

## Smartphone Overuse – A Growing Public Health Issue

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Received date: February 01, 2017; Accepted date: February 23, 2017; Published date: February 28, 2017

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### Abstract

With smartphones growing to be an integral part of model life, an overuse of smartphone has become epidemic around the world. It negatively affects people's life with profound implications on mental, physical, and social health and well-being. It is important to bring the public's awareness to this growing epidemic and to define smartphone overuse as a public health issue. Potential strategies for addressing this issue may be learned from tobacco control, such as health education and health communication, legislation and technical means. In contrast to tobacco control, the aim of public health interventions is not to prohibit smartphone use, but to promote safe, healthful and mindful use. In short, smartphone overuse is an emergent public health issue that demands public health solutions.

**Keywords:** Smartphone overuse; Smartphone addiction; Public health issues; Intervention strategies

### Introduction

Recently, in a Southern Chinese city a young man was killed by a truck while crossing a street. Lying in a pool of blood, his smartphone was still playing a video - the last video he watched in his life. A witness said "He was focusing on the video without noticing the traffic signal [1]. Tragedies like this are happening around the world more often than before, thanks to the widespread use, and overuse, of smartphones.

Smartphone overuse (similar terms: mobile phone addiction, problematic mobile phone use, smartphone addiction) refers to people spending too much time on their smartphones to an extent that it negatively affects their life. Smartphone addiction is a form of internet addiction [2], which is regarded as an addictive behavior, with profound implications on mental, physical, and social health and well-being. Because of its extensive impact on daily life, some new terms were invented in popular culture to describe this problem, such as phubbing [3], nomophobia [4], smartphone zombie [5].

Economic development has brought many new technologies into people's daily life, such as mobile internet. According to data from China Internet Network Information Center (CNNIC), there were about 600 million mobile network users in China by June 2015, representing 45% of the total population [6]. The eMarketer estimated that the number of smartphone users worldwide will exceed 2 billion in 2016 [7]. Now in large cities like Shanghai, you will always see people busy gazing at their smartphone screen in public places. The CNNIC stated that an average Chinese spent 3.6 h per day on the internet. Surveys showed that university students in China used smartphone to access the internet for about 2 h per day in 2010 [8] and spent almost 4 h per day on smartphone in 2014 [9].

Today's smartphones, resemble mini-computers, and provide not only internet services but also access to applications (Apps). The portable and multi-functional nature of smartphone satisfies various demands of people, like online chatting, gaming, shopping, etc., which should encourage dependency [10].

### Adverse Effects of Smartphone Overuse

The overuse of smartphone can lead to a series of problems. Studies have shown that, excessive smartphone use is associated with depression and anxiety disorders [11]. In addition to psychological health, it has also been associated with physical health problems. For instance, due to small screen size, touch panel, and handholding, long time using smartphone increases the risk of ocular diseases [12,13], dysfunction of fingers, neck pain, and other musculoskeletal problems [14-16]. Moreover, smartphone overuse also leads to dysfunctions in daily life, as it distracts people, distorts perception of time, and negatively affects productivity and interpersonal relationships [17]. Moreover, smartphone overuse also sucks up time that could have been spent in a more constructive way, and is associated with other lifestyle risk behaviors such as physical inactivity [18,19].

Another adverse effect of smartphone overuse is accidents and injuries, as mentioned at the beginning of the article. Smartphone use leads to slowed reaction time and increased distraction, both of which are associated with accidents. It was reported that about a quarter of motor vehicle accidents were attributable to drivers using cell phones in the United States [20]. In addition, because of reduced situation awareness and distracted attention, pedestrians using smartphones have high risk of traffic accidents and falls. It was estimated that about 2 million pedestrian injuries were related to mobile phone use in the United States in 2010 [21]. A self-reported survey in Shanghai showed that more than 80% drivers had ever used mobile phone while driving [22].

## Solution of Smartphone Overuse

Behavioral addiction, such as internet addiction and problematic use of mobile phone, has long been studied in the field of psychology. People also tried to find answers of smartphone overuse with the help of psychotherapy (cognitive behavior therapy, mindfulness-based cognitive therapy, etc.). However, smartphone overuse become epidemic in our digital era now. Some positive steps must be taken to prevent this trend, otherwise the medical service capacity cannot meet the requirements. Moreover, many cases should not reach the level for psychotherapy. Therefore, we need to consider and deal with this problem from a public health angle. The discipline of Public Health and Preventive Medicine offers theories and approaches to solve this type of problem. A good example is smoking. In the last decades, tobacco control campaigns have gained great achievement.

In many ways, the smartphone overuse is similar to smoking. Firstly, they are both personal choices of behavioral habits, but the actors can affect others around them, that is, as same as the second-hand smoking has harmful effects on health, using mobile phone tends to be banned in public area [23]. Secondly, they are both addictive behaviors. Many studies have found that the clinical symptoms and disruptions of internet addiction are similar to those of substance abuse disorders, such as tolerance, withdraw, craving, impulsive control disorder and so on [24,25]. Further, recent studies suggested that internet addiction disorder shares similar neurobiological mechanism with substance-related addiction [26]. Finally, similarly to smoking behavior in the earlier years, smartphone overuse has not been valued in public health area. In the view of public, people who indulges themselves in smartphone use could be regarded as somewhat “different”, but not a serious matter. This attributes to various causes, for example, people may not have an adequate understanding of the negative effects; due to limited empirical research, academic circle and government lack the motivation to study and develop measures against smartphone overuse; and the rarely mentioned but maybe the most important is the interference of commercial interests. Therefore, some of the lessons from tobacco control campaigns may be informative in dealing with smartphone overuse at the population level. The particular strategies may include health education and health communication, legislation, and technical means.

## Preventive Strategy Based on Public Health

Health communication and health education are the most important health promotion measures at the population level. Awareness about forbearing smartphone overuse should be raised in school health education programs or curricula; by means of public service advertising, poster or panel people should be advised restraining smartphone use in public areas, such as bus, subway and busy streets. Legislation could be a powerful means to change the social norms. For example, holding mobile phone while driving is illegal in many countries. In China, drivers found using phones will be subject to a fine of 20 to 200 RMB ¥ (about 3 to 30 USD) and a 2-point deduction on the driving record. Although making laws to deter pedestrians from watching smartphones sounds unpractical, rules or norms with similar demands could be made to conduct people's behavior. Nowadays smartphone use is prohibited in workplace or classrooms of some factories and schools. More extensive rules and regulations could involve relevant restriction on smartphone use, which may have cascading effects through change in awareness and social norms. In addition, smartphone integrates many daily function, which is conducive to dependency. Health counseling may suggest

people to use traditional daily instrument instead of smartphone. For example, Montag et al. found people using analogue zeitgebers consumed less time on their smartphone due to less opportunities of sidetracking by their phones when they check time [27]. Finally, the digital technology itself may provide approaches help to solve the problems induced by digital technology. Psychoinformatics is a new interdisciplinary subject, which can aid research and intervention in the context of internet addiction [28]. For example, Apps could be installed on the smartphone to monitor the usage pattern, which should be closer to the real situation than self-report [29,30]. Also Apps was designed to prompt and remind users when the daily limit should be reached [31].

To sum up, smartphone overuse is becoming a public health concern. In contrast to tobacco control, the aim of public health interventions is not to prohibit smartphone use, but to promote safe, healthful and mindful use. Smartphone overuse is an emergent public health issue that demands public health solutions. At an infancy stage, the field requires stronger empirical evidence for the health consequences of smartphone overuse and the efficacy and effectiveness of potential interventions. Furthermore, if we had successful experiences, it could be adopted in other digital devices, because digital overuse would be more and more popular in the coming years [32].

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