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CHAPTER 2

Smartphone/Internet Addictions

Gagan Hans, Akansha Bhardwaj, Novy Gupte

ABSTRACT

Smartphone and internet addiction have emerged as significant concerns impacting the well-being of children and adolescents globally. This chapter provides an in-depth exploration of the definition, prevalence, risk factors, consequences, and treatment approaches related to digital addiction. Definitions of smartphone addiction vary; while behavioral addictions like internet gaming disorder (IGD) are recognized by the World Health Organization and The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), internet addiction (IA) remains unclassified. Risk factors for smartphone/internet addiction include accessibility, personal traits (e.g., depression and impulsivity), family dynamics, and peer influences, while protective factors encompass self-identity, self-esteem, and positive peer and parental relationships. Consequences of excessive use range from mental health issues (e.g., depression and anxiety) to physical problems (e.g., harmful effects on the vision and obesity) and academic performance decline. Prevention strategies involve promoting healthy screen habits, setting limits, and utilizing access limitation tools, while treatment approaches encompass cognitive-behavioral therapy (CBT), pharmacological interventions for comorbid conditions, family therapy, and digital-based interventions. Addressing smartphone and internet addiction requires comprehensive efforts from parents, educators, healthcare professionals, and policymakers to mitigate the adverse effects of digital dependency on the younger population.

Keywords: Digital device, Internet addiction, Mental health; Psychological impact, Smartphone addiction.

INTRODUCTION

In the turn of this millennium, we are consistently using a digital device which offers boundless social, educational, creative, and entertainment opportunities. Smartphones especially after coronavirus disease 2019 (COVID-19) have become essential for children and adolescents for various educational and recreational activities. Smartphones tend to serve as a central aspect of today's social interactions and access to popular media that influences youth culture.[1]

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The recent shift in the learning paradigm and online classes has posed a dilemma among parents and children about restricting the screen time or to go with the flow. With time, some parents have started putting more emphasis on online learning and digital entertainment for their kids, not considering the risk-benefit of the same approach. However, they are not fully aware of the challenges of internet addiction, gaming addiction, cyberbullying, and many more problems related with the same.[2]

Screen time is gradually increasing among children and youth with every successive year. Available information suggests that along with the total daily screen time increase there is a general shift in the increasing specific sedentary behaviors too.[3] With adolescents spending more time on smartphones than on traditional forms of entertainment, averaging approximately 7 hours daily, it is evident how integral these devices are to their lives.[1]

As young minds are premature and thus very vulnerable, children and adolescents have a higher potential to become addicted to smartphones/internet. In other terms, it could also be referred as "Digital Addiction" (DA) as described by Ali et al.[4] In general, DA refers to any "addictive behaviors" associated with using digital devices such as mobile phones, computers, the Internet, video games, and social media.[4]

As such, the age of internet/smartphone addiction risk groups is steadily decreasing, and excessive use of internet/smartphones by children and adolescents is a serious social problem.

SMARTPHONE/INTERNET ADDICTION: A GLOBAL HEALTH PROBLEM

Internet addiction has emerged as a significant mental health concern. A meta-analysis of 31 countries indicates that around 6.0% of individuals aged 12–41 years are estimated to experience internet use disorder globally.[5] Additionally, various studies have indicated that internet use disorder is more common in younger age groups. For example, the Canadian National Center for Addiction and Mental Health surveyed 11,438 students in grades 7–12. They found that 20% students spend at least 5 hours daily on social media while 23% play video games almost daily, and 30% use various electronic devices. Approximately 5% of them reported signs of addiction.[6] In India, a meta-analysis among school-going adolescents revealed the prevalence of moderate and severe internet addiction was 21.5 and 2.6% based on the Young Internet Addiction Test (YIAT) cutoff points of 50 and 80, respectively.[7]

DEFINING THE PROBLEM: STATUS IN DSM-5 AND ICD-11 AND UPCOMING CONCEPTS

In order to provide a common ground for diagnostic criteria and a call for further research, the American Psychiatric Association included "Internet

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gaming disorder (IGD)", which includes both online and offline gaming, in Section III of the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) in 2013.[8] In the DSM-5, five of the nine diagnosis criteria (preoccupation or obsession, withdrawal, tolerance, loss of control, loss of interest, continued overuse, deceiving, escape of negative feelings, functional impairment) must be met within a year to be diagnosed as IGD.[8]

On the other hand, since 2014, the World Health Organization (WHO) has been responding to game addiction as an important public health problem. Following the WHO's recognition of IGD as a disease, the "gaming disorder (GD)" diagnosis was added to the eleventh revision of the International Classification of Diseases (ICD-11) in June 2018.[9] In ICD-11, to be officially diagnosed with GD, a patient must exhibit three symptoms (impaired control over gaming, increasing priority given to gaming, continuation or escalation of gaming despite the occurrence of negative consequences). In the ICD-11, behavioral addiction such as gambling disorder and GD is classified as an addictive disorder, so the name is changed from "dependence" to "use disorder".[9]

The WHO has raised awareness about the potential health implications of excessive mobile phone use, and currently, there is no consensus on the definition of smartphone addiction (SA). Therefore, the term "problematic smartphone use" is more frequently applied, which describes a recurrent failure to control the addictive behavior that results in functional impairment or distress. This failure to control smartphone usage meets the criteria for behavioral addiction, as proposed by Kardefelt–Winther et al.[10]

This behavioral addiction is based on the classic addiction symptomology that was included in DSM-5 criteria for compulsive gambling and substance abuse.[8]

Internet addiction (IA) is a relevant topic in recent diagnostic research, although it has not been officially recognized as a nosology category in the DSM-5 or in the final version of ICD-11. Despite this situation, it has been suggested that problematic internet use is an addictive behavior, since the four fundamental characteristics are manifested.[11] The first characteristic relates to frequent or excessive use and uncontrollability at the expense of other important activities, and considers that those who use the Internet for more than 38 hours a week for a purpose that is not academic or work related are displaying addictive behavior. The second refers to the tolerance arising from the need to be connected to the internet for hours on end to get great benefit from it. The third is associated with the withdrawal that occurs when internet use is not possible. Finally, the fourth involves the adverse consequences of the behavior, that is, the difficulties that arise in the daily lives of individuals with IA, which cause a deterioration in their psychological well-being, social relations, and academic or work performance.[12]

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This relatively new phenomenon of SA has been studied based on previous internet addiction research[13] because both internet addiction and smartphone addiction involve the use of internet-based technology. However, the portability and ubiquitous nature of a smartphone distinguishes its use from traditional internet use on computers or laptops. Therefore, by applying the findings from internet addiction to smartphone addiction, we might miss opportunities to gain an in-depth understanding of addictive smartphone usage. Although a study has demonstrated a positive association between internet addiction and smartphone addiction,[14] others have found differences in gender, psychosocial, and personality traits between the two types of addictions.[15] For example, in terms of gender, males were more internet-addicted while females were more smartphone-addicted.[15]

CLASSIFICATION OF TYPES OF INTERNET ADDICTION[16]

According to Young et al.,[16] "internet addiction" is a broad term covering a wide variety of behaviors and impulse control problems. The five subtypes of "Internet addiction" are as follows:

1. *Cyber-sexual addiction:* This occurs in individuals who are typically engaged in viewing, downloading, and trading online pornography or are involved in adult fantasy role-play chat rooms.
2. *Cyber-relational addiction:* This occurs in people who become overly involved in online relationships or may engage in virtual adultery. Online relationships become more important than real-life ones, and marital discord and family instability may result.
3. *Net compulsions:* This subtype includes a broad category of behaviors, including online gambling, shopping or stock trading. Significant financial losses may result, as well as relational and job disruptions.
4. *Information overload:* The World Wide Web has created a new kind of compulsive behavior that involves excessive web surfing and database searches. These individuals spend a disproportionate amount of time searching for, collecting, and organizing information.
5. *Computer addiction:* Most computers come equipped with preprogrammed games and people become addicted to playing them at the cost of work performance or family obligations.

RISK FACTORS AND PROTECTIVE FACTORS OF SMARTPHONE/INTERNET ADDICTION

Among risk factors, the widespread availability of smartphones and internet-connected devices makes it easy for children to access digital content anytime, anywhere resulting in increased accessibility and therefore increased chances of developing Smartphone/Internet addiction.[1] Furthermore,

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at the personal or individual level, "Internet Addiction" has been linked to increased depression and anxiety;[17] personality traits such as impulsivity, hostility, irritability, and lower self-esteem;[18] attentional difficulties, neglect of responsibilities and poor school performance,[19] and social interaction difficulties related to isolation.[20]

Also, social factors associated with family conditions and parent-child relationships, such as conflicting relationships and poor parental support or stressful life situations, have been related with IA.[21]

In line with previous studies, youth affected by IA were more likely than their counterparts to present major interpersonal difficulties, such as poor interpersonal relationships, inappropriate social behavior, fear of relationships, and/or social problems.[20]

By contrast, protective factors that reduce vulnerability to the development of internet addiction have been related with the self, that is, self-identity, self-esteem, and self-efficacy, as well as with adequate social interaction with peers and parental social provision, including parental supervision, a positive parenting attitude and functional communication.[22]

Although several studies have attempted to identify excessive internet users, the question of what distinguishes addicted users from nonaddicted users still remains unanswered.

CONSEQUENCES OF SMARTPHONE/ INTERNET ADDICTION

Excessive smartphone and internet use can have profound negative consequences on the mental, physical, and socio-emotional well-being of children and adolescents.

Physical consequences of digital addiction include harmful effects on the vision, hearing impairment, and obesity secondary to sedentary lifestyle.[23] At the same time, it will also affect children's sleeping and eating patterns, disruption of circadian rhythm, ultimately causing substantial damage to their health.[23]

Mental health consequences of DA include attention deficit and hyperactivity disorder, depression, and anxiety.[24] Interestingly, the most frequent symptom of DA across all age groups (adolescents, adults, and the general population) seems to be depression. Furthermore, according to research on the psychiatric characteristics of frequent internet users, there is a high prevalence of symptoms such as social anxiety, emotional issues, and cognitive deficits.[25]

Finally, excessive screen time can interfere with academic performance by reducing study time, impairing concentration, and affecting cognitive development. For example, studies have demonstrated that addiction has

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specific effects on brain function. For example, Han et al. (2018) revealed that adolescent IGD was related to the altered position of some prefrontal–striatal circuits.[26]

IMPACT OF CORONAVIRUS DISEASE 2019

The worldwide lockdowns during the COVID-19 pandemic had resulted in a sharp increase in the cases of digital addictions, especially in children and young adolescents. Most preschools, schools, and colleges have switched to home-based online teaching and learning, and hundreds of millions of children worldwide have also been transformed into "online learners". Using India as an example, during the epidemic period, primary and middle school students used digital devices for an average of 2.11 hours/day, with a 28.1% incidence rate of digital addiction.[27] However, neither these children nor their teachers were ready for such a sudden paradigm shift to online learning and teaching, theoretically and practically. Additionally, parents were not yet prepared for digital parenting at home. Therefore, these homeschooling children were extremely vulnerable to unrestricted usage of digital devices, which caused digital addiction accordingly. The negative consequences of internet use may be amplified in the context of COVID-19. Due to increased access to technology and online media, a lack of other sources of entertainment, and a reliance on the internet for communication with the outside world brought by the stay-at-home order, the prevalence and severity of DA among children and adolescent populations have increased during this period.[27]

For instance, Liu et al.[28] surveyed 1,121 medical students in China during the COVID-19 pandemic and found that mobile phone addiction was highly correlated with their food and sugar intake.[28] Coupled with the decline in outdoor activities during the COVID-19 pandemic, online activities became the preferred methods of alleviating boredom for children and adolescents. In addition, childhood and adolescence are critical periods in brain development, and digital addiction may cause functional damage to the brain.[28]

WARNING SIGNS OF SMARTPHONE/ INTERNET ADDICTION

Identifying signs of Smartphone/Internet addiction can be challenging, particularly in children and adolescents. However, several warning indicators include:[16]

- *Idealization of the internet:* The individual perceives the computer or internet as the most significant aspect of their daily life. Children may constantly engage in internet-related activities, neglecting

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responsibilities at home or school. They become deeply absorbed in online activities, losing track of time and prioritizing internet use over social interactions.

- *Social withdrawal:* There is a preference for internet use over spending time with friends, leading to social isolation. This withdrawal from social interactions can impact school performance and overall well-being.
- *Altered behavior:* Children may express concern or anxiety about internet activities even during meals or reading times. Disruption of online activities may lead to heightened emotions, such as nervousness, anger, or aggression.
- *Negative emotional reactions:* Individuals may experience anxiety, unease, outbursts of anger, or depressive behavior when unable to access the internet or engage in online activities.
- *Sleep disturbances:* Spending late hours online, often sacrificing sleep to maintain internet connection, is common among those addicted to smartphones or the internet.

These signs, when observed in conjunction, may indicate the presence of smartphone/internet addiction and warrant further evaluation or intervention.

SEVERITY LEVELS

Internet addiction can manifest with varying degrees of severity, from mild to severe. Clinicians frequently use rating scales to assess the severity of an individual's addiction. Some examples of assessment tools include: Problematic internet use (PIU) criteria, Compulsive internet use criteria, Internet addiction test (IAT), and Young's diagnostic questionnaire (YDQ). These scales consider factors such as the amount of time spent online, the degree of impairment in daily life, and the presence of withdrawal symptoms. Determining the severity level of internet addiction is essential for treatment planning. It helps clinicians to prioritize interventions, allocate appropriate resources, and establish realistic treatment goals. More severe cases may require more intensive treatment, while milder cases may benefit from outpatient or self-help strategies.[29]

PREVENTION AT INDIVIDUAL LEVEL

Preventing and addressing smartphone and internet addiction requires a multifaceted approach involving parents, educators, healthcare professionals, and policymakers.

With regard to prevention, parents play a crucial role in modeling healthy screen habits and setting limits on their children's device use.

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Open communication, setting boundaries, and providing alternative activities are essential strategies for reducing digital dependency.[22]

Another direct prevention strategy for excessive use is access limitation. Access limitation is highly effective, and many countries already prohibit the use of mobile phones in certain situations.[30] However, implementing stricter regulations such as blocking or limiting screen time as a consequence of excessive use, or fatigue systems that reduce connection speed after a certain threshold, can raise concerns about individual freedoms. Additionally, identifying users for the purpose of blocking access can be highly challenging due to the anonymous nature of online activities. For instance, South Korea enforces bans on late-night entry of minors to internet cafes or restricts minors' access to Internet gaming upon their or their parents' requests, a policy known as "selective shutdown" akin to casino self-exclusion.[31]

Self-blockage options by means of hardware or software are a promising potential prevention of internet misuse. If this feature is preinstalled at the factory level, then users may find it easier to self-limit time online or the nature of the content they tend to access (e.g., self-limit late-night access). Apps that automatically track patterns of usage and provide feedback to users (or parents) may also be helpful.[32]

Parental notifications on use patterns, alerts on hazardous access, the locking of certain apps, or the limiting of screen time may be effective preventive measures to protect children from internet addiction.[33]

PREVENTION INITIATIVES FOR SCHOOLS AND COMMUNITIES

Educational Workshops

Schools frequently organize workshops and educational initiatives aimed at educating students on responsible internet usage. These initiatives encompass a range of subjects, such as digital literacy, online safety, and recognizing signs of internet addiction. By imparting knowledge about potential online risks and fostering healthy internet habits, schools enable young individuals to make well-informed decisions regarding their online activities. Additionally, these workshops serve as platforms for open dialogues about both the opportunities and challenges presented by the digital realm.[34]

Community Awareness Initiatives

Public campaigns play a vital role in increasing awareness about the dangers of internet addiction and offering support for individuals and families. These initiatives educate the community about the indicators of internet addiction, its possible repercussions, and avenues for assistance. They also underscore

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the significance of maintaining a balanced approach to technology and prioritizing digital well-being. By striving to diminish the stigma surrounding internet addiction, these campaigns advocate for early intervention and advocate for a culture of responsible internet engagement.[35]

Support Groups and Self-help Resources

- *Twelve-step programs:* Variations of the classic 12-step model for various forms of addictions, like Internet and Technology Addicts Anonymous, offer individuals a structured support system. These programs guide participants through a series of steps focused on self-awareness, accountability, and mutual support. Engaging in a 12-step program enables individuals to bond with others facing similar challenges, fostering a sense of solidarity and shared experience. It provides a framework for accountability and a well-defined pathway toward recovery. For those seeking a structured, community-driven approach to addressing addiction, these programs can be invaluable.[36]
- *Online forums and communities:* Internet-based support groups and forums provide a supportive environment for individuals grappling with internet addiction. These platforms facilitate connection, empathy, and shared experiences among participants. Users can freely discuss their challenges, triumphs, and seek guidance from others who understand their struggles. The anonymity afforded by online communities often encourages individuals to express themselves more openly about their addiction. Such platforms serve as valuable sources of continual support and offer opportunities to connect with a diverse community of individuals navigating similar issues.[37]
- *Self-help literature and workbooks:* Self-help materials, such as books and workbooks, offer individuals valuable guidance, exercises, and techniques for regulating their internet consumption. These resources typically present a systematic method for self-assessment and behavioral adjustment. Individuals can engage with these materials according to their own schedule and preferences, making them adaptable for those who prefer a self-guided recovery journey. Such resources prove advantageous for individuals motivated to address their addiction independently, providing practical strategies and insights for reclaiming control over their internet usage.[38]

ADDRESSING SMARTPHONE/INTERNET ADDICTION THROUGH PROFESSIONAL HELP

Despite ongoing debate over whether to classify the issue as an addiction or establish it as a distinct mental health diagnosis, many children and

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adolescents may need some intervention. Currently, there is no universally accepted treatment approach for digital addiction. However, resourceful clinicians are applying and modifying various effective strategies used for similar issues to tackle this emerging problem.

Psychotherapy

If the aforementioned approaches prove ineffective or if social dysfunction persists, seeking professional guidance becomes imperative, cognitive behavioral therapy (CBT) and CBT-based psychotherapies emerge as the primary psychotherapeutic interventions for internet addiction. CBT stands out as superior to alternative treatments like hospitalization or pharmacological therapy due to its noninvasiveness and short-term effectiveness. Moreover, CBT demonstrates efficacy in reducing internet usage and enhancing self-perception among chronic users, with benefits sustained for at least 6 months. This therapeutic approach revolves around reframing negative thoughts, aiding adolescents in reshaping routine and problematic behaviors, and fostering the development of adaptive, goal-oriented habits to alleviate symptoms of depression and anxiety.[39]

Group and family therapies have emerged as valuable approaches in tackling digital addiction. Family therapy focuses on enhancing communication and relationships between parents and adolescents, redirecting the psychological needs of adolescents from the internet toward interactions and connections within the family unit. On the other hand, while group-based interventions, particularly those spanning 8 weeks or longer and involving 9–12 participants, have shown considerable effectiveness,[40] these approaches vary greatly making it difficult to determine which other aspects of the approach contribute to any observed successes.

Mindfulness-based interventions, encompassing practices like meditation and mindfulness-based cognitive therapy, hold significant value in addressing internet addiction. These techniques promote self-awareness by heightening individuals' sensitivity to their thoughts, emotions, and actions. By fostering a present-focused mindset, mindfulness aids in managing impulsive online behaviors and fostering self-control. Such interventions prove instrumental in cultivating a more balanced relationship with the internet, empowering individuals to make deliberate choices about their online engagements through heightened awareness and conscious decision-making.[41]

Pharmacological Treatment

The general approach of pharmacological treatment has been to use medications to treat comorbid conditions or underlying pathologies of digital addiction including depression,[23] anxiety,[42] impulsivity,[25] and others.[28]

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While there are currently no medications approved specifically for treating internet addiction, ongoing research investigates the potential of certain medications in mitigating cravings and compulsive behaviors associated with excessive internet use. Naltrexone, commonly prescribed for substance addictions, is one such example. Some studies indicate that naltrexone may help in diminishing cravings linked to internet addiction. However, further research is necessary to determine its effectiveness and safety in addressing this condition.[42]

SUMMARY AND CONCLUSION

To summarize, smartphones and the internet have transformed the way children and adolescents interact with the world, offering unprecedented opportunities for learning, communication, and entertainment. However, the addictive nature of these technologies poses significant risks to their well-being. The prevalence of digital addiction continues to rise, particularly among younger age groups, exacerbated by factors like increased accessibility and the impacts of the COVID-19 pandemic.

Efforts to address smartphone and internet addiction require a multifaceted approach involving various stakeholders. Prevention strategies should focus on promoting healthy screen habits, setting limits on device use, and utilizing technological tools for access limitation. Parents play a critical role in modeling appropriate screen behavior and fostering open communication with their children about digital usage.

Treatment approaches for smartphone and internet addiction range from cognitive-behavioral therapy (CBT) to pharmacological interventions targeting comorbid conditions. Family therapy and digital-based interventions also show promise in addressing the underlying factors contributing to digital dependency.

As we navigate the challenges posed by digital addiction, further research is needed to better understand the underlying mechanisms and to develop effective interventions tailored to the unique needs of children and adolescents. Collaboration between parents, educators, healthcare professionals, and policymakers is essential to implement comprehensive strategies that promote healthy digital habits and mitigate the adverse impacts of excessive smartphone and internet use on the younger generation.

By addressing smartphone and internet addiction proactively and holistically, we can foster healthier relationships with technology and promote overall well-being among children and adolescents in the digital age.

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KEY LEARNING POINTS

Definition and Prevalence
- Smartphone and internet addiction, also known as "Digital Addiction (DA)", encompasses addictive behaviors associated with excessive use of digital devices.
- Global studies indicate a significant prevalence of internet addiction, particularly among younger age groups, with varying definitions and terminology used to describe problematic smartphone use.

Risk Factors
- Accessibility and widespread availability of smartphones contribute to increased chances of developing smartphone/internet addiction.
- Personal factors such as depression, impulsivity, and low self-esteem, along with family dynamics and peer influences, play significant roles in the development of digital dependency.

Consequences
- Excessive smartphone and internet use can lead to mental health issues like depression and anxiety, physical problems such as vision impairment and obesity, and academic performance decline.

Impact of COVID-19
- The COVID-19 pandemic has intensified digital addiction due to increased reliance on online activities for education and entertainment during lockdowns.

Addressing the Problem
- Prevention efforts should focus on promoting healthy screen habits, setting limits on device use, and utilizing access limitation tools.
- Parents play a crucial role in modeling appropriate digital behaviors and fostering open communication with their children about device usage.
- Treatment options for smartphone and internet addiction include cognitive-behavioral therapy (CBT), pharmacological interventions targeting comorbid conditions, family therapy, and digital-based interventions.
- Collaboration between parents, educators, healthcare professionals, and policymakers is essential to implement effective interventions and promote healthy digital habits.

FUTURE DIRECTIONS

- Further research is needed to better understand the underlying mechanisms of digital addiction and to develop tailored interventions that address the unique needs of children and adolescents.
- Comprehensive strategies that incorporate education, policy changes, and technological solutions are essential to mitigate the adverse impacts of excessive smartphone and internet use on youth.

REFERENCES

1. Rideout VJ, Robb MB. *The Common-sense Census: Media Use by Tweens and Teens.* San Francisco, CA: Common Sense Media 2019.

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