

# EXCESSIVE USAGE OF SMARTPHONE AND PSYCHOLOGICAL WELLBEING: A REVIEW

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**Abstract:** In past decades many gadgets and devices are invented, a smartphone is one of them. Functions as mini computers, people find difficult to keep away themselves from the smartphone. Due to over usage of smartphones, people became addict to it and started neglecting other areas of life. Adverse effects of smartphone addiction on physical, mental, and social wellbeing, has compelled for recommendation to be included in DSM-V. In 1997, the term 'smartphone' first came into existence, since then, many changes and modification has been brought into it. A wide-spread search on the internet has been done related to excessive and problematic smartphone use, smartphone addiction, psychological or mental wellbeing. The study of the literature revealed that smartphone addiction adversely affects psychological wellbeing such as depression, stress, anxiety, and sleep problems. Most of the studies were conducted on adult populations, university students, or self-selected participants which have a relationship with the study. In many studies, it was found that there was a small statistically significant association between the variables and the populations. It was also seen that excessive use of smartphones keeps individuals away from other activities and health-related behaviors such as physical activities and real social interactions.

**Keywords:** Smartphone addiction, Psychological wellbeing, Depression, Sleep problems.

## 1. Introduction

Rapid advancement in information and communication technology over the past decade or so invented many devices and instruments. A smartphone is one of such device people accepted with open arms, which has invaded in the life to an extent that one feels no life without it. Smartphones with a multitude of functions not only used for communication purposes but also as mini-computer. With so much information on fingertips, it made difficult to unplug and many feel uncomfortable without a smartphone for a few hours. Actually, due to the excessive usage of smartphones, people started neglecting other areas of life and developed pathological conditions related to physical, physiological, psychological, and social too. The most commonly used term to describe such conditions is known as Smartphone addiction." Smartphone addiction" is a disorder involving compulsive overuse of the mobile device, usually quantified as the number of times users access their devices and or the total amount of time they are online over a specified period"[1]. Smartphone addiction is not an individual problem rather it has taken into grip the entire community, especially, the young students. People spend more time on social media, playing games, interacting with people, repeatedly checking texts, emails or apps, searching for information and answers of doubts, etc[2]. Though smartphone addiction needs further study and research, it has been recommended to be included as a disorder in the latest edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-V) [3]. The mobile phone communicates through the emission of radio signals, and the exposure to radiofrequency electromagnetic fields has been proposed to be a health risk. There are today few indications that radiofrequency electromagnetic fields associated with mobile phones have any major health effects [4]. However, in addition to the physiological aspects of the exposure, there is a growing research literature that takes a psychological or behavioral perspective on the potential health effects of mobile phone use. The purpose of this literature review was to carrying out a literature review of quantitative observational studies that consider links between smartphone phone use and mental health from a psychological or behavioral perspective.

### 1.1 Smartphone

A Smartphone, or smartphone, is a term for distinguishing mobile phones with advanced features from basic feature phones. The term "Smartphone" first appeared in 1997, when Ericsson described its GS 88 "Penelope" concept as a smartphone.[5,6] This term was introduced in the market for a new class of mobile phones that provides integrated services from communication, computing, and mobile sectors such as voice communication,

messaging, personal information management applications, and wireless communication capability[7]. Modern smartphones currently include all the features of a laptop, including web browsing, Wi-Fi, and 3rd-party apps, etc. The most popular Smartphone's today which are emerging are Google's Android, Apple's IOS mobile operating systems, and Nokia-X series.[8,9] Significant increase in Smartphone use and their capabilities allow adolescents to access the Internet, communicate, and entertain themselves anywhere and anytime. Therefore, most teenagers in 10-19 years of age can use the Smartphone as a constant companion.

## 1.2 Addiction

According to World Health Organization, "addiction" is considered as dependence, as the continuous use of something for the sake of relief, comfort, or stimulation, which often causes cravings when it is absent[10]. The two major categories of addiction involve either substance addiction, e.g. "drugs or alcohol addiction" or "behavioral addiction such as mobile phone addiction"[11]. Mobile phone addiction/abuse/misuse is one of the forms of compulsive use of "a mobile phone" by adolescents across the world. A new kind of health disorder in this category among adolescents, "smartphone's addiction/abuse/misuse" is now challenging health policymakers globally to think about this rapidly emerging issue. Indian adolescents are also affected by this high smartphone engagement, and the current paper will use meta-analysis to discuss their addictive behaviors.

## 1.3 Smartphone's addiction scenario

Smartphone abuse is increasing in the 21st century as more and more adolescents enjoy exploring their smartphones in their free hours. Smartphone overuse can be a sign of Smartphone addiction as per many studies of Kim and Flanagan[11,12]. New research in the United States suggests that excessive use of smartphones, increases the risk for severe psychopathologies in adolescents and there is growing evidence of problematic use of smartphones that impacts both social and health aspects of users' lives[12,13]. The study of 200 adolescents in Korea also showed that abnormal users of smartphones had significantly more problematic behaviors, somatic symptoms, attention deficits, and aggression, and this study also found that youth were more addicted to smartphones they had more severe psychopathologies[13].

## 2. Materials and Methods:

It is based on literature published during the period 2008-2017. Only original research papers have been included in this literature review. An extensive search of various studies related to excessive and problematic smartphone use, smartphone addiction, psychological or mental wellbeing was done on the internet. The thematic structure has been adopted.

### 2.1 Study Designs and Populations

The majority of studies reviewed had a cross-sectional design and few were identified as having a longitudinal design. The studies excepted test-retest reliability. About one-third of studies were based on the child or adolescent populations which were mostly administered through schools and more than 50% of studies were of adult population based on university or college student populations. In some of the studies, participants were selected through advertisements, postings on websites, mail, personal appeal, or were carried out in specific workplaces or health centers whereas some of the studies lacked proper description regarding the selection process of participants.

### 2.2. Measurements

The literature reviewed revealed that maximum studies were based on self-reported questions and answers through pen-and-pencil or web questionnaires. In some of the studies, data were collected through telephone or face-to-face interviews. In the case of younger children, reports from parents about smartphone usage and health outcomes were considered. Frequency and duration of calls and text messaging, time spent on different apps, and functions were criteria for measuring the quantity of smartphone usage. Many studies also examined type of phone, number of phones, age from using a smartphone, time slots of phone used, presence of a phone in the bedroom, and the size of phone bills.

### 3.1 Frequency or duration of smartphone usage and mental health

In longitudinal studies, the comparison between smartphone owners and non-owner adolescents found that owners slept less and had more sleep problems. After two years follow up it was found that there were no differences in sleep problems between smartphone owners, new owners, and non-owners, but smartphone owners had shorter sleep duration on weekdays in comparison to non-owners [14]. In another longitudinal study of 126 United States adolescents, it was found that more time spent on smartphone use was associated with increased depression [15]. In cross-sectional studies, it was found that there was an association between the quantity of smartphone use and symptoms of depression [16,17]. The use of phones more than 5 hrs a day among Japanese adolescents was not associated with depression after adjusting for confounders while using the mobile phone for more than 2 hrs per day for social networking services or online chatting had an association with depression [18]. A British study found that smartphone use on weekends was negatively associated with mental well-being [19]. In an Israeli study of 185 children, daily time spent on a smartphone was not associated with psychopathological outcomes [20]. A German cross-sectional study with 7533 adolescents found an association between more use of smartphone and sleep problems among girls [21]. In a Chinese study with 6247 school children, it was found that time spent on texting, playing games, or surfing the internet on a smartphone was associated with later bedtimes, shorter sleep duration, problems in initiating and maintaining sleep, and daytime tiredness [22]. Association between shorter sleep duration and tiredness was seen among Japanese adolescents [16], and with poor sleep quality and daytime sleepiness among adolescents in Hong Kong [23]. A study with 1127 Swedish University students it was found that frequent smartphone use associated with sleep problems and depressive symptoms [24]. Among the cross-sectional studies, frequency and duration of mobile phone use, logged by an app on the participants' phones, was associated with depressed mood [25]. In a cross-sectional study of young adults in Sweden, an association between frequency of calls and texts and perceived stress, sleep problems and depressive symptoms were found [26]. In another study, time spent on the smartphone was associated with anxiety [27], while the number of texts was associated with anxiety [27,28] and depressed mood [28]. Also, in the United States, study with 308 adults it was found that smartphone use frequency was negatively associated with depressive symptoms [29,30].

### 3.2 Smartphone Usage at night times

About 15 studies, describes the use of smartphone in late evening or night, i.e., before bedtime, in bed or after lights off, that results in awakening at night because of the phone or even just presence of a phone in the bedroom. In another longitudinal study, an association between night-time awakenings by phone and sleep disturbance perceived stress and depressive symptoms in young adults was found [26]. A study of work-related smartphone use at night showed subsequent lower sleep quantity associated with greater fatigue the next morning and less engagement during the work [31]. Almost all the referred studies used self-reported sleep outcomes. However, two studies examined sleep by actigraphy to self-reported smartphone use [32,33]. Phone notifications at night times predicted global problems, poor sleep quality, and sleep disruptions [33]. Besides sleep outcomes, bedtime smartphone use was associated with reduced mental health, suicidal feelings, and self-injury [34], depressive symptoms [35,36], anxiety, and stress [36], and reduced cognitive performance in one study [37].

### 3.3 Excessive or Problematic use of Smartphone

In the reviewed literature, about 70% of the papers discussed excessive or pathological smartphone use. The papers describe health outcomes of excessive smartphone use, factors of excessive use such as personality, or other psychological factors. With the increased smartphone usage research concerning overuse, excessive, dependent, problematic or pathological, addictive smartphone use has emerged. In 1990, Young proposed the concept of internet addiction as a specific psychiatric disorder, applied Diagnostic and Statistical Manual of Mental Disorders criteria for pathological gambling to internet use [38]. Other concepts emerged are Nomophobia and Phubbing. Nomophobia describes not having access to a mobile phone [39] and includes four dimensions: not being able to communicate, losing connectedness, not being able to access information, and giving up convenience [40]. Phubbing word is a combination of "phone" and "snubbing" refers to when an individual is looking at or attending to his or her phone while in a conversation with others [41]. "Ringxiety" or "Phantom ringing" refers to perceiving that the phone rings even when it does not [42]. Playing games [43,44,45,46] and using social networking site [43,44,47,48] are also associated with excessive or problematic

smartphone use. Because of varied measurements, definitions, and populations the prevalence of problematic smartphone use varied greatly in the studies. Most of the studies were cross-sectional studies. A longitudinal study of three years in Korea in 1877 adolescents found bidirectional relationships between smartphone addiction and depressive symptoms [49]. Another study on the same population found that excessive smartphone use was associated with poor sleep quality over time [50]. In cross-sectional studies association between problematic use of smartphone and depression were seen [49,51,52,53,54,55,56,57] whereas in four studies depression was negatively associated with problematic use [29,30,58]. Positive association were also seen with anxiety [59,58,60,61], sleep problems or insomnia [62,63,64], reduced sleep quality [43,46,51,65], stress [66,55,67,57], impulsivity or less self-control [46,47,66,68,69], attention deficit hyperactivity disorder (ADHD)-symptoms [70], productivity loss at work [71], and perceived phantom ringing [42,72,]. Moreover, problematic use was associated with other behavioral addictions such as internet addiction [55,60,73,74,75,76,77], shopping addiction [78,79,80], gambling addiction [81,82], and general addiction proneness [83,84]. Association between Excessive or problematic smartphone use and loneliness were also seen in many cross-sectional studies [84,54,85,86,87].

#### 4. Discussion

It was revealed from the reviewed literature that many studies investigated the relationship between the usage of smartphones and the psychological wellbeing of humans. It was found that excessive use of smartphones adversely affects mental health, such as depressive symptoms and sleep problems. A relatively good amount of studies examined smartphone use about sleep habits; shorter sleep and reduced sleep quality were associated with smartphone usage at bedtime or night. It was also revealed that excessive or problematic use of smartphones was associated with several adverse effects, such as anxiety, depression, and sleep problems. Most of the studies were cross-sectional and few studies conducted longitudinal design. A majority of studies were based on self-reporting that implies both exposures and outcomes may be subject to misclassification, recall difficulty, recall bias, and response-style bias. Many studies conducted on adult populations, university students, or self-selected participants which compromises the generalizability of results. It was found in many studies that there was a small statistically significant association between the variables and the populations. Excessive or frequent usage of smartphones seen to be associated with many mental health-related symptoms, behavior, or psychological consequences. Beside sleep duration and quality deterioration, it was also responsible for the generation of higher levels of psychological stress and physiological arousal. It was revealed that excessive usage of smartphones keeps individuals away from other activities and health-related behaviors such as physical activities and real social interactions.

#### 5. Conclusions

It was concluded from the reviewed literature that excessive usage of the smartphone has an association with adverse psychological health and behavioral aspects. However, more systematic studies are needed with longitudinal design and well-defined populations to draw valid conclusions about the impact mechanisms of associations.

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