

MEDICAL AND SOCIAL CONSEQUENCES OF DIGITAL ADDICTION

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Digital addiction has no age or gender limitation, but it mainly affects adolescents, but not only them, and has detrimental emotional and physical consequences, both immediate and long-term. This paper aims to present some of the consequences of excessive use of digital technology.

Materials and Methods: This cross-sectional study is attended by 459 subjects (83 male and 376 female), pupils, and students from Bucharest. An omnibus questionnaire with closed and open questions was applied which related to various aspects related to the excessive use of digital technology. The results were statistically processed using SPSS version 21. The principles of anonymity and confidentiality were respected.

Results: A percentage of 37.9% lasted without using a mobile phone, computer, tablet, laptop, or any other terminal/gadget/device, between 1–3 hours, 13.5% between 4–6 hours. They estimated that digital technology had negative effects on the health of 48.5% of respondents. Most of the respondents (42.9%) turned on their mobile phones more than 11 times in an hour. Most study participants (43.4%) received the first device between the ages of 11 and 14. A percentage of 23.8% of the subjects received the first device when they were between 6 and 10 years old, and 28.4% received it after 14 years. 41.6% used a device between one and three hours, 27.3% between four and five hours, 17.7% between six and nine hours. A percentage of 36.2% of respondents practiced one hour of movement per day, 26.0% practiced between 2–3 hours/day, 6.7% between 4–6 hours/day, 13.6% less than an hour/day, 3.1% more of 6 hours/day, and 14.4% did not practice the movement every day.

Conclusions: Uncontrolled access to digital technology has negative effects on brain development, involving risks, which must be assessed, digital addiction being a disease, like any other addiction, with multiple psycho-socio-medical implications.

Keywords: digital addiction, health, society.

INTRODUCTION

In the current context, where much of the work has shifted to the online environment, drawing attention to the negative effects of overuse of digital technology seems to be a risky topic. In this fast-paced, hectic world that has suddenly been silent for a while, digital technology has been a lifeline. In today's society, life without the internet, without a smartphone is almost inconceivable. However, we must not neglect the long-term effects of its overuse.

Controlled use of a device has no negative consequences, while excessive use of digital technology influences physical and mental health, sleep, communication, adaptation, and relationships with others, as well as schoolwork or work.

Digital addiction has no age or gender limitation, but it mainly affects adolescents, but not only them, and has detrimental emotional and physical consequences, both immediate and long-term.

The concept of “internet addiction” has been proposed as an explanation for the uncontrollable and harmful use of the Internet, the symptoms of its excessive use being compared with those of other addictions, especially with gambling¹.

In the Diagnostic and Statistical Classification Manual of Mental Disorders DSM-5 and the International Classification of Diseases (ICD-11), there are differences in the approach to “behavioral addictions”, although in recent years there have been many data related to these addictions. The results on the neurobiological and genetic basis are not yet considered conclusive. A major impediment in exploring behavioral dependencies is the impossibility of translational modeling in

their experimental animals, as opposed to the dependence on substances that can be easily observed and modeled in experimental animals. These aspects are very important because the absence of a unitary and clear approach to compulsive, repetitive behaviors (such as internet use, compulsive shopping, sex, theft, and food) limits the possibilities of diagnosis, prevention, and treatment of affected people². Specialists are not satisfied with the fact that internet addiction is not mentioned in recent psychiatry textbooks, but only in the appendix, as a disorder that still requires multiple types of research³.

Internet addiction is installed when a person uses intensely, prolonged, uncontrolled internet in a pathological sense, being unable to use the Internet effectively, correlating with disinterest in the outside world, with the rejection of people, followed by the installation of isolation and loneliness⁴. This disorder does not have a well-defined cause, being generated by several factors. These include offering multiple levels of rewards, by receiving good news after connecting to social networks. Also, the biological predisposition of people with lower levels of dopamine and serotonin, compared to the general population, who use the Internet to get the same pleasant response, increasing the chances of addiction. Anxiety and depression can be other factors, as the internet is falsely used to alleviate suffering. Shy people and those with social difficulties use the internet more often to avoid interpersonal interaction⁵.

Personality traits, parental and family factors, alcohol consumption, and social anxiety are some predictive factors for excessive internet use⁶. Using the internet for social interaction and mood regulation, poor self-control is also a predisposing factor for compulsive internet use⁷. To these are added depression and stress, with internet addiction having, in turn, a direct impact on depression, anxiety, and stress⁸, which is why depression in adolescence must be properly assessed and treated⁹. One study showed that online shopping, online games, and social networking activities increased the risk for internet addiction¹⁰.

The pathological use of the Internet leads to the difficulty of distinguishing between the virtual world and reality. Most people who overused the Internet and participated in a study by Chamberlain¹¹ had impulsive/compulsive disorders that affected their quality of life. The Internet influences the way we think, as well as the willingness to rely on our knowledge, due to the rapid access to information¹². The internet also affects the process of learning, memorizing, but

also solving problems¹³. It also stimulates the use of legal and/or illegal drugs¹⁴.

Ivan K. Goldberg, a psychiatrist, is the first to define the complex of symptoms caused by the use of the Internet, represented by the neglect of social or professional activities, fantasies or dreams about the Internet, typing, voluntary or involuntary finger movements, as a disease called "internet addiction disorder"¹⁵. This disorder can destroy lives due to neurological complications and psycho-social problems it causes¹⁶.

Even if the use of the Internet increases the ability to search for information, we must be aware that in the case of excessive and long-term use, the share of negative consequences is higher than the positive ones. Several studies have identified that in the dependence on digital communication there is damage to mitochondria, due to exposure to electromagnetic radiation, but also to social skills, as well as reduction of white matter and decrease in gray matter density¹⁷.

A study conducted in 2014 by the Center for Disease Control and Prevention showed that the percentage of overweight or obese children (aged 6–19) in Western countries was 16%. The tripling of this percentage compared to 1980 was almost entirely due to the use of advanced technology. These children have an increased risk of developing type II diabetes, asthma, sleep apnea, social discrimination, high cholesterol, and/or hypertension. Another study claimed that elementary school students consume 20% of their daily calories while watching TV. These calories come from unhealthy snacks and are not burned due to lack of exercise. Often children prefer to eat fast food, either because of advertisements, or out of a desire not to interrupt the online connection, or out of boredom¹⁸.

A large number of hours spent using the Internet associated with a low interest in having interpersonal relationships and communicating with real people, with a social phobia, as well as the presence of psychological symptoms such as anxiety and depression can be important criteria in establishing the diagnosis of Internet addiction disorder (IAD)¹⁹. However, a standardized diagnosis of Internet addiction disorder has not been found, although the prevalence among the population has increased from 0.3% to 38%⁵.

MATERIALS AND METHODS

This cross-sectional study is part of a larger study and was conducted in Bucharest on a group of 459 subjects (83 males and 376 females) with a

mean age of 23.5 years. The gender variable was not proportionate, 81.9% of the study participants were female and only 18.1% male. The participants in the study were pupils and students studying in Bucharest, but the students came from all regions of the country, mainly from urban areas. An omnibus questionnaire with closed and open questions was applied which related to various aspects related to the excessive use of digital technology. The results were statistically processed using SPSS version 21.

The inclusion of the participants in the study was done randomly, voluntarily, following written, informed, and freely expressed consent. The

principles of anonymity and confidentiality were respected, the subjects being able to withdraw at any time during the study. The research had the agreement of the Ethics Commission of the Institute of Anthropology, “Fr. I. Rainer” of the Romanian Academy.

RESULTS

Below are some of the results obtained from this study.

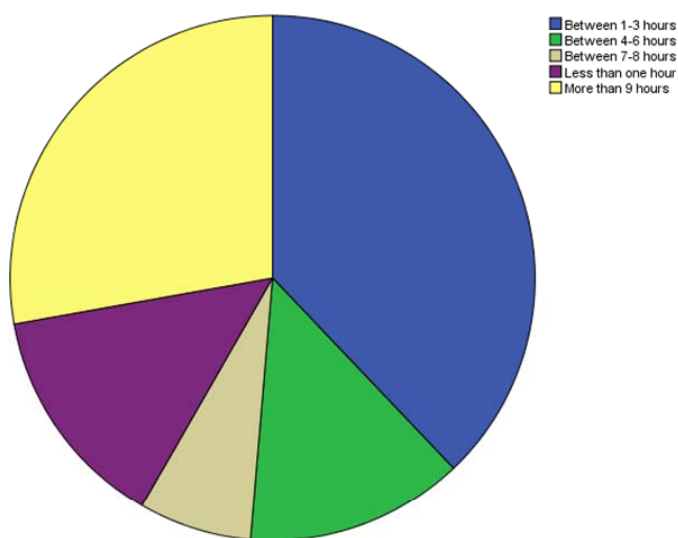


Figure 1. Distribution of the batch according to the time it lasted without using a device.

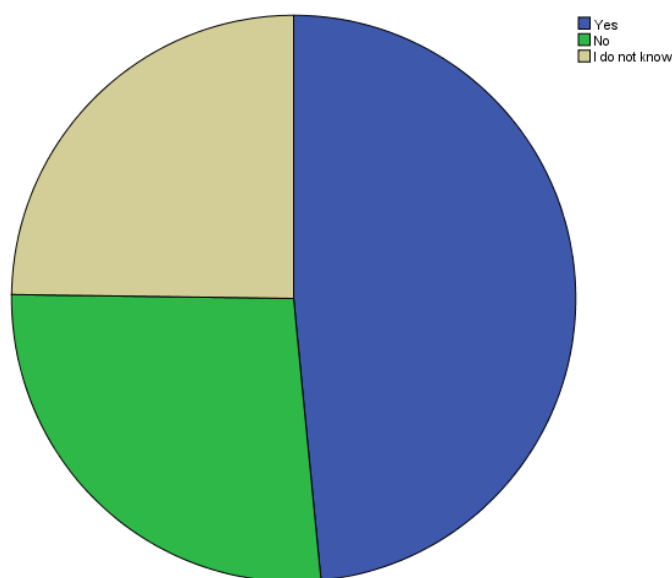


Figure 2. Distribution of the batch according to the recognition of the effects of digital dependence on health status.

A percentage of 37.9% lasted without using their mobile phone, computer, tablet, laptop or any other terminal/gadget/device, between 1–3 hours, 13.5% between 4–6 hours, 7.0% between 7–8 hours, 13.9% less than one hour and 27.8% more than 9 hours, according to Figure 1. Some subjects showed nausea, vomiting, nervousness, psychomotor agitation, lack of concentration, or aggression if they did not use a device for a period of shorter or longer time.

Figure 2 shows that 48.5% of respondents considered that digital technology had negative effects on their health, 26.8% that it was not influenced, and 24.8% did not know if their health was affected or not after use digital technology. Most of the respondents stated that their health

condition was influenced by the excessive use of digital technology, had vision problems, back pain, dizziness, headache, fatigue, vomiting, or existing illnesses worsened.

The results of the study we conducted showed that most of the respondents (42.9%) opened their mobile phones more than 11 times in an hour. 25.8% of subjects opened it 2–5 times/hour, 19.1% opened it 6–10 times/hour, 10.4% once / hour, and only 1.8% opened it at a later interval. one hour, according to Figure 3. These data show that most of the participants in the study were tempted to check their phones very often, theoretically by a simple calculation, almost half of them opened their mobile phone every about 5 seconds.

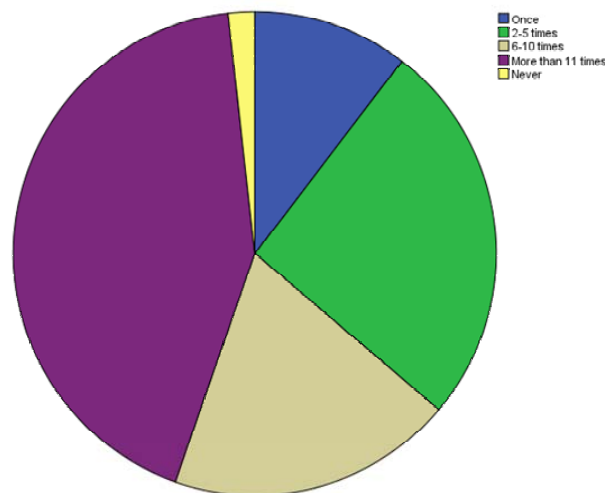


Figure 3. Distribution of the batch according to the frequency of opening the mobile phone in one hour.

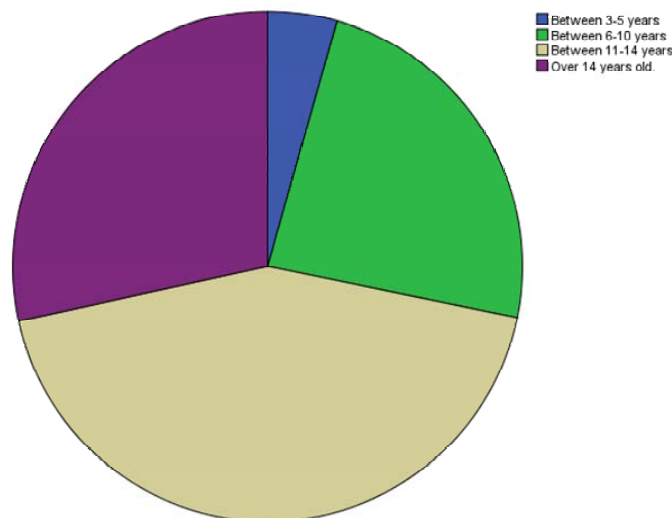


Figure 4. Distribution of the lot according to the age at which the first device was received.

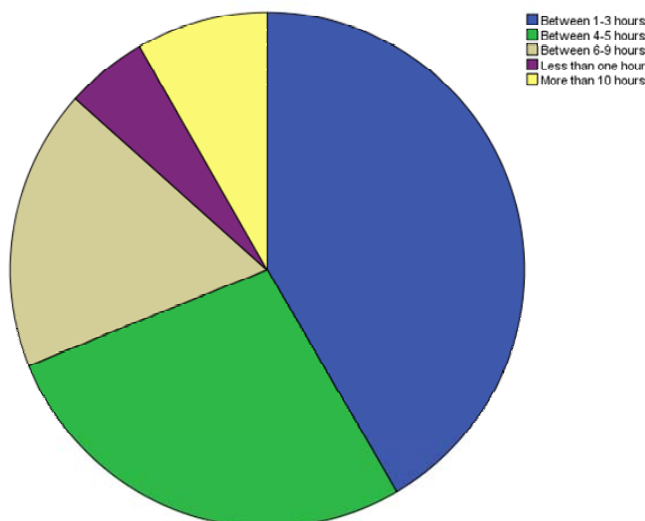


Figure 5. Distribution of the batch according to the time given to the use of a device.

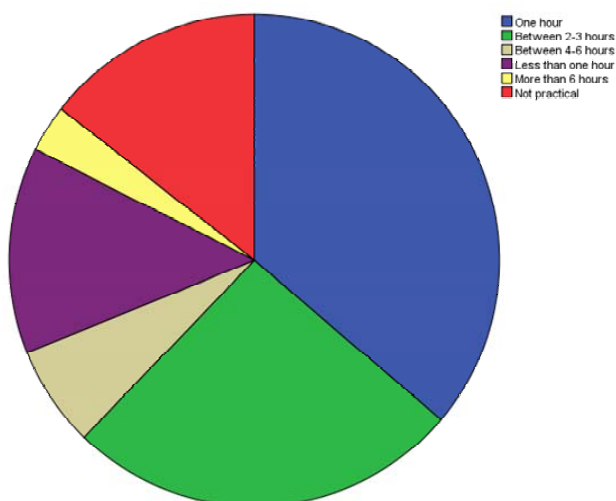


Figure 6. Distribution of the batch according to the time given to the movement per day.

This figure shows that the age between 11 and 14 is the one at which the first terminal/gadget/device (computer, tablet, laptop, mobile phone) received the most participants in the study (43.4%). A percentage of 23.8% of the subjects received the first device when they were between 6 and 10 years old, and 28.4% received it after 14 years. Observing that 4.4% of children received a terminal at a very young age, 3-5 years. We notice that from the age of six, most children and adolescents had a device. It is alarming that young children also had a terminal, even if their percentage was small. For most children, a terminal is the gift they wanted the most and not infrequently for the fact that they had those around them.

The figure shown shows that most of the respondents (41.6%) used a device between one and three hours, 27.3% between four and five hours,

17.7% between six and nine hours, 5.1% less than one hour, and 8.3% more than 10 hours. It cannot be overlooked that about a quarter of the pupils and students who participated in the study used a terminal for more than six hours a day. The study showed that the most frequently accessed computer programs, which were given the most time were: Google Chrome, Word, Power Point, Facebook, youtube, Instagram, the browser to watch movies, documentaries, and to listen to music.

According to the figure above, 36.2% of respondents practiced one hour of movement per day, 26.0% practiced between 2–3 hours/day, 6.7% between 4–6 hours/day, 13.6% less than one hour/day, 3.1% more than 6 hours/day, and 14.4% did not practice the movement every day.

Comparing the time spent using a device with the time given to movement, it can be seen that the percentage of those who spend more time on digital technology is significantly higher than those who prefer to move in various forms.

DISCUSSION

The Internet and the mobile phone have changed people's lives, but questions about the negative effects of their use have arisen since the end of the last century. Internet addiction, due to its devastating impact on users, society, and its rapid spread that is difficult to control, has become a globally recognized problem in recent years. However, its neurobiological mechanism is not yet fully known. Numerous studies have been done that demonstrate the existence of abnormalities in the brain, but these aspects are still being studied.

In this study, most of the participants used a mobile phone, especially to access the Internet, for various purposes. It can be seen that almost half of the participants in the study admitted that they could not last more than six hours without opening a device and the use of digital technology had various negative effects on health. The symptoms they described as having are those that are encountered in this type of addiction.

In the study conducted by Reed *et al.* People access the internet 91.6% for socializing (Facebook, Twitter, etc.), by 90.3% for shopping or banking transactions, by 84.0% for research, by 69.4 % for entertainment, 68.7% for news, 56.3% for sexual encounters, 45.1% for the dissemination of various information, 34.7% for gambling (gambling and lottery), 24.3% for gaming (video games), 20.1% for traditional blogging (excluding Twitter) and 13.2% for chat²⁰.

The Internet, whether used for documentation, information, or entertainment can stimulate the brain's reward system, similar to drugs and alcohol. The signs and symptoms of internet addiction disorder can be physical and emotional. Some of the emotional symptoms of internet addiction disorder caused by its long use are euphoria during online connection, nervousness or apathy after discontinuing online activity, inability to disconnect from the online environment, even in the presence of negative consequences, social isolation, loss of notion time. Physical symptoms of Internet addiction disorder may include dry eyes and other vision disorders, back pain, sore throat, carpal tunnel syndrome, headache, insomnia, eating

disorders (poor or overeating to does not reduce internet time), obesity or weight loss, neglect of personal hygiene to stay connected online⁵.

The most used device, both by children and young people, as well as by adults, is the smartphone. Today, almost half of the world's population uses a smartphone, with more than 3 billion devices. A percentage of 40% of Americans use their smartphone in a variety of situations. A study published in 2015 shows that almost 90% of teenagers in the US-owned or had access to a cell phone, which they used frequently. They sent and received via mobile phones, on average over 60 text messages a day, and over 90% of teenagers accessed the internet from a mobile device, at least occasionally²¹.

In the study we conducted, about 75% of participants opened their mobile phone more than 10 times in an hour. Roberts *et al.* show in a study that students participating in research spent almost nine hours a day on mobile phones, installing an addiction that varies by gender. It is emphasized that modern smartphones are useful in information, communication, and socialization, but on the other hand enslave²².

Risk factors for installing this addiction are daily use of mobile phones, female gender, employment in social networks, video games, shopping and watching TV shows *via* the Internet, chat and messaging, as well as using mobile phones to download various applications²³. Adolescents appear to be more likely to be addicted to smartphones than adolescents. Low self-control and self-esteem, severe parenting, or family dysfunction can increase the risks of problematic smartphone use. Good family relationships, friends, good self-control, academic motivation, and school success can be protective factors^{24,25}.

The mobile phone can lower the IQ, the empathy towards parents and friends, the time given to sleep by 1–2 hours, having as consequences the installation of diabetes and its complications, of hypertension. Due to reduced movement, the risk of obesity among children and adolescents increases. Using your smartphone before bed, thanks to the blue light, which suppresses melatonin, the sleep hormone, also induces poor, restless sleep. Professor Spitzer considers smartphones to be “true Swiss Army knives of the 21st century”, which everyone uses thousands of times. He also claims that the smartphone is “one of the most dangerous killers in history”, replacing alcohol as the main cause of

traffic accidents, leading, among many other risks, to alcohol and nicotine addiction²⁶.

Exposure of teenagers to many electronic devices before bed is dangerous, as LEDs emit much more blue light than white incandescent bulbs and compact fluorescent bulbs and therefore have a greater impact on the pineal gland and circadian rhythm. A large number of teenagers head for the evening chronotype and experience a wrong alternation between biological and social rhythms. All this, to which is added the loss of sleep, results in fatigue, drowsiness during the day, behavioral disorders, alcohol consumption, tobacco, stimulants, and poor results at school^{27,28}. These effects are all the more serious as we observe, and following this study, that the age at which children receive and start using a device is getting younger, the time given to using it increases to the detriment of the movement.

In recent years, various educational institutions, non-governmental organizations, the media have signaled the dangers of excessive use of digital technology by children. Thus, programs for parental education were created. Parents have been taught to rationalize computer and Internet consumption, to start education in this regard from the age of 3–4, not to use excessive gadgets themselves. Also, this means of information and fun should not replace the real effort of students in completing school assignments. Children and adolescents must be involved and responsible in household activities, socializing, or other leisure activities²⁹.

In campaigns to prevent the abuse of alcohol, tobacco, other harmful substances, or digital technology, pupils and students must be informed of the importance of carrying out daily outdoor activities (walking, running, or playing a sport). The ecological education of our entire society must also be cultivated and developed, within programs to improve the quality of the environment.

CONCLUSIONS

Analyzing the results of this study we noticed that the lack of time with activities, communication, and easy information, causes the excessive use of digital technology. A good relationship with parents and friends, good information on the negative consequences of long-term use of devices, and the involvement of children and young people in interesting activities, sports, or relaxation can prevent digital addictive behavior. Often, digital

technology is overused as an alternative to boredom, to the lack of captivating activities.

If we think about how subtle digital addiction is, that we live in an increasingly technological world, with no way back, where progress means digitalization, that intervention and prevention methods are few, with low efficiency, difficult to apply, and long-lasting, it can be said that digital addiction is extremely dangerous. Probably because it is present so frequently, we do not even notice its presence. However, we must keep in mind that uncontrolled access to digital technology has negative effects on brain development, involving subsequent risks, which must be assessed, not neglected, digital addiction, as many studies show, is a disease, like any other addiction, with multiple psycho-socio-medical implications.

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