

Treatment outcomes in patients with Internet Addiction and anxiety

Veruska Santos¹, Rafael Freire¹, Morená Zugliani¹, Patricia Cirillo¹, Hugo H.K. Santos², Antonio Egidio Nardi¹, Anna Lucia Spear King¹

¹ Laboratory of Panic and Respiration, Institute of Psychiatry of The Federal University of Rio de Janeiro (IPUB/UFRJ), Rio de Janeiro, RJ, Brazil; National Institute for Translational Medicine (INCT-TM), Brazil.

² Department of Statistics, Institute of Mathematics and Statistics, Fluminense Federal University (UFF)

OBJECTIVE: To investigate the effectiveness of a treatment for Internet addiction and anxiety disorders, using cognitive behavioral therapy combined with medication, and to analyze the relationship between anxiety and Internet addiction.

METHOD: An open clinical trial included 84 patients (42 in the “comorbidities” group; 42 in the “no comorbidities” group) seeking treatment for anxiety symptoms and/or Internet Addiction. The subjects responded to The Mini International Neuropsychiatric Interview 5.0; the Hamilton Anxiety Scale (HAM-A), the Hamilton Depression Scale (HDRS), Clinical Global Impressions Severity and Improvement (CGI-S and CGI-I) and the Young Internet Addiction Scale (IAT). Patients who had only Internet addiction received psychoeducation on conscious internet use and bibliotherapy; they were defined as the group without comorbidities; patients diagnosed with Internet addiction and anxiety disorder (the group with comorbidities) were forwarded for pharmacotherapy and psychotherapy.

RESULTS: Both Internet Addiction and anxiety decreased after treatment; the average of Hamilton Anxiety Scale of the “comorbidities” group at the beginning was 33.9 ± 7.6 , suggesting severe anxiety, and at the end of treatment it was 15.0 ± 5.1 , suggesting mild anxiety and a significant improvement. The average Internet Addiction score at the beginning was 67.8 ± 9.0 ; at the end of the psychotherapy an average score of 37.7 ± 11.4 was registered, indicating a notable and highly significant improvement.

CONCLUSIONS: The relationship between anxiety and Internet Addiction existed and was strong. Treatment significantly improved both.

KEYWORDS: Internet Addiction, Anxiety, Cognitive Behavioral Therapy.

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E-mail: veruskaasantos@gmail.com

INTRODUCTION

Internet became popular and has grown wildly in recent years: ease of communication, access to information, learning assistance, search for services, leisure and fun transformed the internet into an indispensable tool. A range of users are unable to control their internet use, often resulting in problems at work, in their social life and sexual pursuits, financial complications, a decline in academic or school performance and other negative consequences.

Because Internet addiction (IA) is not a recognized disorder on DSM5,¹ the diagnostic criteria for IA are oft discussed; three models are usually employed. The **first model** is called the component model, suggesting that six components are present in all addictions: salience, mood modification, tolerance, withdrawal symptoms, conflict, and relapse. This model argues that addictions share elements of biopsychosocial processes and originate from pathological gambling.² The **second model** also takes pathological gambling as a starting point. It defines Internet addiction as a failure to control personal impulses, even though the condition does not involve the use of chemicals: it postulates an

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excessive preoccupation with the Internet as the center cause, because of (1) the need to use the Internet with increasing amounts of time to achieve satisfaction; (2) having repeatedly made unsuccessful efforts to control, cut back or stop Internet use; (3) feeling restless, moody, depressed or irritable when attempting to cut down or stop use; (4) staying online longer than originally intended; (5) loss of a significant relationship, of a work position, of an educational or career opportunity because of the Internet; (6) lying to family, therapists or others to conceal the extent of involvement with the Internet; (7) using the Internet as a way of escapism from problems or to relieve a dysphoric mood. The user is addicted when five or more criteria are present for a 6-month period;^{3,4} the **third model** starts from the clinical characteristics of a large group of Chinese patients thought to have Internet Addiction: symptom and impairment criteria (both must be present). (a) Symptom criteria may include preoccupation and withdrawal symptoms; one or more of the following apply: tolerance, persistent desire and/or unsuccessful efforts to control use; continued use despite problems; loss of other interests; use of the Internet to escape or relieve dysphoric mood. (b) Clinically significant impairment criteria may include: functional impairments (reduced social, academic, working ability), including loss of a significant relationship, work, or educational or career opportunities. For this model, the duration of IA must be at least more than three months, with at least six hours of non-business/non-academic internet use per day.⁵

This lack of officially sanctioned diagnosis criteria results in a lack of consensus in assessing Internet Addiction; international prevalence rates use different questionnaires such as the Young Internet Addiction Test (IAT),⁴ the Compulsive Internet Use Scale (CIUS),⁶ the Excessive Internet Use Scale (EIU),⁷ the Problematic Internet Use Questionnaire (PIUQ),⁸ the Chen Internet Addiction Scale (CIAS),⁹ the Addiction Profile Index Internet Addiction Form-Screening Version (BAPINT-SV)¹⁰ and the Internet Addiction Proneness Scale (KS scale).¹¹ Under these conditions, the worldwide prevalence rates of IA ranged approximately from 1.0% to 18.7%.¹²

Researchers suggest that excessive use of the internet can lead directly to Internet Addiction (IA).^{2,13} This behavioral addiction has awakened the interest of Psychiatry, especially as it has been suggested that there is an association with psychiatric disorders such as depression,^{14,15} attention deficit and hyperactivity,^{16,17,18} hypomania,¹⁹ generalized anxiety disorder,^{16,20} social anxiety disorder,^{16,20} dysthymia,¹⁶ alcohol use disorder,¹⁸ eating disorder,²¹ obsessive compulsive personality disorder,²² borderline personality disorder, avoidant personality disorder,²² social phobia²³ and insomnia.²⁴

It has been argued that IA is a symptom of another disorder (such as anxiety or depression) and not a separate

entity,²⁵ while some studies have linked Internet Addiction to impulsive control disorder;^{26,27} in sharp contrast, others have suggested that IA is really a primary disorder.^{3,12} The comorbidities of IA affect the patient's life and the direction of treatment, which ought to emphasize the psychiatric condition and treat the pathological use of Internet.²⁸

The studies recognize that IA causes damage in many social, physical and mental aspects of life, such as job loss, divorce, family disagreements, social isolation, academic failure, abandonment or expulsion from school,²⁹ insomnia, musculoskeletal pain, tension headache, malnutrition, fatigue and blurred vision, besides cognitive impairments.²⁴

Pharmacological and psychotherapeutic treatments for Internet Addiction have been suggested.³⁰ The pharmacological treatment involves medicines such as Escitalopram,³¹ Citalopram,³² Bupropion,²² Olanzapine,³³ Quetiapine,³⁴ Naltrexone,³⁵ Methylphenidate³⁶ and Memantine.³⁷

Cognitive Behavioral Therapy (CBT) is an approach that teaches patients to pay attention to their thoughts, feelings and behaviors and that these dimensions have a strict relationship. Patients are trained to identify through their thoughts and feelings the triggers of addictive behaviors. Other aims of CBT are to teach different coping styles and promote adherence to treatment and prevention of relapses.³⁸ CBT has been used to treat IA in many different ways.^{22,34,35,36} Some researchers argue that the first stage of the treatment should be behavioral, taking into account situations where impulsivity is present.³⁹ Another step of treatment is focused on cognitive aspects of addiction, reducing maladaptive cognitions and promoting restructuring. Also, the real problems that led to addiction are a target of treatment at another moment and this is applied to comorbidities such as depression, anxiety, addiction to drugs or alcohol, as well as other psychiatric conditions.⁴⁰

This aim of this research is to evaluate the effectiveness of a modified CBT protocol and medicines for the treatment of Internet addiction in patients with a range of comorbid anxiety disorders.

■ METHOD

The research was approved by the Ethics Committee of the Federal University of Rio de Janeiro and all patients signed a consent form and were seen and treated at the Laboratory of Panic and Respiration at the Institute of Psychiatry of the Federal University of Rio de Janeiro (IPUB/UFRJ).

The participants were 84 patients seeking treatment for anxiety symptoms and/or Internet Addiction and at screening they responded to The Mini International Neuropsychiatric Interview 5.0,⁴¹ the Hamilton Anxiety Scale (HAM-A),⁴² the Hamilton Depression Scale (HDRS),⁴³

Clinical Global Impressions (CGI)⁴⁴ and the Young Internet Addiction Scale (IAT).³ The 42 patients who only had Internet addiction received psychoeducation on conscious internet use and were considered the “no comorbidities” group; the other 42 patients in whom Internet addiction and anxiety disorder were observed were forwarded for pharmacotherapy and psychotherapy and were considered the “comorbidities” group. The inclusion criteria adopted for the study were patients between 18 to 65 years, with Internet Addiction; IA diagnosis was made for persons with a score of 50 or more on an Internet Addiction Test; anxiety disorder was diagnosed by a psychiatrist attending and completing the initial interview; inclusion also required patients to have enough cognitive ability to understand the instructions. Patients who did not know how to read or write, or had Axis II pathology were excluded.

The psychotherapy used was a modified CBT focused on treating anxiety and IA and is based on a modified Young’s treatment⁴⁰ protocol, which included the insertion of positive emotions. The first step of treatment is directed at treating the anxiety disorder and teaching, through psychoeducation, the mechanism of anxiety and how to deal with it by learning not to be scared in situations that generate anxiety. At this moment, the patients identify and understand emotions and their functioning and their relationship with internet use. All circumstantial situations are explored: social life, interpersonal relations, occupational situations related to anxiety and internet use. The second phase is for cognitive reappraisal of anxiety and internet use, whereby the patients analyze their daily internet use, the cognitions and the triggers involved in the internet use and anxiety. Cognitive distortions, such as selective abstraction, generalization, dichotomic thinking, as well as others that perpetuate anxiety and excessive use of the internet are restructured. This leads patients to understand the influence of thoughts on behaviors. The third phase is behavioral modification and involves breaking habits in the use of the internet and switching to a different use of that broken routine. At this point, the exposures of feared/ansiogetic situations are made and time management is trained. The behavioral modification covers social, interpersonal areas and changing ways of dealing with friends, family and physical activities. Even at this stage, another target was to insert positive emotion into the patient’s life to boost motivation for the development of social skills to remove the patient from the internet and put them back into real life. The last phase of the treatment is prevention of relapse through analyzing improvement, reinforcing new beliefs and behaviors and solving problems. The complete treatment lasts from 8 to 10 sessions.

Statistical analysis

Means, standard deviations and estimated marginal means of the two groups were calculated through a

correlation matrix between anxiety, depression and Internet Addiction between groups. The analyses of the variables considered baseline measurements of IAT, HAM-A and HDRS of all subjects.

Data for “before-treatment” and “after-treatment” were analyzed through t-tests. The differences in IAT, HAM-A, HDRS and CGI scores were assessed by Pearson’s correlation analysis; statistical significance was defined at the $p < 0.05$ level, two-tailed.

■ RESULTS

The groups’ characteristics (42 with Internet Addiction vs. 42 with Internet Addiction plus Anxiety Disorder) for age, sex, education and occupation and baseline scores of IAT, HAM-A, HDRS and CGI-S are presented in Table 1.

The anxiety levels in the “no comorbidities” group (shown by mean scores on the HAM-A) suggested mild anxiety in 32 of the 42 patients of the group; the average score of the group was 10.1 ± 6.9 . This contrasts with the “comorbidities” group with a significantly higher average score of 33.9 ± 6.3 .

The “comorbidities” group included 25 patients with Panic Disorder, representing 59.4% of the sample. The disorders detected in the group are described in Table 2.

The average IAT score in the “no comorbidities” group was 58.9 ± 7.5 (threshold for “problematic” use is 50), which indicated “problematic” internet use. After bibliotherapy and psychoeducation this group showed IAT scores of 54.2 ± 6.3 . Values for IAT are presented in Table 3.

The results of tests in the beginning and the end of the treatment in the “comorbidities” group are reported in Table 4. All four tests show a remarkable improvement

Table 1 - Sample Characteristics and baseline scores

		Comorbidities group	No comorbidities group
Age		29.0 ± 6.4	31.6 ± 10.0
Sex	Male	13 (30.9%)	21 (50%)
	Female	29 (69%)	21 (50%)
Education	Elementary school	0 (0%)	5 (11.9%)
	High school	42 (100%)	37 (88.1%)
Occupation	Student/employed	39 (92%)	41 (97%)
	Unemployed/housewife	3 (7%)	1 (2%)
IAT		67.8 ± 7.4	58.9 ± 7.54
HAM-A		33.9 ± 6.3	10.1 ± 5.4
HDRS		16.3 ± 5.4	5.6 ± 3.2
CGI		5.1 ± 0.6	1.4 ± 0.6

Table 2 - Disorders in "comorbidities" group

Disorder	Total (Proportion %)
PD with Agoraphobia	9 (21%)
PD with Agoraphobia and GAD	15 (35%)
PD with OCD	1 (2%)
GAD	9 (21%)
GAD with ADHD, OCD, Phobia	5 (11%)
Social Phobia	3 (7%)

PD: Panic disorder; GAD: Generalized anxiety disorder; OCD: Obsessive compulsive disorder; ADHD: Attention deficit hyper-activity disorder.

Table 3 - Student's t-test for IAT in the "no comorbidities" group

	Average ± SD		t-test	
	Baseline	End of study	t	p-value
IAT (without comorbidities)	58.9 ± 7.5	54.2 ± 6.3	5.6381	< 0.001

Table 4 - Student's t-test for the Comorbidities Group

	Average ± SD		t-test	
	Baseline	End of study	t	p-value
IAT	67.8 ± 7.4	37.7 ± 8.8	14.63	< 0.001
HDRS	16.3 ± 5.4	7.1 ± 2.4	9.14	< 0.001
HAM-A	33.9 ± 6.3	15.0 ± 3.9	14.18	< 0.001
CGI	5.1 ± 0.6	1.1 ± 0.2	29.74	< 0.001

Table 5 - Correlation matrix between anxiety, depression and Internet Addiction on baseline of two groups

	HDRS	HAM-A
IAT	0.534	0.722
HDRS	—	0.806

in the group. HAM-A dropped from 33.9 ± 7.6 at the beginning, (suggesting severe anxiety), to 15.0 ± 5.1 at the end of treatment, suggesting mild anxiety, a significant improvement. IAT dropped from 67.8 ± 7.4 at baseline to 37.7 ± 8.8 at the end of the study, a notable improvement in Internet Addiction.

There were significant correlations between HAM-A, HDRS and IAT. Internet addiction was associated with depressive symptoms and anxiety symptoms as shown in Table 5.

Improvement was noted in the comparison of scores on IAT and HAM-A scales and especially in the fact that the patients no longer had to manage anxiety using the internet and after treatment could use what they had learnt through psychotherapy.

DISCUSSION

Although Internet addiction is not a recognized disorder on DSM5,¹ there are many studies highlighting

the harmful its effects.^{45,46,47} This research examined the efficacy of combined Cognitive Behavioral Therapy and pharmacological treatment for Internet Addiction and anxiety disorders and the relationship between anxiety and Internet Addiction.

Patients that received bibliotherapy and psychoeducation on the conscious use of internet showed no significant improvements: progress was small and some patients did not change their internet use. Although bibliotherapy and psychoeducation are traditional treatments around the world, this kind of intervention was not taken seriously in our group of patients because they did not read the prescribed texts and the necessary changes were not achieved.

Almost all the patients in the "comorbidities" group, especially those with panic disorder, used the internet to deal with physiological and cognitive symptoms of anxiety; the variety of apps for mobiles using music, respiration, as well as WhatsApp, Facebook and others, together with surfing the internet, were all used as coping strategies to face anxiety. This aggravated internet use and anxiety in these patients, a fact that had also been observed in other studies.^{48,49}

Our study found a higher prevalence rate of women in the treatment group (29 women, 13 men); the control group presented a 50-50 score of 21 men and 21 women. Only two studies showed this difference in prevalence rate among males and females, presenting higher rates in females^{48,50} while most studies found either a higher prevalence among males^{51,52} or equal prevalence.⁵³

The patients who received psychotherapy and medicines were evaluated at the beginning and at the end of psychotherapy: after 10 sessions and medication all indicators had been reduced, proving the efficacy of the protocol. The average score for internet use at the beginning of the treatment was 67.8 ± 7.4, dropping to 37.7 ± 8.8, a notable and highly significant improvement in Internet Addiction. The levels of anxiety also showed considerable improvement, as the average of the treatment group at beginning was 33.9 ± 7.6, suggesting severe anxiety, while at the end of treatment it was 15.0 ± 5.1, suggesting mild anxiety and a significant improvement.

Analyzing the relationship between anxiety and Internet Addiction, a study positively linked IA to anxiety and stress and claims that the more addicted to the internet a person was, the more stressed and anxious he/she will be.⁵⁴ In our study the relationship between anxiety and Internet addiction was evaluated by a correlation matrix between these variables and the statistical results indicate that the correlation between Internet Addiction and depression was moderate (0.534) but the correlation between Internet Addiction and anxiety was strong (0.722); likewise, the correlation between anxiety and depression (0.806) was quite strong. So, the relationship between anxiety and Internet Addiction existed and was strong.

Taking into account previous research into treatment, recent studies pointed to the fact that the most effective treatment for IA should combine cognitive-behavioral therapy and medication.^{12,30} Other interventions using CBT have also been described as successful.^{13,40} Future studies should also investigate treatment differences between approaches such as counseling, gestalt, psychodynamic therapies or even therapies from the new age of CBT such as mindfulness, metacognitive approach and transdiagnostic treatment using a unified protocol to analyze the efficacy and to offer different treatment alternatives. Transdiagnostic treatment using a unified protocol is a protocol for treating depression and anxiety and could be an interesting option for treating IA with comorbid depression or anxiety.⁵⁵

Some limitations should be noted: we did not use specific tests to analyze the level of social phobia or Generalized Anxiety Disorder to analyze the relationship between abusive use of the internet and that specific anxiety disorder separately. This could be a future area of research.

■ CONCLUSIONS

The aim of this study was to evaluate the efficacy of a modified Cognitive Behavioral Treatment protocol combined with medicine treatment for patients with Internet Addiction and anxiety disorder. Another objective was to analyze the relationship between anxiety and Internet Addiction. The most important aspect of this treatment is to promote and support conscious use of the internet to create a healthy relationship with this use. Both Internet Addiction and anxiety decreased after treatment. The relationship between anxiety and Internet Addiction existed and was strong. Treatment significantly improved both. This study calls for further research investigating Internet Addiction treatments, associations and increased promotion of conscious use of the internet seeking well-being and mental health.

■ CONFLICTS OF INTEREST

Authors declare no conflicts of interest regarding this project.

■ AUTHOR PARTICIPATION

Santos V designed the study, wrote the protocol, managed the psychotherapies, analyzed the data and wrote of the manuscript. Freire R, Zugliani M and Cirillo P managed the psychiatry treatments, Santos HK made statistical part and Nardi AE, King ALS contributed to the critical review of the paper.

RESULTADO DE TRATAMENTO DE PACIENTES COM DEPENDÊNCIA DE INTERNET E ANSIEDADE

OBJETIVO: Investigar a eficácia de tratamento para dependência de internet e transtornos de ansiedade, utilizando terapia cognitivo comportamental combinada com medicação, e analisar a relação entre ansiedade e dependência de internet.

MÉTODO: Ensaio clínico aberto realizado no Laboratório de Pânico e Respiração no Instituto de Psiquiatria da Universidade Federal do Rio de Janeiro (IPUB/UFRJ) com 84 pacientes (42 do grupo com comorbidades e 42 do grupo sem comorbidades) que procuravam tratamento para transtornos de ansiedade e/ou dependência de internet. Os sujeitos responderam ao MINI Entrevista Neuropsiquiátrica Internacional 5.0; a Escala Hamilton de Ansiedade (HAM-A), a Escala Hamilton de Depressão (HDRS), a Escala Clínica de Impressão Global de Severidade e de Melhora (CGI-S e CGI-I) e a Escala de Dependência de Internet de Young (IAT). Os pacientes com apenas dependência de internet receberam psicoeducação sobre o uso consciente da internet e biblioterapia, e foram considerados o grupo sem comorbidades, enquanto que, os pacientes com transtornos de ansiedade e dependência de internet foram encaminhados para o tratamento medicamentoso e psicoterapia.

RESULTADOS: Tanto a dependência de internet quanto a ansiedade diminuíram após o tratamento, a média da HAM-A no grupo com comorbidades no início foi de $33,9 \pm 7,6$, sugerindo ansiedade grave e ao final do tratamento foi de $15 \pm 5,1$, sugerindo uma significativa melhora. A media de dependência de internet obtida na IAT no início do tratamento foi de $67,8 \pm 9,0$ e ao final da psicoterapia a maioria dos participantes apresentou média de $37,7 \pm 11,4$ indicando uma melhora notável.

CONCLUSÃO: A relação entre ansiedade e dependência de internet existe e é forte.

PALAVRAS-CHAVE: Dependência de Internet, Ansiedade, Terapia Cognitivo Comportamental.

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