

Mobile Phone and Mental Health: Iron Cut the Iron

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Abstract

In recent time peoples become addicted to smartphones that also hamper the social interactions among individuals. It may cause severe anxiety and depressive symptoms betwixt young adolescents. It worsens the loneliness and ultimately affects the wellbeing and social behavior among populations. Thus, the correlation between mobile phone addiction and depressive symptoms is quite startling. Therefore, an educated person might understand the depressive situation and get rid of it better. But the big concern is towards uneducated ones, who do not see the consequences of depressive conditions and become mentally sick over time. Likewise, in erudite individuals having a high risk of depression compared to literate peoples. To overcome the difficulty of smartphones over usage, a well-defined program and organization of effective presentations provide a better awareness among untaught individuals. Several studies have shown that excess usage harms individuals' eyesight, hearing, and postures. The maladaptive behaviors of phone use may lead to the more enormous consequences of anxiety and depression among users. Moreover, various financed and private platforms are needed to cooperate with this situation via different strategies that might help affect an individual's mental health. There have numbers of mobile apps and tools are available that are beneficial to manage anxious and depressive behaviors in populations. These apps and tools also play an essential role in maintaining the current pandemic condition among COVID-19 patients. This review article covers clinical trials that have performed so far and suggested directions for prospective trials.

Keywords: Smartphone; Adolescents; Anxiety; Depression; Mobile Apps; Mental Health

Introduction

Currently, mobile phone addictions generate depressive symptoms among young adolescents [1]. It has seen in western countries that the popularity of excessive smartphone usage increased day by day. It may lead to several health issues in our youth and makes their body lethargic also. The more prolonged exposure of interactiveness in young individuals leads to several health problems such as sleep disturbance, anxiety and stress [2]. The children are getting stuck in indoor activity rather than playing outside games that make them unhealthy [3]. Besides, adopting a healthy lifestyle, individuals are using smart devices, which affects the health of children very rapidly [4]. It reported that Porn addiction among adolescents worldwide is one of the biggest culprits responsible for major depressive disorder [5]. However, some scientists examining the young individual's educational achievements or physical well-being with mobile phone addiction and others quantify the psychological or social behavior with smartphone addiction. As the active growth in technology makes many smart devices, a mobile phone is one of them. Youth spends their time in a more inclined way on social media; they do academic search,

emails, finding answers to questions as well as playing games. Over the world, mobile phones were handled by 1.85 billion individuals in 2014 that expected to be more than 2.87 billion in 2020. Too much reliance on a mobile phone makes us addicted. Smart-phone makes our life more comfortable than before, but it also ties us. According to the psychologist, the excessive usage of the smartphone not only disturbs physical health but also having psychological or academics effects on youth at the same time.

Several health issues, such as sleep disturbance, depression, anxiety, and stress, all are associated with social media abuse, have been linked to smartphone addiction and usage. Likewise, all entities that can manipulate a person’s behavior can be an addictive inclination. Whenever nature becomes an obligation, it converted as addiction [6]. The children and young adolescents are more prone to develop any addictive behavior, so smartphone addiction can easily be the obligation in young individuals [7]. The harmful radiation releases from the 3G, 4G and 5G mobile phone networks damage the structure and function of the brain, as suggested by several studies [8-11]. Thus, the positive correlation between dependency on smartphones and depression is alarming. There are several preventive approaches for better public health, concentrating on young individual mindsets and may set the limits for their personal and others’ convenience. Several mobile apps and tools are available, which are very beneficial in managing anxiety and depression among affected individuals. Besides, these apps and tools also play a vital role in maintaining the current pandemic condition among COVID-19 patients. A private and financed platform is required to cooperate with this situation through distinct strategies that might help to cure an individual’s mental health. Following figure 1 shows the positive and negative impact of smartphones and apps on various dimensions of mental health.

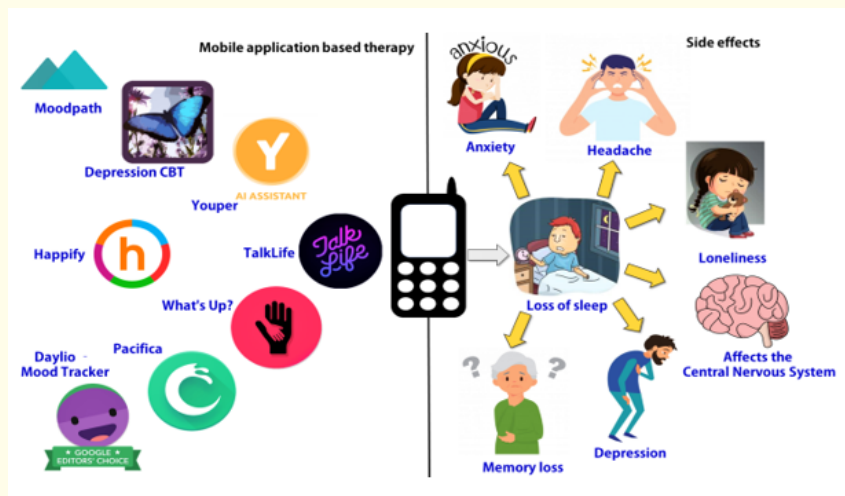


Figure 1: This figure shows the beneficial harmful effect of mobile phone and apps in anxiety and depression (Source-Internet Google).

In this review’s our primary objective is to discuss both the positive and negative effects of cell phones and tools to cope up with harmful impact individuals. This review discusses the relationship between mobile phone use and depressive symptoms by utilizing the pieces of information published worldwide. Several depressive symptoms, such as insomnia, appetite, energy level, concentration, daily behavior or self-esteem symptoms associated with mobile phone usage, also dictate this review.

Sleep disturbance and mobile phone

The sleep quality and quantity play a significant role in the neurological development in children [12,13]. Therefore, mobile phones may also reduce sleep time in adolescents due to enhance screen time [14]. Chronic sleep disorders can also generate obesity, diabetes,

stroke, depression at an early stage in children. The over usage of smart-device may hamper the school time and youth performance in studies also [15]. Due to easily excess vulgar sites, pornography affects the individual's mental health and social well-being [16]. It may significantly affect the circadian rhythm and increase the stress level between the affected individual [17]. Likewise, the Melatonin hormone is the leading regulator of sleeping behavior that ultimately influences their sleeping cycle [18]. The detrimental rays come from smartphones suppresses the melatonin production among individuals, consequently reduces sleep timing [15,19,20]. The adherent consideration effectively suggests the relationship between nocturnal sleep timing with screen timing on electronic media and phone [12]. This experiment conducted on the 843 children from 7th to 9th grade, found that night bed timing is severely affected due to excess use of mobile-phones comparing to non-users. The outdoor physical activity with exciting content might be helpful for the affected children. To overcome the smart-phones addiction in affected individuals the parental concern in bedtime is also beneficial [12]. The several researchers conducted questionnaire-based study with 4,624 college students regarding the relationship between sleep quality and cell phone dependency. They have set three parameters in to which the problematic mobile phone use (PMPU) was assessed for sleep quality and depression, such as Self-rating questionnaire for adolescent problematic mobile phone use (SQAPMPU), Pittsburgh sleep quality index (PSQI) and patient health questionnaire-9 (PHQ-9). Therefore, sleep quality plays a mediating role in affecting the mental health associated with PMPU. Sleep problems were significantly affected by PMPU and cautions should be needed to aware of the peoples regarding these conditions [21]. Moreover, Poor sleep quality plays a very compelling role in enhancing the risk of mental health problems in PMPU as compared without PMPU [22]. The rate of depressive symptoms and sleep dysfunction increases day by day because of the late-night phone addiction among the younger population. Literacy regarding sleep hygiene and the risks associated with electronic media usage at night should be needed for that younger population to improve their well-being [23].

Clinical studies evidence from all over the world

A study investigates the relation between smartphone addictions on different psychological factors in middle school students in South Korea. One group population spends more time on messenger, playing games, surfing on the internet and prolonged use of social media compared to other group populations. Because of limited people in the group, further investigation was required to find a logistic conclusion regarding the relationship between smartphone use and depression [24]. A cohort study explores the negative effect of smartphone use among young adults regarding their psychosocial aspects of mobile phones on their mental health. Both men and women included in this study. It is based on questioner one year follow up study. This study concludes that mobile phones' overuse causes severe sleep disturbance, stress, and other depressive-like symptoms in both men and women. Therefore, Public advice for affected men and women to set their limits on phone usage and change their attitude toward them might be helpful to overcome the depressive symptoms [1].

Likewise, the parallel study among Japanese adolescents exhibits a correlation between mobile phone use and depressed mood symptoms. This analysis helps in the investigation of the relationship between the duration of mobile phone usage and the psychological mood among 10th standard students. The prolonged exposure of the screen may cause major depressive disorder (MDD) among the students. However, reducing screen time overcome the above-mentioned depressive symptoms regarding their mental health [25].

An in the study demonstrated the adverse consequences of smartphones amidst the Middle Eastern population. It investigates the distinct associated factors with addictive behavior that originated in severely depressed individuals. It was a social platform-based questioner analysis conducted on both males and females. Thus, experiments conclude the addiction and depressive behavior linked with extensive phone usage. It reported that un-taught individuals having more depressive symptoms due to extensive usage [26].

Another Chinese students-based follow-up study suggested that inadequate physical activity majorly affects individuals' mental health [27].

Interestingly studies show the impact of mobile phones on high school students and generate their EMF-based characteristics. It is again a questioner-based study conducted in November 2009 and April 2011. Therefore, it is observed that the EMF level increases in

phone addict students. The increased rate of EMF harming the student's mental health consequently causes severe headaches, concentration difficulties, fatigue, and sleep disturbances among high school students. Likewise, some activity can significantly reduce the depressive symptoms such as reducing screen time with phones, earphones and calls [28].

Similarly, Shahrekord university students exhibit smartphone usage relationships and concluded that phone addictive behavior is considered a social and psychological problem. For this study, 296 volunteers were selected.

The experiment results suggest that the health condition of these students' addiction to cell phones is reduced manifold [29]. The Mobile Phone Addiction Craving Scale (MPACS) benefited to mobile phones' excess desire rate. However, adolescents lose their self-esteem due to their strong desire to reach smartphones due to easy cellular excess and addiction rates measured through MPACS. Their scale shows a positive response to identifying the indulgence of an individual with inclination [30]. The rapid advancement in the field of technology has a positive and negative impact on the world.

On the other hand, the adverse technology impact on social media handling is more pronounced in younger populations than older ones. As a result, more focus should require for adolescents in the management of their timing regarding modern technology associated with their inclinations. A broad study ranges should be needed to correctly identify the direct relationship between screen time and mental status [31]. It has also observed that the pattern of usage varied among populations' mental health. Likewise, human habits such as sleeping, eating, anxiety level follow a specific usage pattern [1]. The dependency on cell phones is frequent, so its prolonged usage might be an essential tool for neuroscience research to diagnose mental health [32]. A further broad level of study should require emphasizing the role of Alexithymia in mobile linked with inclination [33]. The indulgence of students in social networking sites, gaming, watching videos plays a dominating role in students [34]. The usability of users varied among addicted students. Thus, the anxiety and depression level differ in populations depending on the usability of the cell phone. However, mobile phones' intensity and modality could be a contributing factor culpable for the mental health problem among students [35,36]. Recent research also explored the connection between excessive cell phone management among late adolescents. It might focus on short term longitudinal pathways of smartphone and sick symptoms among the late adolescent's people. In this study, a total of 346 individuals has participated that reveals the depressive nature becomes enhanced in young one [37,38]. The reports regarding Chinese adolescents show that they have spent more than five hrs on weekends compared to 2 hrs on working days while using cell phones [39]. Therefore, smartphone sensors anticipate the quality of living by measuring depressive symptoms using phone time. Besides, a unique combination of sensors can also identify the people's visited locations. A broad study level will need to explore the geographic area for advance envision in anxiety with phone addicted persons [40]. The phone sensors are designed to correlate the anxiety and depression levels in daily life activity. Therefore, recruitment of a total of 40 students to this exploratory study. The GPS based mobile sensor able to identify behavioral markers and severity levels between the anxiety's individuals. Several researchers think that the large-population based study may recognize and fix the depressive behavior in affected individuals [41].

The systematic review study suggests an active link between cell phone and depression with sleeping dysfunction. It includes all age-group participants from children to adults and elder ones. In this review, we demonstrated that adults are more sensitive than younger ones to depression and sleeping dysfunction. Smartphones change the behavioral and psychological perspective of the affected individual negatively to deal with their daily life. However, broad studies should be needed to draw a definite conclusion [42]. The examinations held to explore smartphones-based anxiety, depression characters among South Korean adolescents. It also correlated the effect of allergic disease on the relationship between cell phone and depressive symptoms. Likewise, the student who suffers from allergic diseases may develop severe symptoms of depression even though facing problem to manage school time due to excess usage of cell phones. However, healthy individuals managed their daily routine tasks far better than diseased individuals. Thus, phone addiction linked to psychological and human ailment conditions. Several researchers claim that a healthy person can overcome an addictive disorder very rapidly than diseased ones due to robust mental health.

A systematic review and meta-analysis demonstrated the relation of phone misuses to children and young people’s mental health. This study includes 41,871 peoples, with 55% female individuals. Every fourth student is affected by the adverse effect of mobile phones that damage their physical wellbeing. The potential step to cure individual mental health is crucial for health agencies [43]. Due to excessive use of smartphones may also create Attention-deficit/hyperactivity disorder (ADHD) among South Korean adolescents. The dependency causes chronic anxiety and depressive symptoms among Korean populations. Therefore, Smartphone Addiction Scale (SAS) used to measure the addiction level in 338 subjects, in which 7.5% of peoples consider in the addiction group.

For developing smartphone addiction, ADHD is one of the high-risk factors. Awareness and proper care should be needed for affected individuals to beaten the ADHD [44,45]. The bad habit of extensive screen time in the bedroom might be responsible for sleep dysfunction among adolescents. Moreover, the development of irritational characters is associated with this excessive usage activity. Therefore, psychological behaviors adversely affected by increased screen time [46].

Positive impact of smartphone on anxiety and depression

There is an urgent need to identify risk factors responsible for anxiety and depression. In many countries like Fizi and islands of the South Pacific Islands, suicide is a big concern due to depression. Mobile applications are meant to be useful in the identification of risk factors for depression associated with suicidal events and provide guidelines to overcome the problem providing specific treatment. AS-RaDA app developed to identify the same complications by the native people of this country. This app has two main components: Center for Epidemiological Studies-Depression (CES-D) and Suicide Behavior Questionnaire-Revised (SBQ-R). System Usability Scale used to assess the effectiveness of this app. These apps and their components are very active in finding the connected risk factor responsible for the depression linked to suicide. Thus, the countries have overcome the suicidal tendency by using the tool of smartphones [47]. Table 1 shows the effectiveness of some mobile apps and tools that very helpful in overcoming depression.

S. No	Mobile applications-based therapy of anxiety and depression	Effect	Citation
1	TeleCoach™	Overcome the Alcohol dependent depression.	[53]
2	Acceptance and commitment therapy (ACT)	Improving the mental health services at college counselling centers.	[54]
3	Ecological Momentary Assessments (EMAs)	Helpful to overcome the anxiety and depression due to COVID19 pandemic. This mobile tool is also helpful in reducing the depression among old populations.	[55,56]
4	Mobile phone applications (App) based cognitive behavioral therapy (CBT)	This therapy is very effective for those women’s who suffers from postpartum depression.	[57]
5	PROMIS (Patient-Reported Outcomes Measurement Information System)	This mobile based tool was very helpful in monitoring and overcoming the emotional distress among young children.	[58]
6	Destressify	Mindfulness-based apps may provide an effective alternative support for university students’ mental health.	[59]
7	1. Mindsurf	MindSurf is providing an evidence-based addition to the large number of health and wellbeing apps already available and helping to address the urgent priority of providing timely access to effective mental health support.	[60]
8	PTSD Coach	It designed for posttraumatic stress disorder (PTSD)	[61]
9	SuperBetter	This social impact project will support colleges and universities in their efforts to improve student success and retention.	[62]

10	Thought Challenger	The app is designed to help alleviate depression and improve happiness. It's built by a team of psychologists and technologists at the Center for Behavioral Intervention Technologies.	[63]
11	Smiling Mind	It is a non-for-profit web and app-based meditation program developed by psychologists and educators to help bring mindfulness into your life.	[64]
12	Headspace	Headspace is used to guide to everyday mindfulness in just a few minutes a day. Choose from hundreds of guided meditations on everything from managing stress and anxiety to sleep, productivity, exercise, and physical health	[64]
13	Catch It	It will help to learn to manage feelings like anxiety and depression with Catch It.	[65]
14	Agoraphobia Free	It measures the effectiveness of a self-guided mobile-based intervention primarily targeting agoraphobic symptoms, with respect to a generic mobile app targeting anxiety.	[66]
15	Mood Mission	Mood Mission helps you learn new and better ways of coping with stress, low mood, depression, and anxiety	[67]
16	Calm	Calm is an effective modality to deliver mindfulness meditation in order to reduce stress and improve mindfulness and self-compassion in stressed college students.	[68]

Table 1: This table shows mobile applications-based therapy of anxiety and depression.

Role of smartphones apps in the current pandemic: COVID19

The world introduces to restrict movement measurement as an effort to decrease the rate of COVID19 infected individuals and make extensive changes in our daily lives. Likewise, new realities of working from home, children home-schooling, temporary layoff, and social distancing with family members may take some time to get acclimated [47]. Adjusting with life-changes like avoiding close contact with vulnerable people, managing the fear of viral contact is very much challenging for us. It is especially problematic for people with mental illness. As the global pandemic COVID19 expands, the potential digital wellbeing applications for mental illness have urgently needed [48]. The digital health apps meet with the demands of peoples in quarantine, following social distancing has centered on depression and anxiety, broadly ignored patients having psychotic disorders. The digital health acclimation to severe mentally ill patients is today's urgent need [49]. The smartphones belong to the newer cellular telephonic category having integrated computer skills and other features with the ability to run plenty of software and apps. With the impact of self-isolation and the shielding consequences on mental health, stress, anxiety and depression are accepted as a significant issue during pandemic situations. Therefore, smartphone apps can help to monitor the psychological conditions and counselling to reassure peoples. It might be an efficient way to implement telepsychiatry assistance in dealing with mentally ill patients. Therefore, with digital phenotyping and smartphone sensors, we can better monitor the mentally ill patients in real-time, with applications such as MONARCH [50], Mind Lamp [51], Crosscheck, etc [52].

The smartphones based digital data used to predict the patient's current mental conditions and also help to create personalized care plans. Several paid applications such as stop breath and think serves real-time based mediation for depression and anxiety to address the globally anxious reactions for pandemic situations. However, some people will also require digital literacy skills that help to optimized access to telehealth applications [49]. The idea of mobile technology-based apps to treat mentally ill patients is not new, although it becomes a reality for severely mentally ill patients today. The initial experiences of having a pandemic situation counterfeit reality and seeking the health care system to keep with the technology urgency of patients immediately. Figure 1 shows the beneficial and harmful impacts of mobile phones and apps in mental health.

Conclusion

In this review, we have concluded that mobile phones and their tools exert both a harmful and beneficial impact on human beings. Anxiety, depression, sleeping dysfunction, mental illness, etc. are some significant severe side effects that arise due to cell phone addiction. Quality and quantity time on the screen are among the major factors responsible for the mental illness. Young adolescents and uneducated people are more prone to develop mental illness as a result of smartphone addiction. Proper care and guidance will be needed to inform the people about how to handle their mental illness by managing quality time on smartphones. As we know, the iron cut is iron, and there are lots of mobile phone apps and tools are available that are very helpful in managing anxiety and depression. Besides, smartphone apps are also beneficial in the management of mental health in COVID19 patients. Further study will be required to generate more evidence regarding the same.

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Conflict of Interest

All authors have declared that there is no any conflict of interest.

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