Review Article

SMARTPHONE ADDICTION: AN UNDEFINED PROBLEM AFFECTING WHOLE GENERATION

Sanjeev Kumar Singh[1], Arti Agarwal[2], Naresh Pal Singh[3], Anita Omhare[4], Atul Mishra[5], Rashmi[6], Ashish Kumar Gupta[7], Anil Kumar Garg[8]

[1]Professor, Department of Pathology, Uttar Pradesh University of Medical Sciences, Saifai, Etawah, Uttar Pradesh, India
[2]Assistant Professor, Department of Pathology, Uttar Pradesh University of Medical Sciences, Saifai, Etawah, Uttar Pradesh, India
[3]Professor, Department of Community Medicine, Uttar Pradesh University of Medical Sciences, Saifai, Etawah, Uttar Pradesh, India
[4]Associate Professor, Department of Pathology, Government Medical College, Kannauj, Uttar Pradesh, India
[5]Associate Professor, Department of Radiation Oncology, Uttar Pradesh University of Medical Sciences, Saifai, Etawah, Uttar Pradesh, India
[6]Associate Professor, Department of Pathology, Uttar Pradesh University of Medical Sciences, Saifai, Etawah, Uttar Pradesh, India
[7]Professor, Department of Pulmonary Medicine, Uttar Pradesh University of Medical Sciences, Saifai, Etawah, Uttar Pradesh, India
[8]Associate Professor, Department of Medicine, SMMH Government Medical College, Saharanpur, Uttar Pradesh, India

ABSTRACT

Smartphones have rapidly become indispensable tools in daily life. Smartphone addiction (SPA) refers to excessive use of smartphone by persons which may leads to psychological or behavioral problems, including feelings of loneliness, anxiety, and depression. SPA is associated with many health problems like neck and shoulder pain and poor sleep quality. Excessive phone use replaces real life interactions, increases loneliness, and increases fear of missing out (FOMO). SPA also reduce subjective well-being and life satisfaction. Studies also showed a significant risk of suicidal ideation and suicidal attempt in adolescents compared to general users. Understanding this problem of SPA, Health institutions are emphasizing the role of balanced smartphone use, family support, school-based programs and digital literacy. Treatment of SPA includes Cognitive behavioral therapy, Motivational interviewing, and neurological techniques. More social and real-world interactions is also needed to prevent SPA. Authors emphasize important role of Social Media restriction for young users; Social Media platforms should modify "addictive" design features like infinite scroll and autoplay. "Artificial Intelligence (AI)" algorithms responsible for engagement of users should also be accountable. AI systems should be designed so as to be compatible with ideals of humanity. According to "Saifai hypothesis" applying ethical responsibility on all AI systems (including smartphones) is not only required but mandatory for better future.

Keywords: Smartphone addiction, SPA, FOMO, social media, Artificial Intelligence, AI.

INTRODUCTION

Smartphones and social media were non-existent nearly two decades back, and now they have become all day companions and connecting majority of world population. As of early 2025 approximately 4.69 billion people own a smartphone globally, with projections estimating nearly 5.8 billion users by 2028.[1] Because of their multifunctionality, Smartphone have become an integral part of daily life, and created dependence.[2,3] According to US national centre for health statistics, 50.4% of adolescents aged 12-17 spend four or more hours per day on smartphone screens, excluding school work.[4] Smartphone addiction (SPA) refers to excessive use of smartphone by persons which may leads to psychological or behavioral problems, and characterized by withdrawal tolerance and loss of control.[5] SPA represents an emergent addictive disorder that badly affects the physical and mental health of adolescents worldwide.[6]

MATERIALS AND METHODS

This was a review study. We carried out a literature search in Pubmed, Web of Science, Medline etc using MeSH terms "Smartphone" "Smart phone addiction" "Mobile phone addiction" "Addictive Social Media" "Algorithms" "Infinite scrolling" "FOMO" "Depression" etc. We searched only recently published English research articles. This was not quantitative or epidemiological study. Authors perceive the mobile phone addiction is big problem of public health hence needs to be discussed.

SMARTPHONE ADDICTION

Average daily smartphone usage has increased markedly over one decade. And this increase of usage is linked to more use of social media, entertainment, education as well as health related applications.[7] smartphone have become central role to connect others to socialize and manage their well- being.[8] Smartphone addiction (SPA) refers to excessive use of smartphone which may leads to psychological or behavioral problems, and characterized by withdrawal tolerance and loss of control.[5]

Smartphone offers people a route to dopamine rush by providing a constant easily accessible source of information.[9,10] Dopamine plays a important role in the brain's reward system.[11] When people obtain positive experiences from smartphones, the reward circuit is activated, and dopaminergic neurons in the nucleus accumbens release dopamine, interacting with prefrontal cortex, amygdala etc. regions.[11]

Studies also show caudate nucleus, brain area associated with reward and impulsivity, become smaller when compared with normal group.[12] People with SPA have less gray matter in the region of lateral orbitofrontal cortex, which is crucial for decision making and impulse control.[13,14]

Whenever smartphone sounds notification, usually average user cannot resist the urge to check it immediately. The reward circuit involving nucleus accumbens plays an important role.[11]

But SPA is not similar to drug addiction. Both drugs addiction and SPA are related to activation of brain's reward circuit. But SPA shows no physical dependence like drugs. And SPA withdrawal symptoms include mainly psychological discomfort e.g. restlessness and without severe physical reactions. Which can be improved through behavioral adjustments. Health risks associated with SPA are mainly indirect e.g. vision loss, sleep disorders.[15-17]

Health hazards associated with smartphone addiction: Despite the increasing prevalence of smartphone addiction (SPA) It is not currently recognized as a formal clinical diagnosis in classification system etc the diagnostic and statistical manual of mental disorders, text revision, (DSM-5 TR) and international classification of diseases (ICD-11). However, DSM-5TR included internet gaming disorder.[18,19]

By using smartphones in late hours of the night, user's sleep quality suffers. A study showed, if people use more time on smartphone, then resulted worse sleep quality.[20] Brain may remain awake under constant stimulation by social media/online games, which trigger dopamine system.[21]

Prolonged screentime in smartphone has been associated with Musculo-skeletal symptoms like neck and shoulder pain. Prolonged and sustained head flexion during smartphone use, is the cause of this pain syndrome.[22-25]

Constant phone use replaces real life interactions. Excessive phone use increase loneliness, fear of missing out (FOMO) and reduce subjective well being and life satisfaction.[26] FOMO is the anxiety of missing out on social experiences, leading to a constant need to stay connected.[27,28] Consequently FOMO leads to excessive smartphone use and leads to SPA, and further exacerbate social anxiety and depression.[29]

An analysis of >125000 children/adolescents in US showed that spending >2 hours a day with smartphone increases the risk of depression, and this risk increases with duration of exposure.[30,31]

Excessive smartphone use can reduce social interaction, leads to feeling of isolation, constant exposure to designed perfect life online may trigger negative self comparisons. Ultimately risk of depression increase.[11] Young people with excessive smartphone usage, often report depressive symptoms and lower self-esteem.[32] compensatory internet use theory stated that depression and anxiety may increase likelihood of SPA.[33]

Shinetsetseg O et al found in their study that adolescents with high risk smartphone use, showed a significant risk of suicidal ideation and suicidal attempt compared to the adolescents who were general users.[34]

Smartphone AI features could contribute to increase depression, anxiety, loneliess, life dissatisfaction and even suicided by facilitating unhealthy social comparisons, cyberbullying and harassment of teenagers and girls.[35-37] Smartphone AI features may fuel hate speech, fake news and polarization, which are injurious for mental peace.[38,39]

Role of Artificial Intelligence (AI) in smartphone addiction: It is well known that smartphone social media platforms use AI in their recommendation systems.[40] It is suggested that Data business model is operating behind social media companies, (so more engagement tactics) contributes to addictive like behaviors in the context of social media.[41,42]

By analyzing great amount of data in real time, AI algorithms play important role in shaping user interactions, influencing content visibility and determining what users see on their feeds. Majority of social media platforms use engagement algorithms to determine the content displayed to users.

With AI, social media can predict user preferences, they can analyze user past behavior, interaction, and content consumption patterns to design feeds that match with user's taste. This personalization

increases engagement. AI algorithms constantly analyze users' interaction (like, share, comment, spent time) to identify content that might engage them more.

In a BBC report, In February 2026, twenty nine US state attorneys requested Social Media Platform META (Facebook, Instagram) in US California federal court, to remove all accounts known to belong user <13 years, and to delete related data and algorithms using such data. [BBC Correspondent Lily Jamali, Los Angeles],[43] these attorneys also requested court to force the company META to implement time restriction for young users, and to deactivate "addictive" design features like infinite scroll and autoplay. They also demanded to disable filters that enhance photos or perception of beauty. So there are demands that Social media platforms should deactivate the addictive features like Infinite scrolling through short form content, reels.[43]

It is also argued that smartphones and their AI features, transforming users from human being to passive consumers, who prioritize the digital affirmation over real world experiences.

In January 5-8, 2017, Asilomar Conference of Beneficial AI organized by the Future of Life Institute. Asilomar principles have been adopted later.[44] Ninth Principle of Asilomar highlights on responsibility. i.e. "Designers and builders of advanced AI systems are stakeholders in the moral implications of their use, misuse and actions, with a responsibility and opportunity to shape those implications." So responsibility towards humanity comes first, engagements by AI algorithms come later.

Solution measures of SPA: To deal with SPA, Health institutions such as WHO, European Commission, FDA etc. emphasize the importance of balanced smartphone use, family support, school based programs and digital literacy.[45]

Educational institution to keep their teaching and learning methods more student centric and interesting. So, students less addicted to smartphones. Schools can ask students to deposit their phones in every classroom. Because smartphone themselves may trigger craving to check new message.

Coginitive behavioural therapy (CBT) helps patients recognize and change their negative thinking related to SPA.[46,47] CBT interventions include target maladaptive behavior, track usage, self-monitoring, role play, journaling etc.[48] Motivational interviewing may also be effective.[11] Some neurological techniques, such as transcranial magnetic stimulation (TMS) to modulate the activitiy of specific brain regions related to addiction.[49,50]

Other simple methods to prevent SPA include, to apply phone app limitation, turn off notifications, more social and real-world interactions, or remove unnecessary social media applications.

For adolescents, measures include parental guidance, media literacy, and transparency in algorithmic operations. Discourage smartphone during meals, before sleep and encourage physical activities.

Despite the well know benefits of exercise, physical activities by people are reducing, major culprit believed is smartphone.[51] Introducing media literacy class or workshop should be encouraged.

Other measure to control addictive features of social media by modifying AI algorithms are already discussed eg to control infinite scrolling, short content and reels, Offscreen of students during schoolwork and sleep. Social media platforms can implement time restriction for young users.

Saifai Hypothesis: Authors have given a hypothesis named as "Saifai Hypothesis". According to this hypothesis "Humanity have limited role to control the direction of AI development, So future Humanity-AI merger will serve humanity, only if we introduce ethical responsibility on all AI systems, without any delay".

Asilomar principles (2017) may be torch-bearers in this direction. This Saifai hypothesis is the much broader view rather than to confined only SPA. SPA is largely associated with data business model, which is operating behind social media companies.[44]

CONCLUSION

Excessive phone use replaces real life interactions, and increases loneliness. There is paradox of being more connected yet lonelier. There are great concerns about AI features of smartphones, affecting health by fueling addiction (SPA), bad sleep and social comparison.

Awareness about SPA is needed, and its management which include balanced smartphone use, family support, school based programs and digital literacy.

"Saifai hypothesis" also emphasizes "Asilomar principles" implementation in view of future Humanity-AI merger required without any delay.

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