A perspective of yoga on smartphone addiction: A narrative review

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ABSTRACT

Evolution in technology is drastically becoming automatic and making life easier. Among those technologies, smartphones are fast-changing technology that is equipping humans to work from anywhere. Frequent usage and dependency on smartphones have increased, which in turn contributes to changes in psychosocial behavioral aspects. Addiction plays an important role in modifying the healthy habits of individuals. Problematic usage of smartphones affects both physical and psychosocial health and emerges as a cornerstone of psychosocial disorder. However, there is a dearth of data to understand the core concepts of smartphone addiction and there is a need to understand from the broader perspective. Yoga is considered one of the viable protocols to provide the way for digital detoxification from technology and smartphone addiction by promoting self-regulation. Yoga brings back a healthy living style, which allows individuals to have enough physical activity through asanas, emotional stability, and awareness through meditation and breathing practices. We hypothesize that a holistic approach to yoga can regulate the symptoms associated with smartphone addiction by increasing the stability of the body and mind and promoting emotional detachment and self-regulation, which play an important role in the de-addiction process.

Keywords: Biopsychosocial model, digital-detoxification, review, smartphone addiction, yoga

Introduction

Technology is becoming ubiquitous. The evolution of smartphones has transformed usage dynamics regardless of age, gender, and economic status. The functions may vary from placing a phone call to checking email, online transactions, texting, surfing the web, playing online games, and listening to music. This problematic overuse has led to addiction in the form of frequent checking of the smartphone. Although addiction has been defined as “a pathological condition that one cannot tolerate without continuous administration of substances,” it is now applied to behavioral addictions, such as gaming and internet use. A growing literature has confirmed that usage of smartphones is more evident among emerging adulthood, with an age range of 18–29 years.

Although smartphone addiction is not recognized as a clinical disorder in the Diagnostic and Statistical Manual of Mental Disorders (DSM-V) or International Classification of Diseases (ICD-10), the estimated prevalence of smartphone addiction is in the range of 10% to 20%. Studies have reported a prevalence of problematic smartphone use among children and adolescents as high as 10% in countries such as the United Kingdom, 16.7% in Taiwan, 16.9% in Switzerland, 30.9% in Korea, and 31% in India. Further, a survey among the six Asian countries showed the highest prevalence of internet addiction through smartphone ownership is 62%.

Studies reported many aspects of problematic smartphone behavior are similar to other recognized behavioral addictions

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such as gambling disorder and other traditional addictions (e.g., substance use, smoking, and alcohol). The pathological use of smartphones has created a new kind of maladaptive behavior and emerging as a cornerstone of psychosocial disorders. Subsequently, researchers have shown greater interest in studying smartphone addiction. The symptoms associated with problematic smartphone usage negatively influence physiological and psychosocial behavior with low psychological well-being, depression, loneliness, social anxiety, and cognitive disorders.

Given the current literature, researchers are actively exploring the significance of yoga and meditation as a viable tool for addressing psychological problems and addictive behaviors. Yoga is a communion of mind and body. Problematic smartphone usage is slowly and steadily gaining influence in manipulating psychosocial behavior. There is a dearth of data in this area to understand the core characteristics. Therefore, we hypothesize that there is a need to understand the problem in a much broader spectrum from the purview of yogic texts that can be recommended as primary care intervention.

### Understanding Smartphone Addiction from a Biopsychosocial Perspective

The biopsychosocial model of addiction posits that biological/genetic, psychological, and sociocultural factors contribute to substance use and all must be taken into consideration in prevention and treatment efforts. As explained in Figure 1, smartphone addiction is a complex and heterogeneous problem, and there is a need to understand it from a biopsychosocial perspective. Griffith has proposed the components model of addiction, which proposes that all addictions comprise a set of criteria that rewards physiological and psychosocial behaviors. He proposed six core components for understanding the biopsychosocial process of smartphone addiction. These are salience, mood modification, tolerance, withdrawal, conflict, and relapse.

### Salience

Predominant smartphone usage over other activities of life influences feelings (craving), cognitive distortions, and deterioration of social behavior. A study on university students has shown high cognitive absorption levels among the smartphone-addicted group. Cognitive absorption is characterized by temporal dissociation, focused immersion, heightened enjoyment, control, and curiosity. Further, an functional magnetic resonance imaging (fMRI) study reported that smartphone addiction inhibits cognitive control during emotional processing and influences social interaction. Similarly, a neuroimaging study on adolescents with mobile phone addiction correlates higher impulsive scores with altered gray matter volume and white matter integrity. Similarly, subjects with gaming addiction have shown enhanced craving and brain activity in the lateral and prefrontal cortex for gaming stimuli.

### Mood modification

The subjective experiences reported using smartphones as a coping strategy to avoid loneliness and dysphoric mood. A study observed that students utilizing their mobile phones as a coping mechanism might get trivial appeasement for loneliness, boredom, and anxiety-induced situations. However, long-term utilization might negatively influence mental health. A study reported that dysfunctional cognitive and emotional processes mediate anxiety, depression, and problematic smartphone usage. Furthermore, smartphone addiction and childhood psychological maltreatment. In a recent study with Indian university students, 43% agreed the mobile phone provides an escape from problems, and 70% agreed that the mobile phone helped them overcome bad moods such as feelings of inferiority, helplessness, guilt, anxiety, and depression.

### Tolerance

The prolonged time spent or frequent checking on smartphones to achieve the former mood modifying effects. Earlier studies claim that the frequent checking of smartphones is because of instant access to rewards. Further, social media has reportedly become the source of perceived social support. Currently, people ascribe perceived social support by likes and shares on social networking sites (e.g., Facebook, Instagram, and Twitter) and communicating through icons. A study has shown that Facebook connectedness is related to greater life satisfaction, lower anxiety, and depression levels, and enhanced social capital. In contrast, extroverts and neurotics with a high Facebook usage negatively influence life satisfaction and social relationships.

### Withdrawal

Recent studies coined a new word Nomophobia (No mobile phone phobia), and FOMO, “fearing of being without a mobile phone,” which is the condition of feeling anxiety when...
missing their smartphones. This condition is widely visible in youngsters with low self-esteem, anxiety, impulsiveness, and high extroversion/introversion levels. Another study reported interpersonal sensitivity, obsession-compulsion, and strong predictors for nomophobia.

**Conflict**

Spending prolonged time on smartphones leads to intrapersonal and interpersonal conflicts, influencing their social relations with family and friends. In addition, texting is a potential distractor among school and college students impacting classroom performance. A study reported that the average time for distraction in class is less than 6 minutes. Furthermore, there has been a decline in face-to-face interactions among teens and making them less talkative to adults.

**Relapse**

There is not sufficient literature to support the relapse condition in smartphone addiction. This condition tends to check the smartphone to recur the previous hedonic experience after a long period of abstinence. Checking smartphones after waking up and before sleeping to get updated is associated with low self-control.

**Understanding the Nature of Smartphone Addiction Through Yoga**

Addiction is defined as a behavior, over which an individual has impaired control with harmful consequences. It can also be viewed as a result of “mindless” states involving escapist attitudes, automatic thinking, emotional reactivity, social isolation, and low self-regulation. Research has pointed out that yoga helps control addictive symptoms by promoting self-regulation. According to the World Health Organization (WHO), psychological health is one of the key components in defining health. The core concepts of yoga emphasize the nature of the mind and its afflictions (Kleshas). Traditional texts such as Patanjali Yoga Sutras (PYS), Bhagavad Gita (BG), Hatha Yoga Pradipika (HYP), and Yoga Vasistha (YV) have highlighted the mind (Chitta) and the interplay of qualities of a person (Gunas) on mental health, and the afflictions caused in the absence of self-control and self-regulation. Sage Patanjali defines yoga as, when the perplexities of the thoughts are controlled by self-regulation, the mind will reach its pristine (PSY 1:2). The afflictions in the mind caused by these perplexing thoughts stem out from ignorance of the truth (Avidya), egoism or identity (Asmita), attachment (raga), aversion (Dwesha), and fear of losing (Abhinivesha) (PSY 2:3). Ayurveda says, “asatmyaindriyarthasannikarsha,” the unhealthy sensory perception causes disharmony in the body either as an increase or decrease of humor (doshas).

Sankhya’s philosophy postulates that qualities (Gunas) play a vital role in defining a person’s temperament (Swabhava). The Guans are classified into three types. Tamas is characterized by dullness, inactive, illusion, depression, laziness, impulsiveness, and excessive sleep. When Rajas is dominant, it symbolizes passion and desire, egoism, self-centeredness, greed, restlessness, ambition, and a sense of self-gratification. Finally, Sattva is associated with stability, self-control, clarity of thought, discipline, self-regulation, one-pointedness, meditative mind, and detachment.

The constant use of smartphones has caused sensory overload invigorating the mind for repeated subjective experiences, and the propensity of these experiences is causing ill effects. According to BG, the pleasures from these sensual indulgences develop an attachment that ignites the desire to have more. When not fulfilled, it leads to anger. From anger comes the delusion, followed by loss of memory, and from that comes the destruction of intellect, leading to the perished mind (BG 2:62-63). Patanjali further explained how these obstacles manifest into afflictions (PSY 1:30 & 31).

The above picture [Figure 2] illustrates how these disturbances of the mind (Chittavikshepas) lead to mental agitation (Adhi) and further as a disease in the body (Vyadhi).

Researchers have found that personality with openness to experience, neuroticism, and extroversion correlates with the smartphone’s problematic usage. Affictions of the mind explain the symptomatic nature of smartphone addiction such as mental laziness (Nityana), idleness, and dullness; indecisiveness, doubtful (Samsraya); carelessness, negligence, and procrastination (Pramada); laziness (Alasya); craving for enjoyment, sensuality (Aparigraha); erroneous perception, false views (Brantidarsana); failing to attain desired results (Alabdhabumikatva); instability (Anavasthitatva). The ramifications of these are transmuted as a disease (Vyadhi) in the body as sorrow (Dukha), depression (DAuraṇmaṇaṇa), shaking off the body (Aangamjyādha), unrythmic breathing (Svāturpannas Viṣkhepa). According to yoga, disease (vyadhi) is of two types, disease born out of mind, stress born psychosomatic ailments, and neurotic problems (Adhiyā Vaṣṭik). The second category is external causes such as accidents, infections, injury, and non-stress (Anadhiyā Vaṣṭik). According to the Yoga Vasistha, mind (Adhi) and disease (vyadhi) are the sources of suffering. Sometimes they follow each other, and at times they cause each other. At the outset, they both root from ignorance and lack of self-control.

**Yoga for digital detoxification**

Addiction is in opposition to the idea of autonomy. Yoga helps develop the ability to connect with life, detox our mind, body, and emotions, and live a harmonious and meaningful life. Current literature has shown that yoga can be a viable tool to manage the afflictions of the body and mind by instigating self-regulation with the combined practices of asana, pranayama, pratyahara, relaxation, and meditation. These are better explained in detail as:
Asanas

Asana is the Sanskrit word for physical posture that helps develop physical and mental stamina and strengthen willpower. In his yoga sutras (PSY), Patanjali expounds that the primary objective of asana is to develop steadiness with ease in the sitting posture and maintain an erect spine for the free flow of energy during meditation (PSY 2.46). The benefits of asana (Asana siddhi) can be reaped with dedication, uninterrupted practice, and a sense of reverence (PSY 1.14). Effects of asana are in the order of somatopsychic, which includes the release of endorphins that induce a sense of relaxation, ease, and well-being in the practitioner.\[49\] A study reported that after 1 h of a yoga asana session, there had been an increase of 27% in GABA (gamma-aminobutyric acid) levels.\[50,51\] Further, induced stress levels were rescinded with Shavasana compared to supine postures and resting in a chair.\[52\] Another study reported that techniques using a combination of stimulation followed by relaxation had reduced oxygen consumption, energy expenditure, and physiological arousal compared to other relaxation techniques.\[53\]

Pranayama

Pranayama is the process of controlling the life force. "Pran" means breath, life force; "Ayama" is lengthening or extension through control. Patanjali expounds pranayama is much more than inhalation and exhalation of breath. It is the process of slow and extended inhalation (puraka) followed by (kumbhaka) retention of breath and (rechaka) the slow exhalation PYS (2:49). Regular practice improves the functioning of vital systems of the body. Mind is a complex structure and highly volatile. Controlling it is a daunting task. The breathing process is connected with the brain and the central nervous system, which is the gateway for emotional responses. Pranayama controls the erratic impulses in the brain by regulating the rhythms of breath. Recent evidence suggests that rapid breathing (Bhastrika) pranayama has significantly reduced anxiety and stress levels and affects the brain's areas involved in processing emotions, attention, and awareness.\[54\] It has also shown a reduction in craving with smoking addiction,\[55\] anxiety, and depression.\[56\] Further, bhrumari pranayama enhanced response inhibition and cognitive abilities.\[57\]

Pratyahara

Pratyahara is the fifth limb of Astanga yoga. Pratyahara has a pivotal role in the process of de-addiction. Pratyahara refers to the conscious withdrawal of the mind from the sensual gratifications (PSY 2:54). Controlling the mind that is conditioned to seek sensual gratifications is challenging. The highest form of pratyahara is not about suppressing the senses; however, sublimating them inward to get into the depths of the mind (PSY 2.55). The other way of doing it is focusing on the space between the two eyebrows with a steady breath; one can gain control over the senses (BG 5.27-28). Addiction is primarily because of craving and lack of self-control.\[58\] Sensory indulgence is the main form of entertainment prevailing with smartphone addiction. Indriya (senses) Pratyahara helps understand the nature of craving and restrain the senses from external gratification by abstaining from these devices to rejuvenate the mind through awareness and self-control.

Meditation

The outset of meditation transpires through Abhyasa (practice) and Vairagya (detachment) (PSY 1. 13&16). The practice of pratyahara promotes detachment towards the objects of sensuality. Meditation is referred to as dhyana in yoga. The mind with an uninterrupted flow of consciousness is called dhyana (PSY 3.2). Over time, various techniques of mediation have been evolved from different schools of thought. West has shown greater interest in mindfulness and transcendental meditation. They are extensively studied for their therapeutical benefits in physiological and psychosocial disorders. Studies have reported mindfulness meditation increases somatosensory processing,\[59\] sleep,\[60\] quality of life,\[61\] and reduced emotional reactivity.\[62\] Further, it effectively controls stress,\[63\] anxiety,\[64\] and depression levels.\[65\] Studies on addiction have reported meditation increases prefrontal activation, which might help in the de-automatization of addictive responses\[66\] and improved cognitive functions,\[67\] response inhibition,\[68\] self-control,\[69\] psychological well-being,\[70\] and abstinence from craving.\[71,72\]
Discussion

Addiction is defined by the American Society of Addiction Medicine (ASAM) as a primary, chronic disease of the brain's reward, motivation, memory, and related circuitry. Dysfunction in these circuits results in distinct biological, psychological, social, and spiritual manifestations.[39] According to one study, internet addiction causes an increase in dopamine in the brain, just like any other substance addiction.[34] Excessive use of the internet through smartphones is a relatively new type of addiction. The condition is not officially recognized by the American Psychiatric Association. Nonetheless, many medical professionals and researchers around the world recognize it as a behavioral addiction. According to several studies, excessive use of smartphones, such as gaming, can change and negatively impact an individual over time. Further, issues arising from excessive smartphone use are a growing social issue that is being debated globally. Many studies have found that the prevalence is high among young adults. Mental illness during the critical period of emerging adulthood can result in lifelong disability by impairing an individual's ability to develop socially, occupationally, and educationally.[35] Currently, individuals visiting the clinics of primary care and psychologists with complaints of anxiety, loneliness, depression, and sleep related problems.[40] Reports suggest that incidence of musculoskeletal pain, pain in the lower back, neck and shoulders are also on the rise.[41] Further, research has shown that family environment is one of the strong predictors of adolescent internet addiction. Furthermore, studies reported there is a relationship between communication, attitude, and cohesiveness in the family and adolescent internet addiction.[42] This highlights the care that should be taken by family members and primary care physicians to prevent the spread of this maladaptive behavior. Recent evidence shows that the Cognitive Behavioral Model, exercise therapy, and art therapy are effective in reducing anxiety, depression, impulsiveness, and with drawl symptoms for smartphone and internet addiction.[43,44] However, there is a dearth of data and further investigations are required to address this problem in a holistic way.

In contrast, yoga is proven to be a viable tool to address physiological, psychosocial, and addictive behaviors by promoting self-regulation and self-control. Yoga is a holistic process of bringing body, mind, and spirit into communion. It has a lineage of more than 5000 years. It has shown a positive effect on perceived stress and quality of life with regular practice among young adults by cultivating subjective well-being.[45] Empirical evidence report that regular practice of yoga in a school has a positive influence on dysphoric moods, emotion regulation, and self-esteem.[46] A review postulated that regular practice of yoga and meditation has enhanced attention and their functional anatomical relationships along with an increase in the gray matter volume enabling individuals to control movement, memory, and emotions.[47] Including yoga as an adjunct treatment modality by the primary care centers and doctors would help in upholding the biopsychosocial dimensions of health in society.

Conclusion

According to recent evidence, researchers are paying more attention to studies on behavioral addictions. Because of its problematic and maladaptive behavior, studies on smartphone addiction have recently increased. Despite this, some studies claim that the prevalence is only 10% to 20%. Because of its market penetration and presence in modern life, there is a need for a broader understanding of the problems associated with it from a biopsychosocial perspective.

Yoga, in contrast, appears to be a promising treatment for addiction and other psychiatric disorders. Its ability to connect with life aids in the detoxification of our minds and bodies, as well as the regulation of emotions, thereby improving our well-being. This is an important aspect of addressing addiction's craving, compulsive behavior, tolerance, and relapse conditions. As a result, incorporating yoga and meditation into daily life will aid in the regulation of the symptoms of maladaptive behavior associated with smartphone addiction.

Key message

The excessive use of smartphones is negatively influencing people's behavior. Looking at the problem from a bio-psychosocial standpoint would help us understand its complexities. Yoga is a mind-body medicine, allows us to understand the nature of behaviour in a holistic way, as well as a possible solution to this maladaptive behavior, by promoting self-regulation and by cultivating subjective well-being.

Highlight

- Understanding smartphone addiction from the viewpoint of modern psychology and yoga
- Giving the perspective of yoga as a viable solution to control the symptoms of smartphone addiction.
- Including yoga as an adjunct treatment modality would be beneficial for the family and primary care doctors.

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References

1. Samaha M, Hawi NS. Relationships among smartphone addiction, stress, academic performance, and satisfaction with life. Comput Hum Behav 2016;57:321‑25.
2. Haug S, Castro RP, Kwon M, Filler A, Kowatsch T, Schaub MP. Smartphone use and smartphone addiction among young people in Switzerland. J Behav Addict 2015;4:299‑307.
3. Oulasvirta A, Rattenbury T, Ma L, Raita E. Habits make smartphone use more pervasive. Pers Ubiquitous Comput 2012;16:105‑14.
4. Kwon M, Lee JY, Won WY, Park JW, Min JA, Hahn C, et al.
Development and validation of a smartphone addiction scale (SAS). PLoS One 2013;8:e5936. doi: 10.1371/journal.pone.0056936.

5. Arnett JJ. Presidential address: The emergence of emerging adulthood. Emerg Adulthood 2014;2:155-62.

6. Billieux J, Maurage P, Lopez-Fernandez O, Kuss DJ, Griffiths MD. Can disordered mobile phone use be considered a behavioral addiction? An update on current evidence and a comprehensive model for future research. Curr Addict Rep 2015;2:156-62.

7. Lopez-Fernandez O, Honrubia-Serrano I, Freixa-Blanzart M, Gibson W. Prevalence of problematic mobile phone use in British adolescents. Cyberpsychol Behav Soc Netw 2014;17:91-8.

8. Yen CF, Tang TC, Yen JY, Lin HC, Huang CF, Liu SC, et al. Symptoms of problematic cellular phone use, functional impairment and its association with depression among adolescents in Southern Taiwan. J Adolesc 2009;32:863-73.

9. Cha SS, Seo BK. Smartphone use and smartphone addiction in middle school students in Korea: Prevalence, social networking service, and game use. Health Psychol Open 2018;5:2055102918755046. doi: 10.1177/2055102918755046.

10. Schacht JP, Anton RF, Myrick H. Functional neuroimaging studies of alcohol cue reactivity: A quantitative meta-analysis and systematic review. Addict Biol 2013;18:121-33.

11. Mak KK, Lai CM, Watanabe H, Kim DI, Bahar N, Ramos M, et al. Epidemiology of internet behaviors and addiction among adolescents in six Asian countries. Cyberpsychol Behav Soc Netw 2014;17:720-8.

12. Aljomaa SS, Mohammad MF, Albursan IS, Bakhiet SF, Abduljabbar AS, et al. Smartphone addiction among university students in the light of some variables. Comput Hum Behav 2016;61:153-64.

13. Bian M, Leung L. Linking loneliness, shyness, smartphone addiction symptoms, and patterns of smartphone use to social capital. Soc Sci Comput Rev 2015;33:61-79.

14. Kee IK, Byun JK, Jung JK, Choi JK. The presence of altered craniofacial posture and mobility in smartphone-addicted teenagers with temporomandibular disorders. J PhysTherSci 2016;2:339-46.

15. Lai CM, Mak KK, Watanabe H, Jeong J, Kim D, Bahar N, et al. The mediating role of Internet addiction in depression, social anxiety, and psychosocial well-being among adolescents in six Asian countries: A structural equation modelling approach. Public Health 2015;129:1224-36.

16. Lee B, Kim S, Kim Y, Bae JY, Woo SK, Woo HN, et al. The relationship between smartphone usage time and physical and mental health of university students. J Korean SocSchHealth 2013;26:45-53.

17. Deshpande A. Mobile addiction and associated factors amongst youth. J Ment Health 2015;2:244.

18. Skewes CM, Vivian MG. The BiopsychosocialModel of Addiction, Peter M. Miller, Principles of Addiction. California, USA: 2013. Pp. 61-70.

19. Griffiths M. A “components” model of addiction within a biopsychosocial framework. J Subst Use 2005;10:191.

20. Barnes SJ, Pressy AD, Scornavacca E. Mobile ubiquity: Understanding the relationship between cognitive absorption, smartphone addiction and social network services. Comput Human Behav 2019;90:246-58.

21. Agarwal R, Karahanna E. Time flies when you’re having fun: Cognitive absorption and beliefs about information technology usage. Manag Inf Syst Q 2000;24:665-94.

22. Chun JW, Choi J, Kim JY, Cho H, Ahn KJ, Nam JH, et al. Altered brain activity and the effect of personality traits in excessive smartphone use during facial emotion processing. Sci Rep 2017;7:12156. doi: 10.1038/s41598-017-08824-y.

23. Wang Y, Zou Z, Song H, Xu X, Wang H, d'OleireUquillas F, Huang X. Altered gray matter volume and white matter integrity in college students with mobile phone dependence. Front Psychol 2016;7:597. doi: 10.3389/fpsyg.2016.00597.

24. Kim M, Lee TH, Choi JS, Kwak YB, Hwang WJ, Kim T, et al. Dysfunctional attentional bias and inhibitory control during anti-saccade task in patients with internet gaming disorder: An eye tracking study. Prog Neuropsychopharmacol Biol Psychiatry 2019;95:109717. doi: 10.1016/j.pnpbb.2019.109717.

25. Jameel S, Shahnawaz MG, Griffiths MD. Smartphone addiction in students: A qualitative examination of the components model of addiction using face-to-face interviews. J Behav Addict 2019;8:780-93.

26. Panova T, Lleras A. Avoidance or boredom? Negative mental health outcomes associated with use of information and communication technologies depend on users' motivations. Comput Hum Behav 2016;58:249-58.

27. Elhai JD, Yang H, Montag C. Cognitive- and emotion-related dysfunctional coping processes: Transdiagnostic mechanisms explaining depression and anxiety's relations with problematic smartphone use. Curr Addict Rep 2019;6:410-17.

28. Liu F, Zhang Z, Chen L. Mediating effect of neuroticism and negative coping style in relation to childhood psychological maltreatment and smartphone addiction among college students in China. Child Abuse Negl 2020;106:104531. doi: 10.1016/j.chiabu.2020.104531.

29. Nehra R, Kate N, Grover S, Khehra N, Basu D. Does the excessive use of mobile phones in young adults reflect an emerging behavioral addiction? J Postgrad Med 2012;46:177-82.

30. Woon DY, Carr CT, Hayes RA. How affective is a “like”? The effect of paralinguistic digital affordances on perceived social support. Cyberpsychol Behav Soc Netw 2016;19:562-6.

31. Hayes RA, Carr CT, Woon DY. One click, many meanings: Interpreting paralinguistic digital affordances in social media. J Broadcast Electron Media 2016;60:171-87.

32. Valenzuela S, Park N, Kee F. Is there social capital in a social network site?: Facebook use and college students' life satisfaction, trust, and participation. J Comput-MediatComm 2009;14:875-901.

33. Chan TH. Facebook and its effects on users' empathetic social skills and life satisfaction: A double-edged sword effect. Cyberpsychol Behav Soc Netw 2014;17:276-80.

34. Bhattacharya S, Bashar MA, Srivastava A, Singh A. Nomophobia: No mobile phone phobia. J Family Med Prim Care 2019;8:1297-1300.

35. Goncalves S, Dias P, Correia A-P. Nomophobia and lifestyle: Smartphone use and its relationship to psychopathologies. Comput Human Behav 2020;2:100025. doi: 10.1016/j.chb.2020.100025.

36. Lister-Landman KM, Domoff SE, Dubow EF. The role of compulsive texting in adolescents' academic functioning. Psychol Pop Media Cult 2017;6:311-25.
38. Chan NN, Walker C, Gleaves A. An exploration of students' lived experiences of using smartphones in diverse learning contexts using a hermeneutic phenomenological approach. Comput Educ 2015;82:96-106.

39. Khang H, Kim JK, Kim Y. Self-traits and motivations as antecedents of digital media flow and addiction: The Internet, mobile phones, and video games. Comput Human Behav 2013;29:2416-24.

40. West R. Theories of addiction. Addiction 2001;1:3-13.

41. Khanna S, Greeson JM. A narrative review of yoga and mindfulness as complementary therapies for addiction. Complement Ther Med 2013;3:244-52.

42. Richter S, Tietjens M, Ziereis S, Querfurth S, Jansen P. Yoga training in junior primary school-aged children has an impact on physical self-perceptions and problem-related behavior. Front Psychol 2016;7:203.doi: 10.3389/fpsyg.2016.00203.

43. Butzer B, LoRusso A, Shin SH, Khalsa SB. Evaluation of yoga for preventing adolescent substance use risk factors in a middle school setting: A preliminary group-randomized controlled trial. J Youth Adolesc 2017;46:603-32.

44. Saraswati SS. Four Capters on Freedom. New Delhi: Yoga Publications Trust, Ganga Darshan, Munger, Bihar, India; 2016.

45. Marengo D, Sindermann C, Häckel D, Settanni M, Elhai JD, Montag C. The association between the Big Five personality traits and smartphone use disorder: A meta-analysis. J Behav Addict 2020;9:534-50.

46. Takao M. Problematic mobile phone use and big-five personality domains. Indian J Community Med 2014;39:111-3.

47. Harwood J, Dooley JJ, Scott AJ, Joiner R. Constantly connected-The effects of smart-devices on mental health. Comput Human Behav 2014;34:267-72.

48. Sohn SY, Rees P, Wildridge B, Kalk NJ, Carter B. Prevalence of problematic smartphone usage and associated mental health outcomes amongst children and young people: A systematic review, meta-analysis and GRADE of the evidence. BMC Psychiatry 2019;19:356.doi: 10.1186/s12888-019-2350-x.

49. Balayogi A. Somato-psychic aspects of asana (Yogic postures). AnnYoga PhysTher 2018;3:1.

50. Streeter CC, Jensen JE, Perlmutter RM, Cabral HJ, Tian H, Terhune DB, Ciraulo DA, Renshaw PF. Yoga Asana postures. AnnYoga PhysTher 2018;3:1.

51. Streeter CC, Whitfield TH, Owen L, Rein T, Karri SK, Yakkhand A, et al. Effects of yoga versus walking on mood, anxiety, and brain GABA levels: A randomized controlled MRS study. J Altern Complement Med 2010;16:1145-52.

52. Bera TK, Gore MM, Oak JP. Recovery from stress in two different postures and in Shavasana-a yogic relaxation posture. Indian J PhysiolPharmacol 1998;42:473-8.

53. Subramanya P, Telles S. Effect of two yoga-based relaxation techniques on memory scores and state anxiety. Biopsychosoc Med 2009;3:8.doi: 10.1186/1751-0759-3-8.

54. Novaes MM, Palhano-Fontes F, Onias H, Andrade KC, Lobão-Soares B, Arruda-Sanchez T, et al. Effects of yoga respiratory practice (Bhastrika pranayama) on anxiety, affect, and brain functional connectivity and activity: A randomized controlled trial. Front Psychiatry 2020;11:467.doi: 10.3389/fpsyt.2020.00467.
71. Garland EL, Froeliger B, Howard MO. Effects of mindfulness-oriented recovery enhancement on reward responsiveness and opioid cue-reactivity. Psychopharmacology (Berl) 2014;231:3229-38.

72. Witkiewitz K, Bowen S. Depression, craving, and substance use following a randomized trial of mindfulness-based relapse prevention. J Consult Clin Psychol 2010;78:362-74.

73. Smith DE. The process addictions and the new ASAM definition of addiction. J Psychoactive Drugs 2012;44:1-4. doi: 10.1080/02791072.2012.662105.

74. David NG. The Addictive Properties of Internet Usage, editors. Young KS, Abreu, Cristiano Nabuco de, Internet Addiction, John Wiley & Sons, Inc., Hoboken, New Jersey: 2011;3-17.

75. Wood D, Crapnell T, Lau L, Bennett A, Lotstein D, Ferris M, et al. Emerging adulthood as a critical stage in the life course. 2017 Nov 21. In: Halfon N, Forrest CB, Lerner RM, Faustman EM, editors. Handbook of Life Course Health Development. Switzerland 2018;123-143.

76. Alkhateeb A, Alboali R, Alharbi W, Saleh O. Smartphone addiction and its complications related to health and daily activities among university students in Saudi Arabia: A multicenter study. J Fam Med Prim Care 2020;9:3220-4.

77. Behera P, majumdar A, Revadi G, santoshi J, Nagar V, Mishra N. Neck pain among undergraduate medical students in a premier institute of central India: A cross-sectional study of prevalence and associated factors. J Fam Med Prim Care 2020;9:3574-81.

78. Nam Y-O. A study on the psychosocial variables of the youth's addiction to internet and cyber sex and their problematic behavior. Korean J Soc Welf 2002;50:173-207.

79. Ju Kim D. A systematic review on the intervention program of smartphone addiction. J Korea Acad Coop Soc 2020;21:276-88.

80. Kim H. Exercise rehabilitation for smartphone addiction. J Exerc Rehabil 2013;9:500-5.

81. Gard T, Brach N, Hölzel BK, Noggle JJ, Conboy LA, Lazar SW, et al. Effects of a yoga-based intervention for young adults on quality of life and perceived stress: The potential mediating roles of mindfulness and self-compassion. J Posit Psychol 2012;7:165-75.

82. Janjhua Y, Chaudhary R, Sharma N, Kumar K. A study on effect of yoga on emotional regulation, self-esteem, and feelings of adolescents. J Fam Med Prim Care 2020;9:3381-6.

83. Van Aalst J, Ceccarini J, Demyttenaere K, Sunaert S, Van Laere K. What has neuroimaging taught us on the neurobiology of yoga? A review. Front Integr Neurosci 2020;14:34. doi: 10.3389/fnint.2020.00034.