Review article

Internet and video game addictions: a cognitive behavioral approach

Dependência de Internet e de jogos eletrônicos: um enfoque cognitivo-comportamental

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Abstract

Background: While several benefits are attributed to the Internet and video games, an important proportion of the population presents symptoms related to possible new technological addictions and there has been little discussion of treatment of problematic technology use. Although demand for knowledge is growing, only a small number of treatments have been described. **Objective:** To conduct a systematic review of the literature, to establish Cognitive Behavioral Therapy (CBT) as a possible strategy for treating Internet and video game addictions. **Method:** The review was conducted in the following databases: Science Direct on Line, PubMed, PsycINFO, Cochrane Clinical Trials Library, BVS and SciELO. The keywords used were: Cognitive Behavioral Therapy; therapy; treatment; with association to the terms Internet addiction and video game addiction. Given the scarcity of studies in the field, no restrictions to the minimum period of publication were made, so that articles found until October 2013 were accounted. **Results:** Out of 72 articles found, 23 described CBT as a psychotherapy for Internet and video game addiction. The manuscripts showed the existence of case studies and protocols with satisfactory efficacy. **Discussion:** Despite the novelty of technological dependencies, CBT seems to be applicable and allows an effective treatment for this population.

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Keywords: Cognitive behavioral therapy, treatment, Internet gaming disorder, Internet addiction, video game addiction.

Resumo

Contexto: Enquanto diversos benefícios são atribuídos à Internet e aos jogos eletrônicos, uma importante parcela da população apresenta sintomas relacionados a possíveis novas dependências tecnológicas, e pouca discussão tem ocorrido sobre o tratamento do uso problemático de tecnologia. Embora a demanda por conhecimento esteja crescendo, apenas um pequeno número de tratamentos tem sido descrito. **Objetivo:** Conduzir uma revisão sistemática da literatura e estabelecer a Terapia Cognitivo-Comportamental (TCC) como uma estratégia possível para o tratamento da dependência de Internet e de jogos eletrônicos. **Método:** A revisão foi conduzida nos seguintes bancos de dados: Science Direct on Line, PubMed, PsycINFO, Cochrane Clinical Trials Library, BVS e SciELO. As palavras-chave utilizadas foram: Terapia Cognitivo-Comportamental; terapia; tratamento; com associação aos termos Dependência de Internet e dependência de jogos eletrônicos. Dada a escassez de estudos no campo, não foram feitas restrições quanto ao período mínimo de publicação, de modo que os artigos encontrados até outubro de 2013 foram contabilizados. **Resultados:** Dos 72 artigos encontrados, 23 descreveram a TCC como uma psicoterapia para a dependência de Internet e de jogos eletrônicos. Os manuscritos mostraram a existência de estudos de caso e protocolos com eficácia satisfatória. **Conclusões:** Apesar da novidade das dependências tecnológicas, a TCC parece ser aplicável e permite um tratamento eficaz para esta população.

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Palavras-chave: Terapia cognitivo-comportamental, tratamento, transtorno do jogo pela Internet, dependência de Internet, dependência de jogos eletrônicos.

Introduction

The Internet has revolutionized communication, allowing for new forms of entertainment as well as the search for information. The World Wide Web has also remodeled the older patterns of relationships and it provides access to information in real time, independently of the physical distance between sender and receiver.

Video games are a form of contemporary media with their own aesthetics and interaction that demand the development of strategies and the understanding of potentially complicated rule sets, being cognitively challenging. This practice transports the user to an intimate interaction with the virtual world[1].

Only recently the scientific literature has started mentioning the problematic use of technologies. Internet addiction, for example, appeared in the medical literature in 1995[2]. Problematic/addictive use of video games has been mentioned more recently, although games have been studied for decades in relation to other topics in user behavior such as aggression/violent content, education and therapeutic use[3-8].

Psychiatric characteristics

The potential problematic/addictive use of Internet and video games has been discussed by researchers as part of newly suggested psychiatric diagnosis[9-12]. Authors report the existence of a portion of the population with characteristics equivalent to addictive use of electronic resources[13]. Internet and video game, as possible addictions, can be studied through the scope of addictive behaviors, that belongs to the impulse control disorder spectrum[14-16].

Some authors argue that the addictive use, either of Internet or video games, presents neurobiological similarities with the substance use group, especially referred to the craving state and brain areas responsible for rewards for the search of additive stimulus[17,18]. This is mainly due to the fact that the areas of the video game addict's brain that respond to stimuli are similar from those of substance dependence's[19] and Internet addicts[20,21].

Internet addiction

While there is still considerable controversy surrounding the exact definition of Internet addiction, there is some consensus on the following symptoms: a) persistent preoccupation with the Internet; b) increasing frequency of the time spent on the Internet; c) frequent unsuccessful attempts to control the time spent online; d) when cut down or interrupted the Internet use, the user feels tired, shaky, or depressed; e) irritability when the user attempts to stop the use of the

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Internet; f) longer permanence on the Internet in relation to what was previously planned; g) jeopardizing of important relationships or even professional work and education due to the use of the Internet; h) lying to others about the amount of time spent on the Internet; i) use of the Internet as a form of escapism for everyday problems[22].

Video game addiction/Internet gaming disorder

The terminology "video game addiction" not mentions if the user plays on-line or off-line games. However, the DSM-5 mentioned a type of video game addiction (related only to on-line games) called Internet Gaming Disorder (IGD)[23]:

> "Persistent and recurrent use of the Internet to engage in games, often with other players, leading to clinically significant impairment or distress as indicated by five (or more) of the following in a 12-month period: "1. Preoccupation with Internet games (the individual thinks about previous gaming activity or anticipates playing the next game; Internet gaming becomes the dominant activity in daily life); 2. Withdrawal symptoms when Internet gaming is taken away (these symptoms are typically described as irritability, anxiety, or sadness, but there are no physical signs of pharmacological withdrawal.); 3. Tolerance - the need to spend increasing amounts of time engaged in Internet games; 4. Unsuccessful attempts to control the participation in Internet games; 5. Loss of interests in previous hobbies and entertainment as a result of, and with the exception of, Internet games; 6. Continued excessive use of Internet games despite knowledge of psychosocial problems; 7. Has deceived family members, therapists, or others regarding the amount of Internet gaming; 8. Use of Internet games to escape or relieve a negative mood (*e.g.*, feelings of helplessness, guilt, anxiety); 9. Has jeopardized or lost a significant relationship, job, or educational or career opportunity because of participation in Internet games."

Epidemiology: internet addiction

Concerning epidemiology of Internet addiction studies show divergent results: 0.6% (China)[24], 1.8% (Sweden)[25] to 4.6% (Germany)[26], possibly because of different assessments and age groups that were investigated.

Epidemiology: video game addiction

A video game addiction study, with a randomly selected sample of 1,178 youth ages 8 to 18, showed that about 8% of video-game players exhibited pathological patterns of play (United States of America)[27]. A manuscript revealed that of a total of 816 individuals the prevalence of video game addiction was estimated to be 0.6 percent, with problematic use of video games reported by 4.1 percent of the sample (Norway)[28]. Gender (male) and age group (young) were strong predictors for problematic use of video games. Other research indicates that a range of 3% of users of video games, worldwide, is presenting addiction, predominantly in male subjects[29]. The same limitations of Internet addiction are present here.

Etiology

Concerning etiology it is advisable to study these phenomena through a multidimensional perspective[30]. The currently suggested criteria emphasize biological factors (including changes in brain functionality). Other risk factors includes some personality traits (especially neuroticism and hostility) and user motivations for playing (achievement socialization and exploration)[30].

Comorbidities: internet addiction

he scientific literature lists comorbidities with Internet addiction, specially: social anxiety disorder (SAD)[31], generalized anxiety disorder (GAD)[32] and obsessive-compulsive disorder (OCD)[33].

Comorbidities: video game addiction

A study revealed that players with autism spend more time using video games in relation to the group of players with ADHD or without psychiatric disorders[34]. Another psychopathology related to video game addiction is major depression[35].

Diagnostic instruments: internet addiction

Examples of current instruments to measure Internet addiction are: Internet Addiction Test[36], the Internet Related Problem Scale (IRPS)[37] and the Compulsive Internet Use Scale (CIUS)[38].

Diagnostic instruments: video game addiction

Instruments of Video game addiction: Video Game Addiction Test (VAT)[39], the Indonesian Online Game Addiction Questionnaire[40], the Problem Video Game Playing Scale (PVP)[41] and the Game Addiction Scale (GAS)[42].

Cognitive behavioral therapy: a possible treatment?

Cognitive-behavioral therapy (CBT) is considered the first choice for treatment of various impulse control disorders (*e.g.*, trichotillomania and pathological gambling), as well as some others containing expressive traits of impulsivity. The same model served as a selection parameter to Internet and video game addiction[43].

CBT posits that individuals may exhibit psychological distress because of the negative way they interpret everyday situations that are commonly considered as neutral events. This therapy model uses a brief structured approach with active collaboration between therapist and patient whereas emotions, physiological reactions, thoughts and actions significantly interfere the way the person evaluate his/her own experiences[44]. The cognitive model has three levels[45]: a) automatic thoughts: characterized as rapid and spontaneous responses of the cognitive field; b) intermediate beliefs: rules developed by the individual him/herself; and c) core beliefs: a deeper level characterized as a synthetic and absolute form of interpretation about oneself and the surrounding reality.

The purpose of this article was to conduct a systematic review of the literature, to establish Cognitive Behavioral Therapy (CBT) as a possible strategy for treating Internet and video game addictions.

Method

The review was conducted in the following databases: Science Direct on Line, PubMed, PsycINFO, Cochrane Clinical Trials Library, BVS and SciELO. The keywords used were: "cognitive behavioral therapy" (CBT); "therapy" and "treatment" in association to the terms "Internet addiction" and "video game addiction", all with their Portuguese equivalents.

Inclusion criteria were: a) articles (original, review, letter to the editor) that associate CBT with Internet and video game addiction; b) explicit descriptors in the title or abstract; c) at least the summary should be in English, Spanish, French or Portuguese. In the absence of specific descriptors (Medical Subject Headings – MeSH), we chose to use terms close to the topics of interest. Considering the scarcity of studies, there was no restriction to the minimum period in the search of manuscripts, being accounted articles published until October 2013. Exclusion criteria were: a) articles without abstracts; b) studies of other psychopathologies; c) use of Internet and electronic games as a treatment model or learning.

Results

A total of 72 articles were found out of which 23 were used in this review. The flowchart shows this process, according to the model of the Preferred Reporting Items for Systematic Reviews and Meta-

Analyses (PRISMA)[46] (Figure 1). A table was made using only the original studies (Table 1). To facilitate the comprehension of this new field of research and professional practice, categories were formed: a) CBT in reliance on Internet and video game addiction; b) Clinical cases; c) Treatment protocols; d) CBT combined with other intervention strategies. Thus, the results are shown below:

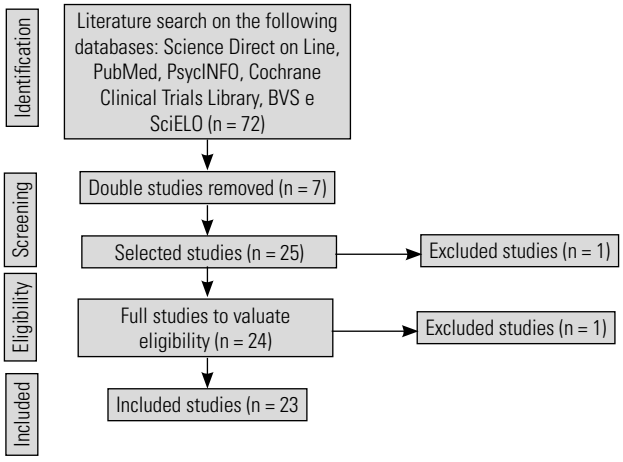

Figure 1. Flowchart detailing inclusion and exclusion selection criteria.

a) CBT in reliance on Internet and video game addiction

Given the scarcity of studies, we chose studies that briefly mentioned CBT in the treatment of these dependencies. The results were: a) original study[47-49]; b) letter to the editors[50]; c) literature review[51,52]. An article in the late 1990's referred to these disorders as a "computer addiction"[53].

Internet addiction

A study on Internet addiction found the most common changes (cognition, behavior and emotion) of these users[54]. Cognitions: a) flow (the user believes that spent less time than actually spent); b) excessive concern ("If I do not get online, something bad will happen"); c) ruminations ("when I'll be back online?"); d) denial ("I do not have a problem with the Internet"), and e) unrealistic expectations ("when I go online my life will be much better"). Behaviors: a) avoidance (when confronted with stressful situations, the Internet becomes an escape of everyday problems); b) impulsivity (difficulty in controlling the inappropriate behavior). Emotions: a) craving (urge to use the Internet); b) guilt (when the user realizes the damage of the inappropriate use). The authors mention strategies for these patients: a) the goal of the treatment should not be abstinence, but moderate use; b) psychoeducation; c) self-observation (understand escapism as a compensatory strategy, also recognizing the triggers); d) time management; e) development of offline activities, and f) prevent relapse.

Table 1. Original studies of Internet and video game addictions (treatment)

Authors (year)	Country which the study was conducted	Sample (n = total)	Psychotherapeutic intervention	Disorder(s) in treatment(s)	Individual/group	Instruments utilized	Results
Hall and Parsons (2001)[57]	United States	n = 1	CBT	Internet addiction	I	DSM-IV	N/I
King *et al.* (2012)[58]	Australia	n = 1	CBT	Internet and video game addictions	I	N/I	N/I
Thorens *et al.* (2012)[59]	France	n = 1	CBT	Video game addiction	I	ELAS/IAT	LSAS = 23/144 IAT = 12/100
Lee (2011)[60]	United States	n = 1	CBT	Video game addiction	I	N/I	Patient quitted after the 5th session
Taquet and Hautekeete (2013)[61]	France	n = 1	CBT	Video game addiction	I	ELAS/BDI/PVP	LSAS = 20/144 BDI = 0 PVP = 0/9
Young (2007)[62]	United States	n = 114	CBT	Internet addiction	I	COQ	Good results 6 months after the end of the treatment
Ge *et al.* (2011)[63]	China	n = 86	CBT	Internet addiction	G	IAT/ SCID	Lower latency at the end of the treatment
Jäger *et al.* (2012)[64]	Germany	n = 33	CBT	Internet and video game addictions	I/G	AICA	N/I
Zhu *et al.* (2009)[65]	China	n = 47 Group A = 23 Group B = 24	CBT / EA	Internet addiction	I Group A (CBT) Group B (CBT + MI)	IAD/SAS/SDS/ HAMA/SRSHS	Group A *vs.* Group B (IAD) 33.20 +/- 4.53 *vs.* 44.00 +/- 5.81
Zhu *et al.* (2012)[66]	China	n = 112 Group A = 39 Group B = 36 Group C = 37	CBT / CT / EA	Internet addiction	I Group A (MI) Group B (CBT) Group C (CT)	N/I	CBT + MI showed the best efficacy
Rooij *et al.* (2012)[67]	Holland	n = 12	CBT / MI	Internet Addiction	G	N/I	8 patients showed good results
Li and Dai (2009)[68]	China	n = 76 Group A = 38 Group B = 38	CBT	Internet addiction	G Group A (CBT) Group B (Control)	CIAS	Group A *vs.* Group B (CIAS) 39.5 ± 8.1 *vs.* 46.4 ± 6.0
Du *et al.* (2010)[69]	China	n = 56 Group A = 32 Group B = 24	CBT	Internet addiction	G Group A (CBT) Group B (Control)	IAT	CBT > control group

Instruments
IAT: Internet Addiction Test; LSAS: Liebowitz Social Anxiety Scale Test; IAD: Internet Addiction Disorder self-rating scale; SAS: anxiety self-rating scale; SDS: self-rating depressive scale; HAMD: Hamilton depression scale; HAMA: Hamilton anxiety scale; SRSHS: self-rating sub-health scale; CIAS: Chinese Internet Addiction Scale; OTIS: Orzack Time Intensity Survey; BASIS-32: Behavioural and Symptom Identification Scale; BDI: Beck Depression Inventory; COQ: Client Outcome Questionnaire; PVP: Problem Video Game Playing; SCID: The Structured Clinical Interview for DSM-IV.
Treatment model
CBT: cognitive-behavioral therapy; CT: comprehensive therapy; EA: electroacupuncture; MI: motivational interview.
Other terms
I: individual; G: group; N/I: not informed.

Suggested techniques for Internet addiction are: a) to discover the patterns of Internet use and break them suggesting a new schedule, b) to use subjects (*e.g.* familiars) that may cause the user to stop using the Internet, c) to define goals, d) to refrain from a particular application, e) to use reminder cards, f) to develop a personal inventory, g) to join a support group and, finally, h) to articulate a family therapy[55].

Video game addiction

The dependent undertake the following strategies: a) monitoring: the client will be aware of the usage time as well as sleep time, neglect of daily activities and mood swings when not playing, b) setting goals: reducing usage time can vary based on the style of the game[56].

In summary the scientific literature mentions more specific techniques to Internet addiction in comparison to video game addiction. Despite this information and although they are different disorders, we believe that these same techniques can be applied to these two possible disorders.

b) Clinical cases

Internet addiction

The following study[57] revealed the case of Becky, 18 years old. At age of 15 she began to create web pages for her school. The following year her parents divorced and she started to isolate herself in her bedroom, participating in chats with other teens whose parents were divorced. Shortly thereafter she began to stop doing her homework, worsening her grades.

Automatic thoughts discussed were: a) "I think I'll never reduce my time spent on the Internet"; b) "I think I will fail in my first semester in college"; The intermediate beliefs: a) "If I fail at school, I have also failed in life", b) "If I ask for help, then you will know that I am weak"; Core beliefs: a) "I am inadequate", b) "I am incompetent". Rules: a) "I live to the extreme; therefore, life will be worth it".

The treatment focused on the interaction of the events with her cognitive vulnerability (always been shy and believed to be difficult to initiate interactions with others), compensatory strategies (holds high expectations for herself, avoids asking for help, searches the Internet as escapism) and the development and maintenance of her Internet addiction. The authors did not reveal the outcome of the interventions, just pointing out that this model has proven effective in other cases of this disorder.

Internet and video game addictions

An article[58] illustrated the case of John, 16 years old, Internet and video game addicted, who spent about 10 hours per day playing electronic games online and downloading movies, series and music. The teenager had difficulty in waking up to go to school and to attend family programs, and also left the college basketball team. He consumed caffeine in excess in order to keep him online; urinated in a plastic bottle to avoid going to the bathroom and, when not on the computer, used the Smartphone to browse the Internet.

The case conceptualization identified automatic thoughts related to getting online and situations that precipitated the use of the Internet. The article did not disclose John's case, but presented the interventions: a) monitoring; b) recording of dysfunctional thoughts; c) setting an alarm to go off after 45 minutes on the Internet and use the other 15 minutes to do an activity out of the Internet; d) methodizing sleep time to use the internet during the day instead of the night; e) using of reminder cards that summarizes the treatment goals; f) performing distraction exercises.

Video game addiction

The first manuscript described the case of MA, 30 years old, single, student of Sociology[59]. Since the age of 12 he suffers constant humiliations of his colleagues, which may have generated isolative behaviors. The patient has depression with suicidal ideations, and high anxiety. Two years ago he met a MMORPG game that he plays almost 14 hours a day, also revealing that he lied repeatedly about its use. Beyond psychoeducation, there was a self-observation of the use of electronic games on the Internet and, in parallel, incremental exposures in relation to social phobia. Dysfunctional thoughts, such as catastrophizing, were restructured in psychotherapy. The patient was also encouraged to bond with people outside the Internet.

The next study presented the case of HC, South Korean, 16 year old, brought to treatment by his mother[60]. She mentioned that her son had symptoms of depression and made excessive use of electronic games. The younger did not want to go to the United States neither to live nor study, presenting significant difficulties in speaking English and to create groups of friends. His average time playing video games is three to five hours a day on weekdays, and thirteen hours a day on weekends.

In the sessions it was suggested strategies to register thoughts, emotions and behaviors, and how these aspects were related to his desire to play. When he started presenting significant improvement, he quitted the treatment. The authors considered that the psychotherapy was not effective for two reasons: a) the psychotherapist passed tasks in excess; b) the patient did not sympathize with the psychotherapist. After the withdrawal a contact was made and it was revealed that the patient had increased his symptoms.

A study initially emphasized the necessity for a psychotherapist to know and understand the world of video games to face this clinical demand[61]. The article presented the case of M.V., 19 years old, who played about 77 hours a week. The patient began playing when he was nine years old, especially MMORPG. The excess of gaming implicated in behaviors of procrastination and this practice led to many losses: low grades, worsening hygiene and reduction of relationships with friends and family. The patient reached seven out of nine (7/9) criteria symptoms of the Problem Video Game Playing (PVP). The initial analysis also showed the presence of severe social anxiety disorder and mild depression.

After performing a psychoeducation about the disorder, the patient has established the advantages and disadvantages of his practice. Advantages: he avoided thinking about problems, fun, relaxing; disadvantages: he got tired of doing the same thing every day, wasn't able to work his symptoms of sadness and anxiety, lost contact with other people, and worsened the notion of time. The patient also noticed the functioning of their behavior as a cycle: his sadness and rumination led to an abusive use of electronic games, and despite feeling pleasure with this activity, he escapes from reality and did not face the difficulties of everyday life. It was established through registers of dysfunctional thoughts, a new form of thinking about his maladaptive behavior. Simultaneously, the patient began to engage in other activities, facing his symptoms of social anxiety disorder (through hierarchical exposition).

The treatment lasted 11 months (17 sessions). The first four sessions helped him to analyze his abusive behavior, how to change it, and strengthen and develop a functional analysis in order to support the therapeutic gains. In the following five sessions: self-observation of his addiction, psychoeducation of the cognitive-behavioral model, monitoring the reduction of playing time and the searching for alternative activities. After six months of monitoring, the patient achieved a good control of the time spent playing electronic games and started maintenance phase and relapse prevention, which corresponded to three sessions.

In summary, only one article[57] showed the treatment of a case of Internet addiction, but the manuscript did not mentioned the follow-up of the psychotherapeutic process, making it impossible to weave further comment. One of the manuscripts[58] presented the case of a young man affected by both possible disorders and, despite the authors mentioned the techniques applied, it also not informed the end of the treatment. The three cases of video game addiction were divided into three perspectives: a) no treatment outcomes[59], b) withdrawal of the patient[60], c) success in the psychotherapeutic process[61]. We believe

that the results of these treatments could be more satisfactory and the authors could publish, in a near future, the follow-up of these cases, which may strengthen if they have satisfactory outcomes and the importance of CBT in these two possible psychiatric disorders.

c) Treatment protocols

Internet addiction

A study investigated the efficacy of CBT[62]. One hundred and fourteen Internet addicts participated in the treatment. The protocol presented the following variables: patient motivation, administration of the time spent online, improvement in social relationships, engagement in activities outside the Internet and the ability to refrain from problematic applications. The results suggested that male subjects in high school have increased risk of Internet addiction. The treatment showed satisfactory aspects, such as the possibility of patients being able to manage their conflicts with the Internet by the end of the second month of therapy and maintain their therapeutic gains six months after the completion of the protocol.

The next study[63], conducted in China, mentions that there are neurobiological factors related to cognitive deficits on Internet addicts. Thus, the use of the instrument P300 (auditory evoked potential) allows to identify changes in working memory as well as in attention process in these patients. In these tests a low amplitude and long-latency are consistently observed in patients with substance dependence. The researchers conducted a study with 38 Internet addicts (32.5 ± 3.2 years) and 48 subjects in the control group (31.3 ± 10.5 years).

After the tests, the dependent group showed longer latency compared to the control group and showed similar amplitude. After three months of treatment with cognitive-behavioral psychotherapy, latency decreased significantly in the dependent group, revealing a decrease in the cognitive deficits described above.

The protocol lasted for three months with 24 sessions of 1 hour, twice a week. The treatment involved eight steps, including team building, the relationship between the ego (self) and use the Internet, training in interpersonal communication, members who achieved treatment success (success stories) training, career planning, college, self-management and construction of a system of self-restraint in which patients could help each other.

Internet and video game addictions

A cognitive-behavioral model combines individual and group interventions, with a duration of four months[64]. This treatment was called Short-Term Treatment of IA/CA (STICA). The IA and CA acronyms refer to the Internet Addiction and Computer Addiction (also called Video Game Addiction). A preliminary validation of the STICA was conducted with 33 patients. Of these, 24 completed the treatment and nine left prematurely (27%). The study was entitled "Treatment outcome of a manualized cognitive-behavior therapy in Internet and Computer game addiction".

Thus, it was elaborated an updated protocol of STICA. The researchers established eight inclusion criteria: (1) to fulfill symptoms consistent with the disorders, which had been held in the last six months, for the Assessment of Internet and Computer game addiction (AICA); (2) score ≥ 7 in self-assessment for the AICA; (3) patients with comorbidities, since the Internet and video game addiction were primary diagnoses; (4) only men; (5) age between 17 and 45 years; (6) changes in medications or dosages will not be allowed in the last two months before the STICA or during treatment; (7) whether the patients used some psychotropic and ended the use of the drug, it should be without the action of another medicine for at least four weeks; (8) during the STICA no other psychotherapeutic model will be allowed and psychotherapies have made must have been completed for at least four weeks. Exclusion criteria were: patients with a score < 40 on the Global Assessment of Functioning Scale, or severe depression ≥ 29 on the Beck Depression Inventory (BDI), drug or alcohol, personality disorders and bipolar disorder.

The treatment was divided into 23 sessions of psychotherapy, with 15 of them in group with duration of 100 minutes each, and eight individually, with the standard time of 50 minutes. The treatment stages were:

Initial phase: to educate the patient regarding the mechanisms and effects of Internet and video game addiction (theories of learning, development and consequences of addictions and the addition cycle).

Intermediate phase: identification of dysfunctional triggers of the Internet use; functional analysis of addictive behavior; strategies of problem solving; construction of alternative activities; monitoring to reduce procrastination, promotion of social communication; training exposure; skills training and promotion of functional use of computers and the Internet.

Final phase and relapse prevention: functional use of the Internet and electronic games and drafting tools in preventing relapse.

In summary, the first study[62] showed that the treatment was satisfactory, but there were no measurement of the patients' symptoms so we could not compare the results of the beginning and end of the treatment. The second manuscript[63] also emphasized that the treatment was successful, but it has the same flaw of the previous article. The STICA[64] protocol, even being consistent in its structure and purpose, also did not thoroughly investigate the treatment results.

d) CBT combined with other intervention strategies

Internet addiction

An article demonstrated the efficacy of electroacupuncture combined with CBT[65]. The 47 participants were divided into two groups: Group A underwent CBT and Group B underwent CBT and electroacupuncture. Ten sessions were performed in an interval of four days between them. The electro sessions were applied to the same interval, but in 20 sessions. The effectiveness of treatment in Group A was 59.1% (13/22) and group B consisted of 91.3% (21/23). The authors suggest that the use of electro-associated CBT was more effective than psychotherapy alone.

The second research[66] had 112 participants that were divided into three groups: a) comprehensive therapy (n = 37), b) electroacupuncture (n = 39) and c) CBT (n = 36). The treatment lasted 40 days, with sessions every four days. The authors concluded that electroacupuncture combined with CBT may improve cognitive function in patients with Internet addiction. This mechanism may be related to the increased speed of brain discrimination and increased mobilization of resources during information processing in the brain.

The Lifestyle Training program aimed to treat Internet addiction[67]. Through a website, users who considered themselves as dependents were recruited. Exclusion criteria: under 18 years old and suicidal behaviors. The website presented a system based on Compulsive Internet Use Scale test (CIUS). Nearly 2000 subjects completed the test, however, only 12 were classified to carry out the treatment program (the others were excluded or had no interest).

The program, based on CBT and Motivational Interviewing focused on the following points: the motivations that could change, the choice of treatment goals, the gain of self-control, the relapse prevention and the coping skills training. The protocol consisted of 10 sessions of 45 minutes; seven of these sessions were performed in a 10-week period and the remaining three, if necessary, for a period of three months. The sessions had a fixed format: introduction, review of the current framework, discussion of the homework, explanation of the theme of the day, practice of the skills, reception of the homework and finally the closure of the session.

The researchers pointed out the main results: a) the monitoring of daily use of Internet revealed the amount of time spent online; b) patients were creative through exercises of self-control; c) the search for new habits linked to expanding friendships and reduced use of technologies; d) techniques in preventing relapse (such as the structuring of leisure time) were successful.

Treatment had satisfactory success. Out of the 12 subjects, three withdrew and/or changed the treatment. The remaining eight par-

ticipants achieved notable changes. All who completed treatment decreased their usage time per day and the number of access during the week. Simultaneously, the same participants showed increased self-confidence.

Two other studies[68,69] demonstrated that the addicted patients were split into two groups: a) control group and b) patients undergoing CBT; and similar results were found: those who underwent cognitive behavioral therapy showed better results at the end of treatment.

Video game addiction

No results were found.

In summary, two studies[65] that used CBT with electroacupunture showed that this treatment model is more effective when combined. A program based on CBT with Motivational Interviewing also showed good results[66]: 75% of the patients were successful. The last two manuscripts[68,69] reinforced that the treatment was satisfactory. A major flaw of these works is that they not revealed statistical results of the treatments.

Discussion

It was pointed out the importance of evidence-based treatment options for Internet and video games addicts. These two phenomena have a remarkable opportunity to be considered new psychopathological manifestations. The literature review described manuscripts with heterogeneous results, especially due to the lack of psychotherapeutic treatments for Internet and video games addictions. Although studies haven't shown the treatment outcomes or revealed withdrawal of the patient, other researchers showed psychotherapeutic success. We find that, to date, CBT is the most common treatment in technological addictions and we believe we have achieved an important result showing how recent is this phenomenon, especially combined with a psychotherapeutic model.

The main thoughts of these patients enable the therapist to recognize the most common cognitive distortions and how they can be re-purposed, encouraging clinical efficacy[70]. In addition, the manuscripts have shown the behaviors of avoidance and impulsiveness of this psychiatric group, suggesting modifiable strategies in psychotherapy[71].

Abstinence is not the goal of the treatment, but adaptive use. Psycho-education, self-observation and development of offline activities appear to help the patients to reduce their time on the Internet and/or with video games. The case studies showed different results: two of them did not mention treatment follow-up, precluding the analysis on these data[57,58]; an article showed that the psychotherapeutic outcome was unsatisfactory due to consecutive patient dropouts[60], two other articles have demonstrated the positive prognosis end of psychotherapy[59,61]. It is still early to assert if CBT will be the therapy of choice for these patients.

Regarding CBT protocols and associated treatments, a study presented the structure of the treatment but without patients' results[64]. Other study mentioned success regarding psychotherapy with their patients, but no data revealed this statement[62]. Two studies have demonstrated the association of CBT to electroacupuncture, revealing that it is more effective when these two interventions are applied simultaneously[65,66]. Other studies showed successful treatment[63,67-69]. We believe that there are few protocols that can demonstrate depth the satisfactory outcome of CBT in greater depth. The omission of this information in several articles corroborated to encumber a better analysis in this article.

The present review showed limitations: a) although we only cited 23 articles (still a small number), we believe we have achieved an important result in showing how recent is this phenomenon; b) the use of different methods of selection of participants in each study prevents a more accurate analysis; c) some manuscripts showed no treatment outcomes; d) there was a variation in the number of participants; and e) most researches has shown results only in adolescents and young adults.

Conclusions

The psychological distress experienced by the addicted to technology is real and has been presented as a clinical demand, as it has losses to the quality of life. The present review has shown that we have encouraging results in treating these possible dependencies, based on CBT, which has been proved effective in combating various psychopathologies[72].

The studies indicated which techniques are the most used in this model of treatment by exemplifying case studies, protocols or combined treatments. Even though not all manuscripts have explained the treatment outcome, we believe it is necessary to reveal how this model of intervention works, increasing this information to health professionals that treats this demand. We also recommend a review of the literature on the pharmacological aspect in the treatment of these addicts[73].

Thirteen articles were shown on Table 1. Three of them showed no results of the treatment; one study demonstrated that the patient quitted and nine manuscripts revealed good results. Some studies have demonstrated greater efficacy when psychotherapy was associated with electroacupuncture. Although there are fewer protocols when compared to the study of other psychopathologies, researches have shown satisfactory effectiveness, proving the same efficacy of CBT in the treatment of other psychopathologies related to impulse control disorder.

References

1. Suzuki FTI, Matias MV, Silva MTA, Oliveira MPMT. O uso de videogames, jogos de computador e internet por uma amostra de universitários da Universidade de São Paulo. J Bras Psiquiatr. 2009;58(3):162-8.
2. Dejoie JF. Internet addiction: a different kind of addiction? Rev Med Liege. 2001;56(7):523-30.
3. Funk JB. Reevaluating the impact of video games. Clin Pediatr (Phila). 1993;32(2)86-90.
4. Anderson CA. An update on the effects of playing violent video games. J Adolesc. 2004;27(1):113-22.
5. Anderson CA, Dill KE. Video games and aggressive thoughts, feelings, and behavior in the laboratory and in life. J Pers Soc Psychol. 2000;78(4):772-90.
6. Akl EA, Sackett K, Pretorius R, Erdley S, Bhoopathi PS, Mustafa R, et al. Educational games for health professionals. Cochrane Database Syst Rev. 2008;(1):CD006411.
7. Brezinka V. "Treasure Hunt" – A cognitive-behavioural computer game. Prax Kinderpsychol Kinderpsychiatr. 2011;60(9):762-76.
8. Primack BA, Carroll MV, McNamara M, Klem ML, King B, Rich M, et al. Role of video games in improving health-related outcomes. Am J Prev Med. 2012;42(6):630-8.
9. Christakis DA. Internet addiction: a 21st century epidemic? BMC Med. 2010;8:61.
10. Pies R. Should DSM-V designate "internet addiction" a mental disorder? Psychiatry (Edgmont). 2009;6(2):31-7.
11. Swaminath G. Internet addiction disorder: fact or fad? Nosing into nosology. Indian J Psychiatry. 2008;50(3):158-60.
12. Petry NM, O'Brien CP. Internet gaming disorder and the DSM-5. Addiction. 2013;108(7):1186-7.
13. Carbonell X, Guardiola E, Beranuy M, Bellés A. A bibliometric analysis of the scientific literature on Internet, video games, and cell phone addiction. J Med Libr Assoc. 2009;97(2):102-7.
14. Shapira NA, Lessig MC, Goldsmith TD, Szabo ST, Lazoritz M, Gold MS, et al. Problematic internet use: proposed classification and diagnostic criteria. Depress Anxiety. 2003;17(4):207-16.
15. Griffiths M. Internet and video-game addiction. Adolescent addiction. San Diego: Academic Press; 2008.
16. Van Rooij AJ, Schoenmakers TM, Vermulst AA, Van den Eijnden RJ, Van de Mheen D. Online video game addiction: identification of addicted adolescent gamers. Addiction. 2011;106(1):205-12.
17. Ko CH, Liu GC, Hsiao S, Yen JY, Yang MJ, Lin WC, et al. Brain activities associated with gaming urge of online gaming addiction. J Psychiatr Res. 2009;43(7):739-47.
18. Wölfling K, Bühler M, Leménager T, Mörsen C, Mann K. Gambling and internet addiction: review and research agenda. Nervenarzt. 2009;80(9):1030-9.
19. Han DH, Kim YS, Lee YS, Min KJ, Renshaw PF. Changes in cue-induced, prefrontal cortex activity with video-game play. Cyberpsychol Behav Soc Netw. 2010;13(6):655-61.

20. Hong SB, Zalesky A, Cocchi L, Fornito A, Choi EJ, Kim HH, et al. Decreased functional brain connectivity in adolescents with internet addiction. PLoS One. 2013;8(2):e57831.
21. Dong G, Devito EE, Du X, Cui Z. Impaired inhibitory control in "internet addiction disorder": a functional magnetic resonance imaging study. Psychiatry Res. 2012;203(2-3):153-8.
22. Young KS. Internet addiction: the emergence of a new clinical disorder. Cyberpsychol Behav. 1998;1(3):237-44.
23. APA. DSM-V: Internet Gaming Disorder [Internet]. 2013. [Capturado em: 01 mar 2014]. Disponível em: <http://www.dsm5.org/Documents/Internet%20Gaming%20Disorder%20Fact%20Sheet.pdf>.
24. Xie Y, Zhou P, Xu L, Peng Z. Prevalence of internet addiction and the related factors in middle school students in Guangzhou. Nan Fang Yi Ke Da Xue Xue Bao. 2010;30(8):1801-4.
25. Bergmark KH, Bergmark A, Findahl O. Extensive internet involvement – addiction or emerging lifestyle? Int J Environ Res Public Health. 2011;8(12):4488-501.
26. Fischer G, Brunner R, Parzer P, Klug K, Durkee T, Carli V, et al. Depression, deliberate self-harm and suicidal behaviour in adolescents engaging in risky and pathological internet use. Prax Kinderpsychol Kinderpsychiatr. 2012;61(1):16-31.
27. Gentile D. Pathological video-game use among youth ages 8 to 18: a national study. Psychol Sci. 2009;20(5):594-602.
28. Mentzoni RA, Brunborg GS, Molde H, Myrseth H, Skouverøe KJM, Hetland J, et al. Problematic video game use: estimated prevalence and associations with mental and physical health. Cyberpsychol Behav Soc Netw. 2011;14(10):591-6.
29. Haagsma MC, Pieterse ME, Peters O. The prevalence of problematic video gamers in the Netherlands. Cyberpsychol Behav Soc Netw. 2012;15(3):162-8.
30. Zboralski K, Orzechowska A, Talarowska M, Darmosz A, Janiak A, Janiak M, et al. The prevalence of computer and Internet addiction among pupils. Postepy Hig Med Dosw. 2009;63:8-12.
31. Yen CF, Yen JY, Ko CH. Internet addiction: ongoing research in Asia. World Psychiatry. 2010;9(2):97.
32. Bernardi S, Pallanti S. Internet addiction: a descriptive clinical study focusing on comorbidities and dissociative symptoms. Compr Psychiatry. 2009;50(6):510-6.
33. Ha JH, Yoo HJ, Cho IH, Chin B, Shin D, Kim JH. Psychiatric comorbidity assessed in Korean children and adolescents who screen positive for Internet addiction. J Clin Psychiatry. 2006;67(5):821-6.
34. Mazurek MO, Engelhardt CR. Video game use in boys with autism spectrum disorder, ADHD, or typical development. Pediatrics. 2013;132(6):260-6.
35. Wenzel HG, Bakken IJ, Johansson A, Götestam KG, Øren A. Excessive computer game playing among Norwegian adults: self-reported consequences of playing and association with mental health problems. Psychol Rep. 2009;105(3):1237-47.
36. Widyanto L, McMurran M. The psychometric properties of the internet addiction test. Cyberpsychol Behav. 2004;7(4):443-50.
37. Widyanto L, Griffiths M, Brunsden V, McMurran M. the psychometric properties of the Internet Related Problem Scale: a pilot study. Int J Ment Health Addict. 2008;6(2):205-13.
38. Meerkerk GJ, Van Den Eijnden RJJM, Vermulst AA, Garretsen HFL. The Compulsive Internet Use Scale (CIUS): some psychometric properties. Cyberpsychol Behav. 2009;12(1):1-6.
39. Van Rooij AJ, Schoenmakers TM, van den Eijnden RJJM, Vermulst AA, van de Mheen D. Video Game Addiction Test: validity and psychometric characteristics. Cyberpsychol Behav Soc Netw. 2012;15(9):507-11.
40. Jap T, Tiatri S, Jaya ES, Suteja MS. The development of Indonesian online game addiction questionnaire. PLoS One [Internet]. 2013;8(4):e61098.
41. Tejeiro Salguero RA, Morán RMB. Measuring problem video game playing in adolescents. Addiction. 2002;97(2):1601-6.
42. Lemmens JS, Valkenburg PM, Peter J. Development and validation of a Game Addiction Scale for Adolescents. Media Psychology. 2009;12(1):77-95.
43. Hodgins DC, Peden N. Cognitive-behavioral treatment for impulse control disorders. Rev Bras Psiquiatr. 2008;30(1):31-40.
44. Matusiewicz AK, Hopwood CJ, Banducci AN, Lejuez CW. The effectiveness of cognitive behavioral therapy for personality disorders. Psychiatr Clin North Am. 2010;33(3):657-85.
45. Beck A. Terapia cognitiva: teoria e prática. Porto Alegre: Artmed; 2009.
46. Moher D, Liberati A, Tetzlaff J, Altman DG. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. Ann Intern Med. 2009;151(4):264-9.
47. Chakraborty K, Basu D, Vijaya Kumar KG. Internet addiction: consensus, controversies, and the way ahead. East Asian Arch Psychiatry. 2010;20(3):123-32.
48. Romo L, Aubry C, Djordjian J, Fricot E, Adès J. La dépendance à l'Internet et la prise en charge cognitivo-comportementale. J Thérapie Comport Cogn. 2004;14(3):117-23.
49. Davis RA. A cognitive-behavioral model of pathological Internet use. Comput Human Behav. 2001;17(2):187-95.
50. Pujol CC, Alexandre S, Sokolovsky A, Karam RG, Spritzer DT. Internet addiction: perspectives on cognitive-behavioral therapy. Rev Bras Psiquiatr. 2009;31(2):185-6.
51. Abreu C, Karam R. Internet and videogame addiction: a review. Rev Bras Psiquiatr. 2008;30(2);156-67.
52. Lemos I, Santana S. Electronic games dependency: the possibility of a new psychiatric diagnosis. Rev Psiq Clín. 2012;39(1):28-33.
53. Orzack M, Orzack D. Treatment of computer addicts with complex co-morbid psychiatric disorders. Cyberpsychol Behav. 1999;2(5):465-73.
54. Khazaal Y, Xirossavidou C. Cognitive-behavioral treatments for internet addiction. Open Addict J. 2012;5(1):30-5.
55. Young KS. Internet addiction: symptoms, evaluation, and treatment. Innovations in clinical practice: a source book [Internet]. Sarasota: Professional Resource Press/Professional Resource Exchange; 1999.
56. King DL, Delfabbro PH, Griffiths MD. Cognitive behavioral therapy for problematic video game players: conceptual considerations and practice issues. J CyberTherapy Rehabil. 2010;3:261-74.
57. Hall AS, Parsons J. Internet addiction: college student case study using best practices in cognitive behavior therapy. J Ment Heal Couns. 2001;23(4):312-27.
58. King DL, Delfabbro PH, Griffiths MD, Gradisar M. Cognitive-behavioral approaches to outpatient treatment of internet addiction in children and adolescents. J Clin Psychol. 2012;68(11):1185-95.
59. Thorens G, Khazaal Y, Zullino D. Traitement par thérapie cognitivo-comportementale d'une addiction Internet spécifique: un apport théorique illustré par une étude de cas d'un patient souffrant d'une addiction à un jeu de rôle en ligne massivement multijoueurs (MMORPG). J Thérapie Comport Cogn. 2012;22(2):60-7.
60. Lee E. A case study of Internet Game Addiction. J Addict Nurs. 2011;22(4):208-13.
61. Taquet P, Hautekeete M. Prise en charge TCC d'une addiction aux jeux vidéo: l'expérience de jeu contribue à la thérapie. J Thérapie Comport Cogn. 2013;23(3):102-12.
62. Young KS. Cognitive behavior therapy with Internet addicts: treatment outcomes and implications. Cyberpsychol Behav. 2007;10(5):671-9.
63. Ge L, Ge X, Xu Y, Zhang K, Zhao J, Kong X. P300 change and cognitive behavioral therapy in subjects with Internet addiction disorder: a 3-month follow-up study. Neural Regen Res. 2011;6(26):2037-41.
64. Jäger S, Müller KW, Ruckes C, Wittig T, Batra A, Musalek M, et al. Effects of a manualized short-term treatment of internet and computer game addiction (STICA): study protocol for a randomized controlled trial. Trials. 2012;13(43):43.
65. Zhu T, Jin R, Zhong X. Clinical effect of electroacupuncture combined with psychologic interference on patient with Internet addiction disorder. Zhongguo Zhong Xi Yi Jie He Za Zhi. 2009;29(3):212-4.
66. Zhu T, Li H, Jin R, Zheng Z, Luo Y, Ye H, et al. Effects of electroacupuncture combined psycho-intervention on cognitive function and event-related potentials P300 and mismatch negativity in patients with internet addiction. Chin J Integr Med. 2012;18(2):146-51.
67. Rooij AJ, Zinn MF, Schoenmakers TM, Mheen D. Treating internet addiction with cognitive-behavioral therapy: a thematic analysis of the experiences of therapists. Int J Ment Health Addict. 2012;10(1):69-82.
68. Li G, Dai XY. Control study of cognitive-behavior therapy in adolescents with Internet addiction disorder. Chinese Ment Heal J. 2009;23(7):457-70.
69. Du Y, Jiang W, Vance A. Longer term effect of randomized, controlled group cognitive behavioural therapy for Internet addiction in adolescent students in Shanghai. Aust N Z J Psychiatry. 2010;44(2):129-34.
70. Fortune EE, Goodie AS. Cognitive distortions as a component and treatment focus of pathological gambling: a review. Psychol Addict Behav. 2012;26(2):298-310.
71. Goldfried MR. Evidence-based treatment and cognitive-affective--relational-behavior-therapy. Psychotherapy (Chic). 2013;50(3):376-80.
72. Hofmann SG, Asnaani A, Vonk IJJ, Sawyer AT, Fang A. The efficacy of cognitive behavioral therapy: a review of meta-analyses. Cognit Ther Res. 2012;36(5):427-40.
73. Camardese G, De Risio L, Di Nicola M, Pizi G, Janiri L. A role for pharmacotherapy in the treatment of "internet addiction". Clin Neuropharmacol. 2012;35(6):283-9.