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Electronic Media Addiction: A Literature Review

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Background

Electronic media addiction is an emerging phenomenon that is characterized by excessive use or exposure to a given media. Current research is scientifically testing media dependence of various outlets including the Internet,[1] video games,[2] and cell phones,[3] amongst others. However, defining media addictions has become increasingly difficult, as technological advancement allows us to access the Internet on our cell phones, watch TV on our computers, and participate in interactive multiplayer online games.

The prevalence of media in our daily lives has led to debate on the legitimization of media addictions[4] and how to define it.[5] While there is disagreement on the validity of electronic media addiction, the concept has gained acceptance as a clinically treatable condition[6] and in 2013, the American Psychiatric Association (APA) considered a subset of media dependency, Internet Gaming Disorder, for inclusion in the DSM-V.[7]

Increasing media usage over the last decade[8] has been met with public concern about its overuse and potential negative outcomes ranging from physical to mental health issues.[9] While prevalence rates range across countries, the cases of media addiction are expected to increase as accessibility to media continues to expand. A recent survey measuring Internet and mobile usage amongst Canadians revealed that 80% of the population have home Internet access and spend an average of 17 hours online per week.[10] Screen time rates are even higher in Canadian youth who average 3 hours per day.[11] This high rate of electronic media utilization, in a population at risk for Internet addiction, provides cause for concern.[12]

The impact of increased media usage on health is two-sided, as it is likely a contributing factor to novel behavioral addictions, while also being an important tool for facilitating patient and doctor interaction. Media can play a valuable role in advancing patient engagement, public awareness[13] and health communication.[14] Therefore, it is important to understand media addictions so as to appropriately label pathological behaviors. The following review highlights how media addictions of Internet, video games, and cell phones are defined and measured. In addition, the most common risk factors, outcomes and treatments are identified. This paper aims to provide an overview of media addictions for naturopathic doctors.

Internet addiction

Definition

Internet addiction (IA) has been variously termed "pathological Internet use", "Internet dependence", "problematic Internet use",[1] and "Internet addiction disorder",[15] with many studies simply interchanging the term "addiction" with any of the previous designations.[16] The lack of a standard definition has lead to the inaccuracy and ambiguity that seems to plague much of the research. Estimates of prevalence vary widely internationally, ranging from 0.7% through 18.3%, depending on diagnostic criteria used.[15-25] Notably, the vast majority of studies of problematic Internet use have focused on investigating students, therefore prevalence of IA outside of children, adolescent and young adult populations is not well understood. Due to student necessity of spending time on a computer for activities related to school, it could be suggested that high rates of Internet usage among this population might be a reflection of the realities of the current schooling experience. Though not officially a DSM diagnosis, reports of Internet addiction have existed since the early 1990s, largely based on a behavioral addiction model using criteria such as dysfunctional use, tolerance and withdrawal.[19,21] More recent studies have corroborated the presence of tolerance and withdrawal in pathological Internet use,[1,21,26-29] and, employing an addiction paradigm, cite dependence,[27] preoccupation,[1,27,28] inability to cease,[1,7,27,28] life consequences,[1,7,19,21,30,31] diminished impulse control,[21] and relapse[1] as characteristics of such use.

Pathological Internet use is associated with high comorbidity with other disorders.[7,16,18,21-24,32-36] It is associated with depression, anxiety, or gambling, although direction of causality or the presence of shared risk factors remains uncertain.[16,19] The Internet may well provide a medium for other disorders to be expressed. What remains unclear is the extent to which using the Internet can cause a psychological dependency.[7,19,37,38] The appropriateness of "Internet addiction" as a blanket term is further complicated when one considers that addictive tendencies are sometimes displayed towards particular Internet applications (e.g., chatting on-line or visiting specific sites repeatedly) but not others.[19]

Measures

Dr. Kimberly Young, creator of the Internet Addiction Test (IAT),[26] contends that the practice of online engagement, regardless of content, is an addictive behavior. The IAT is a 20-question survey validated in the United Kingdom, United States, Finland, and South Korea.[16] Many studies, however, use differing cut-offs from IAT outcomes to classify Internet addiction, resulting in sometimes misleading claims as to prevalence and risk. Other widely used assessment tools include the Internet Addiction Proneness Scale for Youth (K-Scale)[22] developed in South Korea, one of the most wired countries around the globe, and the Chen Internet Addiction Scale (CIAS)[39] commonly used in the Far East from where much of the research on IA is originating.[5] The CIAS alleges a specificity of 92.6%,[39] although this cannot be confirmed due to variability amongst screening tool diagnostic criteria. Shapira et al.[40] have proposed the following as appropriate diagnostic criteria for IA based on impulse control disorder assessment: maladaptive preoccupation with Internet use and Internet use that causes clinically significant distress or impairment.

Risk factors

Psychosocial comorbidities have been associated with Internet addiction. In a study of 20 individuals exhibiting pathological Internet use, all patients had at least one lifetime DSM-IV Axis I diagnosis, with bipolar disorder and substance use disorder occurring most frequently.[36]

Duration of time spent online has also been associated with pathological Internet usage. There are conflicting results whether frequency or duration of time spent online is an appropriate measurement in diagnosing IA.[7,21,23,24,26,41] However, one study specifically correlated increased hours spent on online social networking sites with increased psychopathology,[15] and some have associated more hours spent online with higher rates of IA.[7,25]

Some researchers have studied the impact of biological markers on behavioral addictions, drawing from links made with substance abuse.[42-48] fMRI scans of pathological online users versus healthy controls revealed that cue-induced gaming urges in the former group resembled that of substance dependence.[49] In another case-control study, 15 male adolescents diagnosed as Internet-addicted were shown to have significantly reduced lateral orbitofrontal cortex thickness, an area that may play an important role in addiction behavior.[50]

Outcomes

There exists a high comorbidity of pathological Internet use with psychiatric disorders, the most notable of which appear to be substance abuse,[7,16,18,21,32,33] ADHD, [16,21,34,35] anxiety,[16,17,21] and depression.[17,21-23,35] One study from Hong Kong determined that 58.9% of Internet addicts surveyed met the cut-off for depression using the General Health Questionnaire-12 ($p<0.001$).[23] The same study found significantly more pathological Internet users with concomitant insomnia as compared to non-problematic users ($p<0.001$). Health risks related to sleep issues amongst Internet addicts have been noted elsewhere, including increased use of sleep medication, higher prevalence of apnea, bruxism, and lethargy.[16,51-54] Prospective studies would be helpful in determining direction of causality with regard to the relationship between sleep troubles and problematic Internet use.

In a report on Internet addiction, Dr. Kim Young asserts that 29% of patients reported physical symptoms as a result of extensive inactivity associated with increased computer use. Consequences of such behaviour included carpal tunnel syndrome, strained vision, back pain, headaches and weight gain or loss.[54] Irregular eating patterns have been suggested as a contributing factor to said weight changes,[55] with one study finding the likelihood of obesity of students with IA to be 1.840 times that of non-addicted counterparts ($P<0.001$).[56] Other serious, frequently occurring difficulties described include marital/sexual problems resulting from a preference for online sex-related activity such as chat rooms and viewing of pornography; financial troubles due to debt incurred from online gambling, subscription fees and shopping; and work-related issues such as diminished productivity, including dismissal.[53]

Video game addiction

Definition

Video game addiction is a relatively new concept that has gained increasing attention over the last couple of decades. There has been growing concern over the problematic or "addictive" nature of video games since the mid-nineties.[57]

Game play is regarded pathological when it begins to harm the individual's social, occupational, family, school and/or psychological function. However, there is no standardized clinical diagnosis to date that has been validated for measuring video game addiction. It is often categorized as a "behavioral addiction",[58] in which there is no chemical dependence yet it can stimulate emotional responses and dopamine release.[59,60] While there is still much debate on how best to define behavioral addictions,[32,61,62] many theorists employ the term when referring to problem video game use.

Some researchers have criticized the notion of video game addiction, suggesting the condition has been overestimated due to a lack of standardized definition.[31] Furthermore, it has been argued that it is a 'secondary addiction' (a symptom of a pre-existing problem) resultant of an individual's poor coping abilities and time management skills.[63-66] However, this school of thought does not consider that game play can produce flow states where the player is focused, has a sense of control, and may lose sense of time and place.[67] Certain video game characteristics (promotion of interactivity, creation of alternative realities, feeling of anonymity in socially rewarding situations) can also contribute to addictive behavior.[57,68] Therefore addiction is a complex condition influenced by individual biopsychosocial factors, their actions, and culture,[2,69] as well as the structural characteristics of video games.

Measures

The majority of studies measuring video game addiction used screening tools adapted from the DSM-IV criteria for the assessment of pathological gambling.[70-73] The measure defines video game addiction based on 6 core components of addictive behaviors:

- Salience (the most important activity in the person's life),
- Mood modification (using games to alter mood as a coping strategy),
- Tolerance (increasing amounts of time playing video games to achieve former mood-altering effects),
- Withdrawal (unpleasant physical and psychological states caused by reduced patterns of video game playing),
- Relapse (person's failed attempts to control or reduce patterns of video game playing), and
- Conflict (conflicts between the use of video games and other activities/interpersonal relationships/negative personal emotions like guilt).[74,75]

Questions were scored on Likert-type scales with acceptable reliability and validity (Cronbach's alpha = 0.7). Questionnaires consisted of self-report surveys, suggesting possible social desirability bias and subsequent underestimation of prevalence of addiction rates. Some studies also surveyed children who might not have fully understood the concept of addiction.[76]

The Engagement-Addiction scale, another measure used, was developed by Charlton to differentiate high engagement from video game addiction.[29] Charlton argues that some of the 6 behavioral addiction items (tolerance, euphoria, and cognitive salience) do not apply to video game addiction but rather to non-pathological 'high engagement' game play.[29] He concludes that assessing gaming addiction based on Brown's criterion can lead to overestimation of video game-related addiction.

Prevalence

Rates of addiction varied across studies. Research mainly focused on pre teens and adolescents (ages 8-18 years) observing 2.7%-9% of the studied populations presenting with pathological patterns of playing.[60,72,73,77,78] In studies including older age groups, the rates were similar, ranging from 8-11.9% for pathological playing.[79,80] Firstly, variability in rates of prevalence might be related to the variety of screening tools used to assess addiction across studies. Secondly, national and cultural differences between participant study cohorts could also explain variance in prevalence observed. Differences in norms surrounding video game play and addiction may vary with culture. For example, local area networks for Internet gaming are popular in Singapore.[81] Lastly, age ranges were not consistent between studies and different video game playing habits may be dependent on age.

Risk factors

Several significant risk factors for video game addiction have been observed: younger age,[72,82] male sex,[70,72,77] greater number of hours playing video games,[72] lower social competence, greater impulsivity, poorer emotional regulation,[78] lower self-worth and esteem,[82] high level of escapism during video game play,[83] dysfunctional coping, higher levels of violence acceptance,[77] and the playing of role playing games.[84] There is little evidence for a genetic predisposition to gaming addiction.

Outcomes

The literature has found deleterious outcomes to physical and psychosocial health associated with excessive video game playing. Youths characterized as "pathological" video gamers had significantly higher rates of depression, anxiety, social phobia and poor family relations.[78] Greater psychological distress was also observed,[85] along with increased thoughts of suicide.[77] School performance has been shown to suffer in individuals showing pathological video gaming habits.[73,74,86] Typical physical symptoms associated with high levels of video game play included eyestrain, headaches, epileptic fits, muscle soreness,[70] and pain syndromes associated with repetitive strain injuries.[87,88] It has been shown in some studies that video game playing is also strongly associated with weight gain,[89,90] although this may not be true of activity-promoting video games such as some games using the Wii console.[91]

Video game addiction is also described as a comorbidity in certain mental health conditions. Pathological gamers were found to be twice as likely as non-pathological gamers to have been diagnosed with an attention problem (ADHD).[73] Addiction has been correlated with attention problems.[92]

Cell-phone addiction

Definition

Since their debut in 1983, mobile phones have transformed into multi-functional devices integrated into daily social and work environments.[3] In addition to calling, mobile phones allow access to various media platforms including text messaging, Internet browsing and game playing.[93] The APA has yet to acknowledge a disorder associated with the addictive use of cell phones making problematic mobile use difficult to define and diagnose.[3] The consensus amongst the studies on cell-phone use reviewed suggests mobile phone addiction is a form of technological addiction and subset of behavioral addictions.[3] Prevalence rates of cell phone addiction were limited; however, one review noted rates that varied from 0-38%, depending on the scales used and the populations studied.[94]

Measures

Various measurements have been used to assess the risk factors associated with problematic mobile use.[93,95,96] The most commonly used screening tool is the Mobile Phone Problem Use Scale developed by Bianchi & Phillips.[3] It has been translated across

different languages (Cronbach ~0.8).[3,93] Vagueness in defining cell phone addiction makes it difficult to generalize the results of the above studies listed.[89]

Risk factors

The strongest risk factors for cell-phone addiction identified included being of a younger age,[3,97] a high self-monitor,[93] extroverts,[93,94] persons with low self-esteem[3,93,94] and depression.[94,95] As expected with utilization of newer technologies, younger cohorts were more likely to own a cell-phone and engage in problematic cell-phone use.[3,97] High self-monitors are described as persons being overly concerned with their public image, making efforts to regulate their behaviors to meet the demands and expectations of their peers.[93] High self-monitors were found to converse more on mobile phones and have more symptoms of problematic mobile use.[93] Persons with low self-esteem were also likely to indulge in problematic mobile use among other addictive behaviors to avoid problematic situations.[3,93] These individuals were more likely to have alcohol, smoking, Internet, gambling and sexual behavior addictions although the etiology of such behaviors remains unclear.[3,93] Individuals who reported feeling lonely were found to converse more on mobile phones although it was not significantly associated with problematic mobile use.[93]

Depression is the most commonly associated symptom of problematic mobile use and is significantly correlated with individuals who have low self-esteem.[94] In addition, adolescents with severe depression were more likely to have 4 or more symptoms of problematic cell phone use (CPU).[95]

Although some studies have observed differences in the rates of calls made between men and women, the relationship between gender and addictive cell-phone use is inconclusive.[3,93,94] Neither culture nor ethnicity conclusively found to be risk factors for problematic use despite different cultural norms concerning mobile phone use, such as increased utilization in Eastern versus Western cultures.[94,97]

Outcomes

There have been many associated health risks due to problematic mobile use. Some countries have banned cell phone use when driving (both texting and the use of handheld devices), though individuals continue to participate in these risky behaviors.[3,95] Additional problems associated with problematic mobile use include: incurring financial debt, mobile bullying, social harassment, disruption to social life and work, depression, anxiety, radiation exposure, oxidative lens stress and shoulder/neck/back pain.[3,93,95] Some problematic mobile users suffer from anxiety when deprived of use but overall mobile use has not been shown to influence anxiety.[95]

Treatment

As of yet, there is no standardized treatment for media addictions due to lack of evidence-based research. Some studies have based psychosocial interventions on those used in substance use disorders with relative success, however unreliable reporting on validity, reliability and statistical significance limit generalizability of findings.[6,16,98] Internet abstinence and counseling programs specifically dealing with IA do exist,[99,100] including the Center for Internet Addiction in Pennsylvania, recently founded by Dr. Young.[101] Individual cognitive-behavioral therapy seems to be the most frequently employed psychosocial intervention thus far.[6,98]

Pharmacological studies are relatively lacking, though there have been a couple of studies examining the effects of methylphenidate in children (mean dose 30.5 +/- 13.3 mg/d, range 18-54 mg/d),[102] and Escitalopram (a selective serotonin reuptake inhibitor) on adults (20mg/d),[103] with IA. In both studies, measures of Internet usage decreased significantly.

Acupuncture treatments have been used for decades for substance use addictions, but results from randomized controlled trials have proved inconsistent.[104] A study by Zhu et al. looked at the effect of electro-acupuncture (EA) on cognitive function in Internet-addicted patients as compared to psycho-intervention (PI) or comprehensive therapy (CT; EA + PI) and found that scores on the IA self-rating scale decreased more significantly in the CT group than with EA or PI alone.[28]

Conclusion

Electronic media have changed our lives fundamentally – from how we socialize to how we work. Despite varying definitions, measures, study designs and populations, the review shows that overuse of electronic media can have multiple negative psychosocial and physiological influences. The most commonly recurring health outcomes of media addictions included depression, anxiety, sleep disturbances, an increased disruption of one's social life, and various musculoskeletal pains. Pathological behaviors were also associated with several mental health disorders such as autism, ADHD and substance abuse. Subjects more likely to develop a media addiction were young (adolescent), male, having a comorbid mental illness, spending more hours playing and having low self-esteem.

There are many challenges facing future research in this field. Without a standardized definition for specific media addictions and criteria for diagnosis, assessing the validity of results across studies is difficult. Definitions of media addiction must take into account demographic and cultural norms on acceptable media use. While problematic use mainly affects younger cohorts, development and persistence of addiction over time remains unknown since there are few longitudinal studies completed on the subject to date. Future research would benefit by including follow-up measures to assess the behaviors of "addicts" after adolescence. It is also important to elucidate whether addictive behaviors can translate into different behavioral or psychosocial problems later in life and whether negative health outcomes are reversible. Media outlets contain many different types of activities that can fuel specific addictions or compulsions (i.e., emailing, socializing, information browsing, gaming), making it difficult to clearly define specific media-related pathologies. In addition, with the growing prevalence of mass media in our lives,

we are surrounded by these technologies, making media pathologies all the more likely and difficult to avoid.

As media addictions become more common, it is essential for naturopathic doctors to be aware of the effects of excessive media use on physical and psychosocial health outcomes. While currently there is no gold standard screening tool for media addictions, NDs would benefit from asking questions during the patient assessment derived from the abovementioned diagnostic measurements based on the components of addictive behavior adapted from the DSM-IV. Severity should be determined mainly by how negatively the activity has affected the patient's daily life. Specifically for IA, NDs can ask patients to complete the IAT's online questionnaire for a baseline measure of addictive Internet use. Efforts to mitigate these pathological behaviors must go beyond individual cases and target community and societal norms regarding media use.

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