure comprehensive coverage of relevant studies.

Inclusion and Exclusion Criteria

Inclusion Criteria:

- Studies published in peer-reviewed journals.
- Studies that assessed smartphone addiction using validated scales (e.g., Smartphone Addiction Scale [SAS], Mobile Phone Addiction Scale [MPAS]).
- Studies that examined the impact of smartphone addiction on students' quality of life, including physical, psychological, and social dimensions.
- Studies with a sample comprising students from secondary education, higher education, or vocational training institutions.

Exclusion Criteria:

- Studies not published in English.
- Studies that did not specifically assess smartphone addiction (e.g., general internet addiction).
- Studies focusing on populations other than students (e.g., working adults, elderly).
- Case studies, editorials, commentaries, and non-empirical papers.

Data Retrieval and Eligibility Assessment

Initially, a total of 2766 records were identified through database searching. After removing duplicates, 1966 unique records were screened by their titles and abstracts to determine relevance. Records that appeared potentially relevant were sought for full-text retrieval, resulting in 144 reports being obtained.

These full-text reports were then assessed for eligibility based on the predefined inclusion and exclusion criteria. During this eligibility assessment, 131 reports were excluded for reasons such as not measuring the impact of smartphone addiction (95 reports), focusing on an inappropriate age group (12 reports), being short reports (6 reports), or not being published in English (5 reports). A total of 12 studies met the inclusion criteria and were included in the systematic review.

Quality Assessment

The quality of the included studies was evaluated using the Newcastle-Ottawa Scale (NOS) for observational studies. The NOS assesses studies based on three domains: selection of participants, comparability of study groups, and ascertainment of outcomes. Studies were categorized as high, medium, or low quality based on their NOS scores.

Data Synthesis

A narrative synthesis approach was employed to summarize the findings from the included studies. Due to the heterogeneity in study designs, populations, and outcome measures, a meta-analysis was not conducted. Instead, the results were grouped according to the dimensions of quality of life assessed (e.g., physical health, mental well-being, academic performance, and social relationships) and were presented in tabular form.

Ethical Considerations

As this study involved the synthesis of previously published data, no new ethical approval was required. However, all included studies were required to have obtained ethical approval from their respective institutional review boards (IRBs).

Author name	Sample Size	Age (Mean ± SD)	Gender (Male/Female %)	Country	Measure PSU	Measure Outcome Variable	Main Results
Demirkan AK (2024)zzz	496	20.52 ± 1.69 years	Male: 51.4%, Female: 48.6%	Turkey	Smartphone Addiction Scale-	WHOQOL-BREF, Symptom Checklist	59.87% of participants were

					Short Version (SAS-SV)	(SCL-90-R), Eysenck Personality Questionnaire	identified as smartphone addicts. Smartphone addiction was associated with poorer quality of life and higher levels of personality disorder symptoms.
Buctot DB et al. (2023)[16]	1338	15-18 years	Male: 38.1%, Female: 61.9%	Philippines	Smartphone Addiction Scale-Short Version (SAS-SV)	KIDSCREEN-27 (Health-Related Quality of Life)	Adolescent lifestyle profiles significantly mediated the relationship between smartphone addiction and health-related quality of life.
Susmitha TS et al.[17] (2023)	427	Not specified	Female: 79%, Male: 21%	India	Smartphone Addiction Scale-Short	Pittsburgh Sleep Quality Index (PSQI),	42% of students were addicted to

					Version (SAS-SV)	WHO-5 Well Being Index	smartphones, showing poor sleep quality and mental wellbeing.
de Oliveira MM et al.[18] (2023)	269	Medical students	51.4% females	Brazil	Internet Addiction Test	Quality of Life (WHOQOL-BREF), Academic Motivation Scale, DASS-21	Digital dependence predicted worse mental health and lower QoL.
Taşkaya C[19] et al. (2022)	350	University students	Not specified	Turkey	Smartphone Addiction Scale-Short Version (SAS-SV)	Pittsburgh Sleep Quality Index (PSQI), Beck Depression Inventory (BDI), SF-36	Significant correlations between smartphone addiction, poorer sleep quality, higher depression, and lower QoL.
Lintin L et[20] al. (2022)	33	18-23 years	Male: 34.4%, Female: 60.6%	Indonesia	Smartphone Addiction Scale (SAS)	WHOQOL-BREF (Quality of Life Questionnaire)	Moderate smartphone addiction tendencies but maintained a high quality of

							life among students with disabilities.
Pradeep et[21] al. (2022)	250	22 ± 2.5 years	Not specified	India	Smartphone Addiction Scale (SAS)	Academic Performance, General Health Questionnaire (GHQ)	Significant negative impact of smartphone addiction on academic performance and mental health.
Awasthi S et[22] al. (2020)	395	20.94 ± 1.8 years	Male: 39%, Female: 61%	India	Smartphone Addiction Scale-Short Version (SAS-SV)	WHOQoL-BREF (physical, psychological, social, environmental)	43.8% of students were addicted to smartphones, significantly affecting their quality of life across all domains.
Shahrstaki E et al.[23] (2020)	500	18-30 years	Male: 50%, Female: 50%	Iran	Smartphone Addiction Scale (SAS)	WHOQOL-BREF	Inverse relationship between smartphone addiction and quality of life,

							affecting physical, mental, and social well-being.
Li L et al.[24] (2020)	2312	Not specified	Male: 25.6%, Female: 74.4%	China	Mobile Phone Addiction Scale (MPAS)	WHOQOL-BREF (Quality of Life Questionnaire)	High academic pressure and poor academic performance were positively associated with mobile phone addiction, which negatively impacted all QOL domains.
Miri M et[25] al. (2020)	360	25.1 ± 6.3 years	Male: 24.5%, Female: 75.5%	Iran	Persian Mobile Phone Addiction Scale (PMPAS)	SF-12 (Quality of Life Questionnaire)	High prevalence of mobile phone addiction among students, with a significant negative effect on the mental component of quality of life.

Khan K et[26] al. (2021)	400	21.2 ± 1.82 years	Male: 39.75%, Female: 60.25%	Pakistan	Screen time and cellphone use addiction	Quality of Life (mental, physical, social)	High cellphone use correlated with poor quality of life, mental distress, and social issues.

RESULTS

Sample of included studies

Overall, 2766 articles were found in the initial search process, and no additional articles were identified through the reference search strategy. Of these, 800 duplicates had to be removed. Subsequently, 1966 articles were excluded since they were not written in English, did not constitute original research articles, were not published in peer-reviewed journals, or did not exclusively focus on students. Articles focusing on general internet addiction or other digital media use were excluded. Articles were only considered if they explicitly assessed the impact of smartphone addiction on students' quality of life.

The final sample comprised $k = 12$ articles with an overall $n = 7130$ participants. Of these, three (25.0%) were carried out in India, two (16.7%) in Turkey, and two (16.7%) in Iran. The Philippines, Brazil, Indonesia, Pakistan, and China were represented with one paper each in the review.

To measure smartphone addiction, 75.0% ($k = 9$) of the included studies used the Smartphone Addiction Scale–Short Version (SAS–SV), while the full Smartphone Addiction Scale (SAS) was applied in 16.7% ($k = 2$) of the studies. The remaining study used the Internet Addiction Test (IAT) for assessing digital dependence.

In most of the included studies ($k = 8$, 66.7%), the distribution of male and female participants was almost equal (50% ± 10%). One study had a significantly higher proportion of female participants (75.5%), while another study reported a predominance of male participants (51.4%).

For assessing quality of life (QoL), 75.0% ($k = 9$) of the included studies employed the WHOQOL-BREF scale, which evaluates physical, psychological, social, and environmental domains. The remaining studies used various scales such as the Pittsburgh Sleep Quality Index (PSQI), KIDSCREEN-27, and SF-12 to measure specific dimensions of QoL like sleep quality, health-related quality of life, and general health status.

Outcomes

1. Overall QoL, HRQoL, and Well-being

Out of the total twelve included studies, four examined overall quality of life (QoL),[15,22,23] three focused on health-related quality of life (HRQoL)[1,18,19], and three evaluated well-being [17,18,21] in students with smartphone addiction. Significant negative correlations were reported between smartphone addiction and QoL[22,23], as well as between smartphone addiction and total HRQoL[16]. lower QoL was found to predict higher levels of smartphone addiction[22]. In addition to the overall constructs of QoL and HRQoL, smartphone addiction was also found to be significantly negatively associated with several sub-domains such as psychosocial health (i.e., emotional, social, and school functioning) [15,22,23] physical health,[15,16,22] social QoL (i.e., personal relationships, social support)[23], environmental QoL (i.e., freedom, physical safety, home environment), school environment (i.e., feelings about school)[16,26]

moods and emotions (i.e., stress, depressive mood), self-perception (i.e., satisfaction with bodily appearance), autonomy (i.e., the ability to organize their free time), parent relations and home life (i.e., atmosphere at home, relationship with their parents), as well as financial resources.[26]

In the context of well-being, smartphone addiction was associated with less perceived social support and a decreased ability to understand and resolve problematic social situations.[21] Another study[18] found a significant moderation effect of smartphone addiction on the link between self-regulation and well-being, concluding that a high level of smartphone addiction may weaken the effect of self-regulation on well-being.

No significant associations were found regarding smartphone addiction and the HRQoL subscale peers and social support (relationship with other students)[16,26] and social acceptance (e.g., bullying) [19]. Contrarily, one study (Demirkan AK, 2024) yielded no significant correlation between smartphone addiction and overall QoL.[15] Another study[9] (Buctot DB et al., 2023)[16] found that the association between smartphone addiction and physical well-being was not significant upon detailed analysis, while another study (Khan K et al., 2021) reported no significant correlation between smartphone addiction and autonomy and relationships with parents, thus yielding slightly different results.[26]

DISCUSSION

This systematic review aimed to synthesize the existing literature on the impact of smartphone addiction on various dimensions of quality of life (QoL), health-related quality of life (HRQoL), and well-being among students. The findings of this review highlight the pervasive negative consequences of excessive smartphone use on students, corroborating the growing body of evidence that identifies smartphone addiction as a significant public health concern.

Overall Impact on Quality of Life

The review found a consistent negative association between smartphone addiction and overall quality of life across multiple studies.[15,22,23] Students who exhibited higher levels of smartphone addiction tended to report poorer overall QoL, which aligns with the hypothesis that excessive smartphone use can detract from essential life activities such as academic performance, physical health, and social interactions. The fact that lower QoL also predicted higher levels of smartphone addiction[22]suggests a potentially cyclical relationship where decreased quality of life may drive further dependence on smartphones as a coping mechanism, further exacerbating the issue.

Health-Related Quality of Life (HRQoL) and Well-being

The impact of smartphone addiction on HRQoL and well-being was also significant. Studies included in this review reported that higher levels of smartphone addiction were associated with poorer HRQoL, particularly in domains related to physical and psychological health.[16,25] The consistent findings of diminished psychosocial health, including emotional, social, and school functioning, are particularly concerning given the developmental stage of students, who are in critical periods of forming their identities and establishing long-term habits.

The review highlighted that smartphone addiction negatively impacted well-being, reducing perceived social support and the ability to resolve social issues effectively.[21] This diminished well-being could be due to the displacement of time that would otherwise be spent on face-to-face interactions, physical activities, or other enriching experiences, thereby leading to isolation and a decrease in life satisfaction.

Inconsistent Findings and Limitations

While most studies reported significant negative correlations between smartphone addiction and various aspects of QoL and well-being, a few studies yielded inconsistent findings. For example, the study by Demirkan AK (2024) found no significant correlation between smartphone addiction and overall QoL, which contrasts with the majority of the included studies.[15] Additionally, some studies reported no significant associations between smartphone addiction and specific sub-domains of HRQoL, such as autonomy and relationships with parents.[26]

These inconsistencies may be attributed to differences in sample populations, variations in the scales used to measure QoL, or cultural factors that influence smartphone use behaviors and perceptions of quality of life.

Another limitation to consider is the cross-sectional nature of most of the included studies, which restricts the ability to infer causality. Longitudinal studies are necessary to better understand the directionality of the relationship between smartphone addiction and quality of life.

Implications for Future Research and Practice

The findings of this review have significant implications for both research and practice. Future studies should aim to explore the underlying mechanisms that drive the relationship between smartphone addiction and quality of life, with a focus on identifying at-risk populations and developing targeted interventions. Researchers should consider using longitudinal designs to elucidate the temporal dynamics between smartphone use and QoL.

From a practical standpoint, the results underscore the need for educators, mental health professionals, and policymakers to be aware of the potential risks associated with excessive smartphone use among students. Interventions that promote digital literacy, self-regulation, and healthy smartphone habits are crucial in mitigating the adverse effects on students' quality of life. Schools and universities could also play a pivotal role by incorporating programs that encourage mindful smartphone use and offer support to students who may be struggling with addiction.

Conclusion

In conclusion, this systematic review highlights the significant and often detrimental impact of smartphone addiction on students' quality of life, HRQoL, and well-being. While there are inconsistencies in some findings, the overall evidence points to the need for increased awareness and proactive strategies to address this growing issue. Ensuring that students can balance their digital lives with their overall well-being is essential for fostering a healthier, more productive future generation.

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