

## Cell Phone Addiction: A Review of the Available Data

OCTAVIAN VASILIU\*, DANIEL VASILE\*\*, DIANA GABRIELA VASILIU\*\*\*, FLORIN VASILE\*\*\*\*

\* University Military Central Emergency Hospital “Dr. Carol Davila”, Bucharest

\*\* University of Medicine and Pharmacy “Dr. Carol Davila”, Bucharest

\*\*\* Coltea Clinical Hospital, Bucharest

\*\*\*\* UMF “Titu Maiorescu”, Bucharest

Mircea Vulcanescu Str., no.88, Bucharest

ROMANIA

octavvasiliu@yahoo.com

*Abstract:* The use of cell phones is nowadays a necessity for many individuals, and this technology has a privileged position not only in the communication field, but, due to various applications, in the economic, educational and cultural life. However, addiction as a “dark side” of this technology use has been described, and multiple psychological scales for the determination of this addiction’s severity have been created. Smartphone addiction is not specific to a certain cultural, social, economic or educational background. Risk factors for smart phones addiction development have been detected in epidemiological trials: female gender, high anxiety level, insomnia, Internet use, alcohol use, low self-esteem, low self-control, and sensation-seeking. Depression has been associated with both high risk for developing cell phone addiction, and with protective value for this pathology. Applications for monitorisation of the smartphone use have been created, in order to help a clinician to verify the status of the addiction. No clinical trials focused on specific treatment approaches has been yet initiated. Due to the increasing rate of cell phones use, and to the wide range of population possible affected by excessive use of the cell phones- from children to elderly individuals, more research is needed for delineating harm-reduction approach (to decrease the use, or to make the behaviour controllable) and therapy (in more severe cases).

*Key-Words:* smartphone addiction, cell-phone addiction, problematic mobile phone use, behavioral addiction, technological addiction, Internet use

### 1 Introduction

The use of cell phones is nowadays a necessity for many individuals, and this technology has a privileged position not only in the communication field, but, due to various applications, in the economic, educational and cultural life. It’s not unusual for a person nowadays to wear permanently more than one cell phone, d.e. one for personal purposes, and other for professional-related activities. Children, adolescents and young adults are using smartphones on daily basis, but older adults and elderly persons are no exception. Cell phone technology has become a necessity, not just another gadget.

While cell phones benefits are obvious, they have also a „dark side”, which includes excessive use and addiction. This type of behavioural addiction must be approached with caution, because the risk of over-pathologize a socially acceptable and useful behaviour is not negligible. Like in the

case of other technological addictions, there is a grey area between what is normal and what becomes excessive.

There are many cultural, social and professional aspects that must be taken into the consideration when considering an individual that became addicted to any form of technology.

A valuable indicator of pathological behaviour is the negative impact that cell phone use has over an individual’s daily functioning and well-being. Decreases of work productivity, conflicts in the familial or social relationships, severe limitations in recreational activities or a general restriction of one’s life to cell phone use, all of these are signs of a behavioural addiction. Other indicators of addiction, like in the domain of drug-induced disorders, are difficulty to reduce the cell phone use, a tendency to increase its daily use, and possible signs of withdrawal when the behaviour is

stopped (like restlessness, anxiety or other mood change etc).

Cell phone addiction, also known as „problematic mobile phone use (PMPU)” [1], is a very complex phenomenon, with intricated clinical elements: a person could use excessively cell phone for chatting, Internet surfing, e-mailing, social network sites visiting, gaming, online shopping etc. This leads to the conclusion that cell phone addiction analysis could delineate multiple addictions inside it, making the diagnostic and therapeutic approach more difficult.

The reported prevalence in adolescents, according to the studies that used structured scales, varies from 18.8% in Japan [2], to 28.7% in Holland [3].

A pathway model for this addiction has been proposed by J. Billieux et al. [1], and it includes 3 etiopathogenic pathways- excessive reassurance, impulsive-antisocial, and extraversion, each of these being influenced by risk factors, like low self-esteem, low self-control, sensation-seeking etc.

A study of social and psychological predictors of mobile phone dependency and social network sites in adolescents and young adults proved that impulsivity, social comparison, and perceptions of social network sites support predicted mobile phone dependency (through the mediation of social network sites addiction), and that impulsivity is directly linked to the mobile phone dependence [4]. Individuals with a strong orientation toward social comparison may be at risk for mobile phone dependence and social network sites addiction [2].

A case report of an adolescent girl who spent 8 hours daily using her smartphone for various activities, like making selfies, watching movies, Internet surfing, or visiting social sites rise the question of which component of smartphone addiction is the main problem [5]. In this particular case, it looked like social sites addiction was the core element, based on the subject's fear that she would be abandoned by her friends if she gives up her cell phone intensive usage [5]. Projection, denial, and repression are the most commonly used defense mechanisms in addictions, and mobile phone dependence is no exception [5], which explains the high rate of psychotherapy failure.

Due to the fact that the line between normal use and the addictive use of the cell phone is arguable, a review of the literature was considered necessary in order to verify if enough evidence could be found in the field of this technological addiction that may support the existence of “cell phone addiction” as a pathological entity.

## 2 Objective

The main objective of this review was to identify the available data in the literature regarding the diagnosis criteria, risk factors, validated psychometric scales, and therapeutic approaches in cell phone addiction. All relevant data were extracted and compared, and conclusions have been formulated where data were based on good-quality studies.

## 3 Methods

Data regarding cell phone addiction were collected from the main medical electronic databases (PubMed, Cochrane, Medscape, PsychInfo), and structured according to the clinical and therapeutic variables.

## 4 Results

A number of 16 relevant references have been identified in the electronic databases, with significant data regarding variables that matched our review's objective.

### 4.1. Risk factors

Evening oriented adolescents scored higher on smartphone addiction scales, and female gender is more prone to cell phone addiction, according to a double study in which participated 342 younger adolescents and 208 older adolescents [6].

It has been reported a decrease in the total time spent on cell phone with age, the highest risk being for people under 20-years old, probably related to the low self-control found in this age group, and the most frequently met behaviour is text messaging [7].

High cell-phone use is associated with being female, high level of anxiety, and insomnia [8]. Female gender, Internet use, alcohol use, and anxiety were found as risk factors for cell phone addiction, while depression and temperance presented protective value, according to a study realised in Korea [9]. However, depression and avoidant attachment style were the best predictors of cell phone addiction in students, according to a research realised in Iran (n=100) [10].

High-risk smartphone users showed less physical activity, reflected in total number of steps taken and average calories consumed by day [11].

A comparative study of mobile Internet use in US and Korea found that Asian users have a higher incidence of dependency levels, with students, unemployed users, and younger

generations being more susceptible to the development of this addiction [12].

Variables related to personality that correlated with cell phone addiction were extraversion, neuroticism, openness-to-experience, according to the big-five model [13].

In conclusion, female gender has been reported by more than one research as being a risk factor, depression is cited as a vulnerability, but also as a protective factor, while other factors (in generally based on the big-five model of personality) need to be replicated by better quality trials.

#### 4.2. Standardized measurement of cell phone addiction

Smartphone Addiction Proneness Scale (SAPS) developed by D. Kim et al. [14], and has 15 items. It is destined for the measurement of smartphone addiction proneness in adolescents [14].

Smartphone Addiction Scale (SAS) [5] is a self-diagnostic scale that could help in finding individuals with features suggesting this specific behavioural addiction. SAS has 6 factors- daily life disturbance, positive anticipation, withdrawal, cyberspace-oriented relationship, overuse, and tolerance [15].

Smartphone Addiction Inventory- Short Form and Standard Form (SPAI-SF and SPAI) are instruments with 26 items, and 10 items respectively, both possessing a 4-factor structure- compulsive behaviour, functional impairment, withdrawal, and tolerance [16,17]. A cut-off value of 24/25 on SPAI\_SF discriminated between controls and cases of smartphone addiction [17].

Problematic Mobile Phone Use Questionnaire (PMPUQ) is an instrument that measures 4 dimensions- prohibited use, dangerous use, dependence, and financial problems [18].

Cellular Phone Dependency Questionnaire (CPDQ) is an instrument created by M.Toda et al., and it contains 20 questions, scored from 0 to 3 [19], higher scores indicating more severe addiction.

Brief Smartphone Addiction Scale (BSAS) was developed based on the Griffiths components of addiction model, and contains 6 items, scored on a 6-point scale [20]. BSASA is considered a valid and reliable tool for screening for mobile phone addiction in school children [20].

In conclusion, a large number of scales have been designed for the measurement of this addiction' severity. However, their comparative validity has not been determined, so further research is needed in order to verify these scales' properties.

#### 4.3. Treatment

Like in the case of other technological addictions, no good quality data regarding any kind of treatment could be detected in the literature.

Smartphone Addiction Management System (SAMS) has been created for assessment and intervention in cases of cell phone excessive use, that has been applied in Korea [21]. This system is based on an Android smartphone application and a web application server, and it helps monitoring the user's time spent on application, together with GPS location and Internet access location [21].

Cognitive-behavioural oriented therapy could be useful, if we extrapolate data from trials focused on drug-related addictions.

Due to the underlying factors of smartphone addiction, like depression, anxiety, or some personality characteristics, a psychotherapeutic approach should begin with a multidimensional evaluation, because the behavioural addiction could be only the most visible part of a multi-faceted problem.

Because a complete abstinence is not a realistic target for the treatment, controlled use of the smartphone, with applications that could monitor the time spent by user daily on cell phone-related activities, could be beneficial. Similar to "harm-reduction" approaches in drug-use disorders, gradually decreasing time spent on cell-phone and limiting the number of activities that imply use of a cell-phone could be intuitively useful.

#### 4.4. Discussion of the results

An initial evaluation focused on establishing if the cell phone use is normal or excessive should incorporate the analysis of risk factors, like the Internet use, alcohol abuse, less physical exercise, avoidant attachment style, higher dependency and anxiety levels.

The use of standardised severity measurement scales should be a good practice recommendation for this kind of disorder. Also, for the monitorisation of the cell phone addiction a standardised instrument need to be used.

Applications on the cell phone for alerting the individuals when excessive use is detected, as well as cognitive behavioural therapy seem to be, at least until now, the most supported therapeutic interventions for smartphone addiction.

## 4 Conclusion

Due to this disorder's relatively high prevalence in general population, and even higher prevalence in young persons, and also due to the disorder's

financial and relational negative impact, further good-quality trials focused on the efficacy of psychotherapy and psychopharmacology approaches are considered necessary.

Future research should address the important issue of clear-cut diagnosis criteria for cell phone addiction. This issue implies large scale investigations, in order to differentiate between the normality and pathology. Cultural and age differences may be important, as the uses and symbolism of the cell phone are not the same in every society, at any age.

Comparative analysis of the measurement scales' validity for this technological addiction is another important aspect that need further research.

Expanding the register of the psychotherapeutic techniques for behavioral addictions in general, and comparative analysis of them in large scale trials could lead to the formulation of a therapeutic guideline, very important for this kind of disorders.

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