



## An Overview about online related addictive Behaviors among medical students

Amany El-Shabrawy, Amira Youssef, Eman Seif Al Nasr Soliman, Eman  
fouad

Psychiatry Department, Faculty of Medicine - Zagazig University, Egypt

Email: [syfalnsr51@gmail.com](mailto:syfalnsr51@gmail.com)

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### Abstract

**Background:** Behavioral addiction is identified as any persistent and repeated behavior that has damaging mental, physical, social, and financial effects on an individual's life. And while these forms of addiction are less-known, they have generated debates among medical experts and organizations, specifically on their authenticity. Since university students are important resources who will take charge of future leading roles and positions in society, their mental health has been regarded as an important aspect in the development of individuals and society. Research among college students in US found that approximately 10.3% of the overall sample scored in the clinical range for cybersex addiction. Previous studies have investigated the prevalence of high-risk and potential-risk users of each addictive behavior in medical students. For risky users, the prevalence ranged from 5.6%–52.4% for internet use. Addictions in medical students are as prevalent as in a general population and that internet use and smartphone use may be better explained by a stress-addiction model with resilience and self-esteem as mediators than alcohol use.

**Keywords:** Behavioral addictions, medical students

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It's fairly easy to understand how someone could experience addiction with an addictive substance like alcohol or nicotine. It's much more challenging to see the complexity of addiction and understand how someone could be addicted to a behavior. Behavioral addiction is real, though, and can have just as devastating effects on a person's life as any other addiction (1).

Behavioral addiction is identified as any persistent and repeated behavior that has damaging mental, physical, social, and financial effects on an individual's life. And while these forms of addiction are less-known, they have generated debates among medical experts and organizations, specifically on their authenticity (2).

But while experts may not agree on whether this type of addiction is true, there is no doubt that behavioral addictions are a growing problem that impairs an individual's daily functioning. Some examples of addictive behaviors include gambling, sex, internet, shopping, and video games (3).

The prevalence rates for each separate behavioral addiction (after correcting for publication bias) were 10.6% for internet addiction, 30.7% for smartphone addiction, 5.3% for gaming addiction, 15.1% for social media addiction, 21% for food addiction, 9.4% for sex addiction, 7% for exercise addiction, 7.2% for gambling addiction, and 7.2% for shopping addiction. Facebook addiction is a form of behavioral addiction characterized by excessive and compulsive facebook use that interferes with a person's daily functioning (4).

The symptoms of facebook addiction include repeated failure in attempts to facebook use, lack of engagement in other activities previously enjoyed, inability to cut back on using internet-accessible devices despite negative consequences, and failure to complete responsibilities at home, work, or at school (5). Genetics, co-occurring mental health issues (such as anxiety and depression), and environmental variables all contribute to problematic Facebook use. Males, persons with underlying psychiatric issues, and those who experience familial conflicts are all more prone to develop this disorder. (5).

The short-term effects of facebook addiction include weight gain, unfinished important tasks, and a pile of neglected responsibilities in many aspects of life, while its long-term effects are vision problems, neck pain, backache, social withdrawal, and carpal tunnel syndrome (5).

Fortunately, recovery is possible. The most common treatment options include different types of therapy, such as behavior modification, cognitive behavioral therapy (CBT), and dialectical behavior therapy (DBT) (4).

These treatment modalities are applicable to any form of social media addiction one may be suffering. Overcoming facebook use problems is also possible with the use of self-help strategies, such as limiting or monitoring time on the internet using an app or software, blocking out distracting websites, participating in social activities, and spending physical time with loved ones. Contrary to popular belief, withdrawal effects can also be experienced by those who are attempting to cut back on their internet use. Some internet addiction withdrawal symptoms include feelings of boredom, anxiety, depressed mood, and elevated heart rate (6).

The limited physical activity and heightened psychological arousal that come with excessive internet use can also have psychological impacts on the afflicted person, including mental health difficulties such as obsessive-compulsive disorder (OCD), depression, anxiety, and dysfunctional family relationships (4).

#### **Internet gaming disorder:**

Internet gaming disorder or game addiction is defined as the excessive use of video games that involves a lack of control over the habit and that leads to physical, social, and emotional problems. Medically known as gaming disorder, it is a diagnosable condition that was officially recognized by the World Health Organization (WHO) in 2018. Symptoms of gaming addiction include obsession with one or more video games, the need for more and more time to be spent playing games, failed multiple attempts to cut back on playing internet games, lack of interest in other activities, and experiencing withdrawal symptoms when they cannot play video games (7).

The causes of gaming disorder are the addictive qualities of video games, instant gratification from playing, a desire to escape reality, and co-occurring mental health disorders. There are also risk factors for video game addiction, including having an addictive personality, low self-esteem, aggression, and impulsivity (7).

The short-term effects of gaming addiction include hunger, fatigue, lack of motivation, and sleep deprivation, which can all lead to more permanent effects, such as insomnia, obesity, social isolation, and aggression (5).

Treatment for this form of behavior addiction typically involves therapy, with the most common type used for video game-related problems being cognitive behavioral therapy (CBT). And now that gaming disorder has been recognized as an official disease, more people are able to overcome it with professional help (8).

If left untreated and one decides to deal with the disorder alone, it could be an unpleasant experience, especially with the possibility of suffering from video game addiction withdrawal symptoms, including intense urges to play video games, irritability, anxiety, stress, restlessness, and mood swings (9).

The psychological impacts of computer and video gaming addiction can also be severe, and may lead to poorer overall mental health, decreased cognitive functioning, poorer impulse control, depression, development of ADHD symptoms, depression, and even suicidal thoughts (7).

## Behavioral addictions in medical students

Since university students are important resources who will take charge of future leading roles and positions in society, their mental health has been regarded as an important aspect in the development of individuals and society. Due to the current trend in which university courses tend to be considered as stepping stones to success rather than be chosen based on student's abilities and aptitudes (10).

University students face multiple stressors such as academic overload, constant pressure to succeed, competition with peers as well as concerns about the future. College students are more likely than the rest of society to acquire an Internet addiction. This might be attributed to a variety of factors, including time availability, use accessibility, psychological and developmental aspects of early adulthood, minimal or no parental supervision, and the use of the Internet to reduce test anxiety. (11)

Among university students, medical students specifically need a special attention as they usually spend long hours on the internet for getting the latest updates on medical education and research, using emails, social media, discussion forums and watching movies online. Medical students experience less stress about their future job prospects compared to non-medical students, but they face high levels of academic stress due to the demanding learning environment and intense competition. This can lead to increased anxiety and mental health issues among medical students compared to the general population. Internet addiction or problematic Internet use became a growing social and public health problem, affecting people worldwide (WHO 2015), especially teenagers and university students leading to many negative consequences (4).

Internet addiction was more prevalent among medical students than non-medical students with more than half of the medical students suffered from severe Internet addiction. Since the mental health of medical students is associated with the quality of health care in the future, it is essential to propose an intervention strategy for the prevention and treatment of these conditions.(12)

### Prevalence:

Research among college students in US found that approximately 10.3% of the overall sample scored in the clinical range for cybersex addiction and Dwulit et al in a cross-sectional study among Polish University students found 12.2% prevalence of self-perceived pornography addiction (13).

Regarding facebook addiction among university students, 13% of the Norway university students, 9% of the German college students are addicted to facebook, 38% of university students in Jordan and 47% of Malaysian students found to be addicted to facebook, 39.7% of the Bangladesh students (3) and 33% of Indian students are at risk for facebook addiction, while among Egyptian university students; severe Facebook addiction represents (1%), moderate Facebook addiction represent (46.8%), mild Facebook addiction represent (48.7%), and students with normal users represent (5.5%) (14).

Previous studies have investigated the prevalence of high-risk and potential-risk users of each addictive behavior in medical students. For risky users, the prevalence ranged from 5.6%–52.4% for internet use, 4.4%–60.3% for smartphone use. Prevalence of problematic pornography use among undergraduate medical students in India was 12.5%. Another study among medical students in Saudi Arabia found that problematic pornography use had a prevalence of 11.6% and there was a significant association between stress, anxiety and problematic pornography use (15).

Another common form of online addictive behaviors is internet gaming disorder. A study conducted in Ain-Shams University, Egypt found that the prevalence of IGD was 10.9% among students in the medical faculty, as compared to 9.3% in the overall university student body. While prevalence of IGD among medical students in Saudi Arabia was 8.8% (16).

### Causes of spreading behavioural addictions among medical students:

#### Stressors on medical students:

Stress is defined as an imbalance between environmental conditions necessary for survival and the ability of individuals to adapt to those conditions. Stress in medical students is stress caused by strenuous medical programs, which may have physical and psychological effects on the well-being of medical students. Excessive stress in medical training predisposes students for difficulties in solving interpersonal conflicts as a result of previous stress (17).

They are required to learn a great deal of new information in a short period of time before taking exams and evaluations. Therefore, they have little to no time to review what they have learned. Medical students are overloaded with a tremendous amount of information. They have a limited amount of time to memorize all the information studied. The overload of information creates a feeling of disappointment because of the inability to handle all the information at once and succeed during the examination period. Many medical students struggle with their own capacity to meet the demands of medical curriculum (8).

Second year students experience other stressful situations because they start to interact with the patients. These interactions include stressful situations, like the delivery of bad news (8).

Many people believe that the most stressful period of a medical student's academic career is the gap between graduation from medical school and being board eligible in a medical specialty (22).

Anxiety disorders impact a substantial number of medical students because stress has long-term effects on emotional and behavioral symptoms. Medical students experience substantial levels of stress, especially during their clinical years. As this illness has gained national and international attention, students are the first line of stress detection and protection. Students must be taught the tools they need to recognize and cope with stress, as well as assurance that they will not be judged if they seek stress management assistance. To help medical students recognize and manage their stress, instructors, counselors, and other faculty members must approach the student in a non-threatening, nonjudgmental manner. (23).

#### **Impact of stress on medical students:**

Researches have revealed that medical students are susceptible to stress and anxiety. In fact, it has been found that more than half of the medical students experience stress. stress and anxiety have been linked to various forms of addiction, including behavioral addictions (24)

many studies have compared the association between addictive behavior and stress, but only a few studies have been conducted on medical students (6).

Among them, studies on internet use and smartphone use have shown a positive correlation between stress and addictive behaviors (18).

The various types of stress events can induce impulsive and compulsive behaviors and cause vulnerability to addictive behaviors. Accordingly, many reports indicated that stress can potentially enhance the development of addictive and relapse behaviors (19).

chronic or acute stress alters the mesolimbic dopamine, glutamate, noradrenaline, and GABA systems; moreover, it increases the corticotropin-releasing factor of the hypothalamus-pituitary-adrenal axis and the autonomic hyperactivity. Recently, the kappa receptor and endogenous ligand dynorphin were found to contribute to the occurrence of comorbidity for substance abuse with chronic stress, post-traumatic stress disorder (PTSD), and traumatic stress, indicating the opiate system is also involved in the stress-induced anxiety and addictive behaviors (20)

Excessive stress in medical school predisposes students to difficulties dealing with interpersonal conflicts, sleeping disorders, decreased attention and concentration, the temptation to cheat on exams, depression, loss of objectivity, an increased incidence of errors, and inappropriate behavior such as negligence. Furthermore, stress among medical students might impair the student's health and cause illness. (20)

This can cause headaches, gastrointestinal disorders, coronary heart disease, impaired judgments, absenteeism, self-medication, and the consumption of drugs and alcohol. It is notable that these risks continue throughout training, also affecting resident and attending physicians in addition to medical students, particularly with regard to depressive symptoms. Students who struggle with exam preparation have less time for exercise and socializing, which are more stressful than perceived course discrimination or patient mortality. (17).

Medical Students would often cram before exams only to forget most of it after exams or entirely skipping organ systems as complete knowledge is not necessary for passing exams. Stress levels have a strong relationship with physical condition. Medical students during an examination period can experience insomnia, fatigue, and nausea (21)

Moreover, metabolism is disturbed by diarrhea or constipation. Skin diseases, including acne, dermatitis, and psoriasis, are common during the examination period. These symptoms are provoked by long working hours and the tension of completing the courses with good grades. Medical students are known to drink caffeinated beverages to stay active and attentive while studying. Caffeine can increase the levels of adenosine, adrenaline, cortisol, and dopamine in the blood, but it also inhibits the absorption of some nutrients, increasing the acidity of the GI tract and depleting the levels of calcium, magnesium, iron, and other trace minerals of the body through urinary excretion. (8).

Caffeine also inhibits insulin stimulation, lowering blood flow to the brain by up to 30%. Stress can cause increases in adrenomedullin, norepinephrine, leptin, NPY, nitrite, and ACTH levels. Excess adenosine, adrenaline, cortisol, and dopamine in the bloodstream can cause heart disease, weight gain, skin problems, depression, and fatigue. Also, it weakens the immune system, raising the risk of stomach ulcers and heartburn. (22).

During the examination periods, the menstrual cycle hormones (follicle-stimulating hormone (FSH) and luteinizing hormone (LH) are influenced as well. Female students may be concerned during menstrual cycles since FSH and LH normal levels fluctuate dramatically. Medical students may have interrupted sleep patterns throughout these periods. (22).

Stress can also reduce professional efficiency. It impairs attention, focus, decision-making, and the capacity to form strong physician-patient connections. Medical students have also reported changes in their conduct when pressured. Irritability and sadness are widespread among students in latter semesters, and these mental problems intensify when exams begin (21)

#### **Stress management among medical students:**

Stress among medical students has become a global problem, with students serving as the first line of detection and protection (21)

Because excessive stress can create problems, it is vital to determine how much stress a student is under. Today, techniques exist to determine how much mental stress medical students can withstand. It is essential that you schedule your study time and eat well throughout the day. Furthermore, daily exercises may help to reduce stress.(8).

Interventions against academic dishonesty, such as plagiarism, also help medical students feel less stressed and depressed. Students can learn from one another and reduce stress by exchanging ideas while studying in a small group. Furthermore, some medical schools provide psychologists to help students cope with stress (17).

Communication among third- and fourth-year medical students prepares them for the challenges of clinical practice. This mental preparation allows students to reduce the number of blunders during medical consultations. (25).

Medical students are trained to diagnose and treat patients, but they may not be entirely prepared to talk with them about their issues or to deal with unwelcome news and emotional stress during consultations (25).

Emotional intelligence (EI) can help defend against the consequences of psychological stress and improve well-being. However, EI is formed by personality and has not been shown to be influenced by stressful conditions. However, students who participate in extracurricular activities have lower levels of anxiety than those who are focussed entirely on their schoolwork. (22).

To address these problems, some medical schools have made changes such as reducing the workweek, instituting curricular reforms such as having shorter classes, less rote memorization, and providing psychological services (23).

Some programs require mandatory participation in support groups, thus the amount of stigma is substantially lower than that associated with individual therapy (21)

This gives long-term continual guidance and enables students to track their development and prepare for future practice. Other stress-management programs give trainees with coping strategies such as hypnosis,



visualization, and muscle relaxation; affiliation with peers, opportunities for emotional expression, and strengthened interactions with faculty (18).

Most of program interventions involve a group manner in which trainees interact with their peers or leaders. There is no "gold standard" for stress-reduction programs for medical trainees. Some proposed a plan of directed and non-directed support groups, relaxation training (including meditation and hypnosis), time-management and coping skills, mindfulness-based stress reduction, and mentorship programs. (22).

A good intervention includes relaxation basics such as abdominal breathing, learning to identify and counter negative thoughts, using imagery in relaxation, practical ways to increase healthy eating, developing positive coping, appropriately applying relaxing or activating words, and redirecting time and energy to different tasks based on importance. (22).

### **Psychiatric comorbidities in medical students:**

medical training is a stressful process which may contribute to the emergence of depression and anxiety (26)

Medical students experience depression and anxiety at a higher rate than the general population or students from other specialties. Previous studies have reported that a significant percentage of medical students suffer anxiety disorders because stress has a strong relationship to emotional and behavioral problems. Feelings of disappointment academically are most prevalent in those students who have poor academic performance (27).

The major emotional disorders observed include inability to feel reasonably happy, sleep loss, over-worrying, constant stress, feeling unhappy and depressed, inability to concentrate, inability to enjoy normal activities, losing confidence in oneself, inability to overcome difficulties, inability to face problems, inability to make decisions, inability to play a useful role in things, and believing oneself to be worthless. (27).

Given these emotional issues, research have shown that medical students are more prone to consider suicide than students from other institutions. Female medical students may react to stress with increased anxiety. (23).

Academic pressure, workload, financial concerns, sleep deprivation, as well as factors interfering in everyday personal life are stressors factors. academic pressure was the major concerns identified by the students when asked about the reasons for psychological distress (28)

One of the key causes of significant mental strain is the vast amount of knowledge and the high demands of medical courses. Simultaneously, they learned that sleep and other social activities were severely constrained, exacerbating their distress. (28)

Depression and anxiety symptoms can adversely influence medical students, including poor academic performance, school dropout, alcohol and substance abuse, internet addiction and suicidal ideation and attempts. It seems that specific personality traits ,impulsivity, and motivational factors play an important contributory role in both substance use and other potential behavioral addictions. (29)

The prevalence of ADHD symptoms is relatively high among medical students. Long-standing ADHD, especially among medical students with a very demanding programme, would lead to poor school and consequently poor career performances if not identified and managed early. According to a systematic review examining the association between IAD and psychopathology , 75% of the studies reported significant associations with depression, 57% with anxiety, 100% with symptoms of ADHD, 60% with obsessive-compulsive symptoms, and 66% with hostility/aggression. No studies reported associations between IAD and social phobia. In general, the strongest association was found between IAD and depression. (30)

### **Social factors:**

Personal stressors include family, friend and relationship issues. Financial issues are common, as many students carry heavy educational debts, and they feel compelled to hold a secondary job in order to repay their debts (18).

Many students are also required to work part-time alongside their studies to support themselves, and this often exacerbates stress. The transition to university coincides with a critical developmental period during which young people leave their family home whilst their brain is undergoing accelerated growth and shows heightened sensitivity to stress (31)

There are a number of unique stressors associated with moving from home into shared accommodation such as living with strangers, developing independence, and managing domestic commitments. Isolation is frequently exacerbated by relocation away from family and friends. Other stressors include limited free time to relax or develop new support systems, psycho-social concerns brought by the stress of residency, and inadequate coping skills (21)

forming new friendships at university can be stressful, and many young people experience pressure to establish and fit in with a new group of friends. poor attachment of young individuals to their parents and peers has been associated with significant psychopathology, which can lead to social media addiction and various mental health issues (32)

### **Impact of behavioural addiction on medical students:**

Studies show that Internet addiction has more adverse impacts (33)

#### **Impact on academic performance:**

medical students use the internet mostly for non-academic purposes, such as entertainment and social networking, and that such use has negative effects on academic performance. in a study, Chou and Hsiao (2000) found that internet addicted students compared to nonaddicted ones revealed more negative outcomes in their academic studies and daily routines. However, studies most reported only one or two types of addiction and did not show overall pattern of addiction across several types of addictive behavior. Moreover, only a few studies have compared the levels of addiction among medical students by grade, mostly due to small study sample sizes. Reduced academic performance is one of the most important consequences of internet overuse for students. The results of a study on medical students showed that students who used social networks and internet more than average had a poor academic achievement and low level of concentration in the classroom (34)

The results of a study in India showed that internet and social networking addiction had a negative effect on academic performance and mental health of students (21)

The results of another study on Qatari students showed that Grade Point Average (GPA) was lower among students who were addicted to social networking compared to other students. Findings of a study in Iran (2018) also showed a significant correlation between addiction to the internet and educational burnout. Because of the charm of the internet, most college students report that they spend a lot of time online, while they falter in their task or academic Performance (35)

#### **Impact on sleep quality:**

Many studies have found that IA is related to sleep quality. Studies have proved that poor sleep quality is associated with IA. A meta-analysis of 23 studies found that people who were addicted to the internet had significant symptoms of poor sleep quality and reduced sleep time. survey on 840 teenagers and adults found that after 21:00, the longer the internet time, the more devices used, the greater the negative impact on sleep quality. Studies have reported that the higher the medical students use the network during sleeping times, the higher of IA score (36)

IA was associated with mental illness such as depression and anxiety, which affect sleep quality, a possible mechanism by which IA caused sleep disorders is that medical students with IA had long-term exposure and light source, leading to inhibition of melatonin secretion. And another mechanism is that the brain is

over-excited due to prolonged use of the Internet, leading to a series of sleep problems, such as difficulty falling asleep, easy to wake up, and low sleep efficiency. research proved this mechanism that people who play mobile phones for 60 minutes before going to bed have a higher probability of having a sleep disorder than those who have played for 10 minutes before going to bed. Some other reasons may explain this phenomenon: Radiation from computers and mobile phones can have a negative impact on the user's nervous system, which can lead to headaches, mental discomfort, decreased sleep quality, and increased dysfunction during the day. (37)

Sleep problem may raise risk for, and even directly contribute to, the development of some psychiatric disorders and worsening mental health. Sleep disorders are associated with complications including headaches, learning disabilities, memory impairment, aggressive behavior, and mental disorders (37)

### Impact on mental health:

Internet addiction is associated with increased risk for numerous adverse behavioural and mental health sequelae, including elevated risk for depressive and anxiety symptoms, impaired cognitive functioning, greater level of perceived fatigue, disrupted sleep quality and reduced sleep duration. These adverse consequences of internet addiction and related behavioural disruptions can be highly relevant for healthcare professionals who often work in high-stress environment that require mental flexibility, optimal cognitive functioning and hand dexterity. (38)

In fact, more often than not, individuals identified as having behavioral addictions are also diagnosed with another co-occurring disorder. Unfortunately, the incidence of adolescent mental-health problems like these is not likely to decrease any time soon, as mounting pressure to be successful in school and a debilitating fear of failure continue to plague students in increasing measures (25).

conducted a systematic analysis of 10 studies and found that the prevalence for nonsuicidal self-injury and suicide rate in IA patients was higher than that in non-IA patients, and the prevalence range was 1.6–18.7%. A cohort study found that Internet addicts without self-harm behavior were 2.41 times more likely to self-injury than non-Internet addicts after one year (39). In China, there was a research proof that in adolescents, the network experience related to self-harm (40)

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