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## Commentary

# Is Cognitive Behavioral Therapy an Intervention for Possible Internet Addiction Disorder?

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**Abstract** Internet addiction disorder (IAD) has been proposed to describe uncontrollable, damaging use of Internet technology leading to some changes in the autonomic nervous system. IAD can be defined as an impulse-control disorder that does not involve an intoxicant. Diagnostic and Statistical Manual of Mental Disorders (DSM-V) does not recognize it as a disease but the new approach of research domain criteria (RDoC) considers re-evaluating DSM because of the change in global prevalence of IAD from 0.3% to 38%. Treatment of IAD is still unsolved due to the lack of concrete evidence, knowledge, and information about the disease. Some therapeutic examples are medications and psychotherapies such as cognitive behavioral therapy (CBT). The CBT approach addresses dysfunctional emotions, maladaptive behaviors and cognitive processes. Modified CBT is used for the treatment of IAD but better results are observed when it is combined with other therapies. This commentary is based on full research papers and some specific case reports recording CBT as the treatment for IAD. PubMed, Scopus, Ovid, ProQuest, ScienceDirect, and SpringerLink are the databases used for this commentary. More exhaustive research is needed in this field as to confirm the etiology of IAD and its intervention with CBT.

**Keywords** internet addiction disorder (IAD); cognitive behavioral therapy (CBT); Diagnostic and Statistical Manual of Mental Disorders (DSM-V); research domain criteria (RDoC), International Classification of Diseases (ICD-10)

## 1. Introduction

Internet addiction disorder (IAD) was first coined in 1995 to represent problematic Internet usage behavior [16]. IAD is characterized by excessive or poorly controlled preoccupations, urges or behaviors regarding computer use and Internet access that leads to cognitive impairment and mental distress [12,15,21,22,38,42,57,59,71,72,73]. Other terms given to this phenomenon are compulsive computer use [7,8,55], pathological Internet use [17,49,61], problematic Internet use [5,58], and Internet dependency [14,67].

IAD has drawn lots of attention from the public due to its damaging effect to society [2,13,22,40,51,68,72]. Several researchers are investigating in this area as to diagnose the etiology of IAD for an appropriate treatment of this disorder. IAD is not a recognized disease according to the 10th edition of the International Classification of

Diseases (ICD-10), and the newly published Diagnostic and Statistical Manual of Mental Disorders (DSM-V) [3]. DSM-V states that a considerable nosological ambiguity is inevitable and there is still no universal definition or well-recognized criterion for IAD today, but the new approach of RDoC [32] considers re-evaluating DSM because of the change in global prevalence [1,35,44,52] of IAD from 0.3% to 38%. This obvious difference in the prevalence may be due to the subjects, cultural background, different methodologies, outcomes, and assessment tools [11].

The damaging effects of IAD include social isolation, family discord, divorce, job loss, academic failure, poor grades, academic probation, and even expulsion from schools [40,51,66]. Some of the major physical symptoms of IAD are sleep deprivation, tension headache, musculoskeletal discomfort and pain, blurred vision, malnutrition, fatigue [68], and cognitive impairment [17]. These social, physical, and mental impairments lead to challenging interpersonal relationships and dysfunctional families.

Absolute therapeutic regime of IAD is not available due to its unclear etiology [11,12,31,59,69,73]. However, antidepressants, mood stabilizers, and other psychotherapies such as cognitive behavioral therapy (CBT) have been introduced to symptomatically treat IAD [5,9,28,29,41,43,54,75].

CBT is a psychotherapeutic approach that addresses dysfunctional emotions, maladaptive behaviors, and cognitive processes. CBT is based on Beck's theory that thoughts determine feelings and behavior [6]. It has been used to treat depression, mood, anxiety, alcohol and other substance abuse, and borderline personality disorders as well as bulimia and sexual dysfunctions [56]. Modified CBT is the most commonly used intervention for IAD and is also proved to be effective [47].

This commentary will review the literature on CBT intervention and provide evidence for the suitability of this approach for the treatment of possible IAD.

**Table 1:** Results of IAD and CBT using Scopus, Ovid, ProQuest, ScienceDirect, SpringerLink, and PubMed databases.

No	Database	Search term/keywords	Search results	Papers fulfilling inclusion criteria
1	Scopus	(TITLE-ABS-KEY (“internet addiction” or “internet abuse” or “problematic internet use” or “pathological internet use” or “excessive internet use” or “internet dependence” or “pathological computer use” or “cyber abuse” or “internet behavior dependence”) AND TITLE-ABS-KEY (“cognitive behavioral therapy” OR “cbt”))	23	7
2	Ovid	(“internet addiction” or “internet abuse” or “problematic internet use” or “pathological internet use” or “excessive internet use” or “internet dependence” or “pathological computer use” or “cyber abuse” or “internet behavior dependence”) and (“cognitive behavioral therapy” or CBT).	32	8
3	ProQuest	All ((“internet addiction” or “internet abuse” or “problematic internet use” or “pathological internet use” or “excessive internet use” or “internet dependence” or “pathological computer use” or “cyber abuse” or “internet behavior dependence”)) AND all ((“cognitive behavioral therapy” or CBT))	2	1
4	ScienceDirect	TITLE-ABSTR-KEY ((“internet addiction” or “internet abuse” or “problematic internet use” or “pathological internet use” or “excessive internet use” or “internet dependence” or “pathological computer use” or “cyber abuse” or “internet behavior dependence”)) and TITLE-ABSTR-KEY ((“cognitive behavioral therapy” OR CBT))	6	5
5	SpringerLink	(“internet addiction” or “internet abuse” or “problematic internet use” or “pathological internet use” or “excessive internet use” or “internet dependence” or “pathological computer use” or “cyber abuse” or “internet behavior dependence”) and (“cognitive behavioral therapy” OR “cbt”)	21	2
6	PubMed	(“internet addiction” or “internet abuse” or “problematic internet use” or “pathological internet use” or “excessive internet use” or “internet dependence” or “pathological computer use” or “cyber abuse” or “internet behavior dependence”) and (“cognitive behavioral therapy” OR “cbt”)	5	2
<b>Total papers</b>			<b>89</b>	<b>25 (16*)</b>

\*Sixteen papers were used as nine papers were overlapped in different search engines.

## 2. Materials and methods

A total of sixteen research papers published between 2001 and 2013 reporting CBT as IAD intervention were retrieved from searching PubMed, Scopus, Ovid, ProQuest, ScienceDirect, and SpringerLink databases (Table 1). (“Cognitive behavioral therapy” or “CBT”) and (“Internet addiction” or “Internet abuse” or “problematic Internet use” or “pathological Internet use” or “excessive Internet use” or “Internet dependence” or “pathological computer use” or “cyber abuse” or “Internet behavior dependence”)) were used as search terms. Criteria for inclusion for the review were studies that used at least one form of CBT treatment for IAD and were written in English and/or Chinese language. In this commentary we are including all the research work on subjects who are diagnosed by all available tools for IAD and have CBT as intervention. The exclusion criteria for the articles are reviews and those which are not in combination with IAD and CBT.

## 3. Results

For this review, we retrieved a total of twenty-five research papers on CBT (exclusively or in combination with other interventions) as a treatment for IAD but we analyzed only sixteen papers. Papers were analyzed on the basis of location, nature of study, subjects, and types of CBT intervention.

When the effect of CBT on IAD was analyzed on the basis of geographical location, we observed that seven of these studies were carried out in China [23,25,45,76,77,78,79], two in Germany [70,33], two in Greece [62,63], three in USA [43,74], one in Korea [39], and one in Netherlands [65]. No work was retrieved from Australia, New Zealand, Africa or South America, possibly may be due to that different methods are being carried out in these regions for the treatment of IAD.

While doing the assessment for the types of study, we observed one paper about case control study on diagnosed IAD patients [4] and eight studies were random controlled trials on IAD patients [23,33,39,45,76,77,78,79]. Whereas one study was a survey research design that screened clients using Internet Addiction Test [74], three studies were case studies in which one focused on a single female college student [27], another was done on a teenage boy [43], and the third one on two male teenagers [63]. Similarly, one paper was of a descriptive study on IAD patients [62], one pilot trial [70] and one thematic analysis [65] which aims to identify themes within qualitative data.

Whereas for the analysis of papers based on the recruitment procedure of IAD patients, we found that in seven studies [23,45,65,74,76,77,78,79], the subjects recruited were diagnosed with IAD only without any comorbidity. In another seven studies [25,33,39,43,62,63,70] the subjects

were IAD adolescents who were also diagnosed with other comorbid disorders such as depression and anxiety [25,33,39,43,62,63,70]. One study [27] was focused on an Internet addicted eighteen-year-old college student and another used clients from online-help website of the Center for Online Addiction [65].

When papers were analyzed for the types of CBT intervention, we observed that CBT can be carried out on its own or associated with another management approach for the treatment of IAD. In eight of the studies, the intervention was CBT-only [23,25,27,33,45,63,70,74], and in two studies the intervention was CBT and counseling [43,65], whereas in four studies the intervention was CBT combined with electroacupuncture (EA) [76,77,78,79]. Similarly, in one study the intervention was CBT combined with motivational interviewing (MI) [65], and in two studies short-term treatment of Internet and computer game addiction (STICA) [33,70] was used. In other two studies, the intervention was CBT-medicine using prescribed bupropion [39] and fluoxetine [39,63]. Most of the treatments in conjunction with CBT were noninvasive.

CBT-only intervention (Table 2) showed improved time management skills and better emotional, cognitive, and behavioral symptoms. For the first year of operations at the Specialized Outpatient Unit for Internet and PC Addiction in Greece, the CBT protocol proved to be successful in treating IAD symptoms [63]. CBT-only methods are of different types [23,27,63,74] that effect IAD treatment.

CBT in combination with medicine (Table 3) proved to be more effective than medicine only, where Young's Internet Addiction Scale scores were more reduced as compared to the scores obtained from the bupropion-only group [39]. Another study reported a reduction in computer usage time from sixteen hours per day to four hours per day when CBT is combined with 30 mg/day fluoxetine [62]. It is suggested by researchers that CBT in combination with medicine may be more effective for the treatment of IAD for on-line game addiction, particularly in reducing severity of online game play and anxiety, as well as in improving life satisfaction [39].

In the CBT + counseling study, the results showed (Table 4) overall improvement in the follow-up sessions. When CBT is combined with counseling, it will not only improve IAD symptoms, but also other underlying behavioral issues [43]. In the CBT + MI study, the researchers established the suitability of such intervention by focusing on setting goals of treatment through gaining self-control, reducing Internet usage, and learning alternative ways to fill leisure time [65].

CBT + EA studies, as presented in Table 5, show that the effectiveness of this combine therapy for the treatment of IAD can be measured by using many diagnostic scales such as IAD self-scale table [79], network craving scale [78],

and ZUNG, SAS, HAMA [76,77]. These scales are not only responsible for the measurement of IAD improvement but also to evaluate the underlying mechanisms and factors responsible for IAD symptoms. The researchers found that this treatment was also effective in decreasing the levels of norepinephrine in serum indicating that this approach is deep enough to stimulate or regulate the neurotransmitters [77]. One study clearly established the effectiveness of combined therapy for IAD, showing that CBT + EA is 91.3% effective as compared to CBT-only which is 59.1% [76].

#### 4. Discussion

It may be controversial that IAD does exist though its hazardous effects of excessive Internet use as have been widely reported around the world [10,18,19,20,23,24,26,30,34,36,37,42,46,48,50,53,60,64]. Many pioneers have begun trying to find out treatments or interventions to alleviate or remove the negative consequences of uncontrolled Internet usage. Among all the solutions they have put forward, CBT is the most promising treatment regardless of the fact that the majority of research on CBT intervention to treat IAD has been done on a small group of subjects with weak research designs or just case trials [65,74].

From the literature analysis we observed that CBT is the most effective treatment for IAD [23,27,39,62,65]. All the sixteen papers we reviewed were from six different countries. We observed that 87.5% (14/16) concluded that CBT treatment is effective in IAD and 12.5% (2/16) are still continuing with their ongoing research in this field. All of the results indicated that CBT could be successfully implemented for IAD treatment globally. To confirm this fact, further CBT-IAD-related research should be done worldwide on large groups with resilient research designs.

Furthermore, the literatures reviewed in this commentary indicated that CBT can be effective to treat IAD patients with or without other comorbidities. Many researchers indicated that CBT is also effective in improving the associated comorbidities of IAD [27,39,45,76,77,78]. For clarification and better understanding of the pathology, further in-depth research is needed on the relationship between IAD and its comorbidities as well as on the mechanism of how CBT influences IAD.

However, CBT showed its positive effect when being used exclusively and when used in combination with other therapeutic approaches. In the sixteen papers we reviewed we found that CBT can be applied on its own (original or modified version), as well as in combination with counseling, EA, and medicine, respectively. It was observed that CBT in combination with other treatments is more effective as compared to CBT alone for improving IAD symptoms [39,76]. Further research is needed to confirm that the combined approach is better than CBT alone.

**Table 2:** Exhibited outcomes of CBT-only intervention for IAD treatment.

Year	Country	Type of study	Recruitment procedure	Intervention techniques	Intervention outcomes	Reference
2001	USA	Working definition of IBD + a case	An 18-year-old female internet-addicted college student	Classical CBT, using the case summary worksheet	Outcome of this therapy in this paper was decreased in the level of self criticism, personal isolation increase in cognition, decreasing and increasing relationships	Hall et al. [27]
2007	USA	Longitudinal study	114 IAD clients from the Center for Online Addiction were recruited where 66 were males and 48 were females	12 online sessions of CBT with a frequency of once per week	Most clients were able to manage their symptoms by the 8th session. The effect of self-management was sustained when a 6-month follow-up was performed	Young [74]
2010	China	Random controlled trials	56 IAD adolescents (12–17 years old) were recruited from secondary school and were randomly allocated into two groups. The case (CBT treatment) group $n = 32$ ; and the control group $n = 24$	The case group received an 8 session multimodal school-based group CBT for the subjects, group cognitive behavioral training for parents; the control group received no intervention	In this intervention outcome multimodal school-based group CBT showed improved time management skills and better emotional, cognitive, and behavioral symptoms	Du et al. [23]
2010	Greece	Descriptive study	40 teenage boys (mean age 15 years) identified were IAD patients and recruited from the specialized outpatient unit for Internet and PC addiction	A sixteen session CBT protocol was employed	During the first year of operations the unit has treated a variety of IAD cases with success	Siomos et al. [62]
2011	China	Nonrandomized, case control study	38 IADs (age 25–34 years) and 48 non-IAD volunteers (age 25–33 years) as controls	CBT program involving 60-min sessions twice a week for three months. This program contains eight steps: team building, examining the self, the relation between the self and the internet, interpersonal communication training, training members to share their success stories, college career planning, self-management, and building a self-restraint system. Success of this program was estimated by measuring the changes in the event-related potentials (ERP)	IAD group exhibited significantly longer P300* latencies than controls in their ERP, indicating deficit in cognitive function. After 3 months of CBT, P300 latencies decreased significantly in the P3a* and P3b* indicating a significant increase in attention and cognition	Ge et al. [25]
2012	Germany	Randomized controlled multicenter trial (study protocol)	In this protocol development study 192 patients (17–45) will be recruited over a period of 36 months from three clinical units and will be randomly assigned to the STICA group ( $n = 96$ ), or to the WLC group ( $n = 96$ )	STICA comprises 23 psychotherapy sessions with a total duration of 4 months. Fifteen sessions will be weekly group sessions (100 min each) and eight will be fortnightly individual sessions (50 min each). The WLC group will receive the full treatment after a 4-month waiting period	The purpose of this study is to determine the efficacy of STICA and its impact on the associated mental disorders	Jäger et al. [33]
2012	Germany	Pilot study	IAD patients were recruited from Grüsser-Sinopoli outpatient clinic for behavioral addiction	A standardized CBT approach (STICA) for Internet addiction was performed in an open trial	73% completed STICA and 27% terminated treatment prematurely indicating the success of STICA	Wölfling et al. [70]
2013	China	Two types of studies: study one** and study two (it is a randomized, controlled trial)	In study two, 28 game addicted male adolescents were recruited and randomly divided into two groups: CBT group ( $n = 14$ ); clinical control group ( $n = 14$ )	The CBT group received a 12-session course of CBT, with sessions twice a week. Each CBT session lasted 45 min. The control group received a 45-min basic counseling twice per week	Both CBT and basic counseling intervention groups demonstrated significantly lower post-treatment score. OGCAS scores	Li et al. [45]

\*NR = not reported; P300 wave is an event-related potential component elicited in decision making process and is recorded by electroencephalogram; P3a is an event-related potential associated with brain activity related to the engagement of attention and the processing of novelty; P3b is an event-related potential used to study cognitive processes; STICA = short-term treatment of internet and computer game addiction; WLC = wait list control; OGCAS = online game cognitive addiction scale; IBD = internet behavior dependence.

\*\*Study one is excluded because CBT intervention is not applied in this case.

**Table 3:** Exhibited outcomes of CBT+medicine intervention for IAD treatment.

Year	Country	Type of study	Recruitment procedure	Intervention techniques	Intervention outcomes	Reference
2010	Greece	Case study	Two 15-year-old boys: Case 1: IAD combined with anxiety; Case 2: IAD combined with depressive disorder	Case 1: A behavioral intervention for anxiety and a CBT program for IAD Case 2: Fluoxetine (30 mg/day) was initiated for depressive disorder, followed by CBT program	Case 1: on-line gaming was limited to 2 hours/day on follow-up; Case 2: with medication, mood was improved and computer usage time fell from 16 to 4 hours/day. This condition was further improved when CBT was applied	Siomos et al. [63]
2012	Korea	Random controlled trial	65 depressed male adolescents with excessive on-line game play were recruited, divided and were randomly assigned to Group A (CBT+Med) $n = 32$ and Group B (Med only) $n = 33$	All participants in Group A and Group B were prescribed bupropion with a fixed dosage of 150 mg/day for 1 week followed by 300 mg/day for 7 weeks. Participants in Group A also received eight-session CBT while participants in Group B had a weekly basic counseling	Young Internet Addiction Scale scores in Group A were reduced compared to those of Group B. The mean anxiety scores in Group A did not change while those in Group B were increased. The mean life satisfaction scores in Group A were increased compared to those of Group B. These results suggested that CBT is better than basic counseling and is more effective when given with the medicine	Kim et al. [39]

\*Med = medicine.

**Table 4:** CBT in combination with counseling intervention for IAD treatment.

Year	Country	Type of study	Recruitment procedure	Intervention techniques	Intervention outcomes	Reference
2011	USA	Case study	A 16-year-old Korean adolescent	Five individual counseling sessions (30 min to 1 h per week) of combined therapy of CBT, behavioral modification and 12-step program	Two months follow up showed improvement in online game addiction. Author suggested that three therapies could be combined to form a treatment model for treating IAD	Lee [43]
2012	The Netherlands	Thematic analysis	Five therapists carried out intervention on 12 IAD addicts recruited from a website called "internet-under-control" ( <a href="http://www.internetondercontrole.nl">www.internetondercontrole.nl</a> )	10 outpatient sessions of combined CBT and MI* based treatment for a duration of 45 min	It was agreed by therapist that CBT+MI can be suitable for treating IAD	van Rooij et al. [65]

\*MI = motivational interviewing.

CBT with motivational interviewing showed that the patients' behavior was improved along with IAD symptoms [65]. This type of treatment is not only suitable for treating addiction but also for improving real-life social relationships. Our observations showed that CBT in combination with basic counseling intervention significantly affects the treatment of IAD so it is possible that basic counseling or similar approaches can be used [45].

In combined treatment of CBT with EA we observed exclusive beneficial outcomes that are deep enough to change the neurotransmitters activities indicating that changes in biochemistry result in altered behavior of a person.

When CBT is used with medicine such as anti-depressant bupropion which is a catecholamine reuptake inhibitor, the treatment seems to be more effective. This

**Table 5:** CBT in combination with EA\* intervention for IAD treatment.

Year	Country	Type of study	Recruitment procedure	Intervention techniques	Intervention outcomes	Reference
2008	China	Random controlled trial	47 IAD patients were recruited from clinics and colleges were randomly divided into Group A: ( $n = 23$ ), CBT-only and Group B: ( $n = 24$ ), CBT + electroacupuncture	Group A was treated with CBT, once every 4 days for 10 sessions in total. Group B was treated with EA once every other day, for 20 sessions, in combination with the same CBT protocol as that in Group A	The total effective rate was 91.3% for Group B and 59.1% in Group A and was obtained from the scores of IAT; whereas the scores from SAS*, HAMA*, and the serum NE* were decreased significantly in both groups indicating that the therapy reduced the anxiety effectively (both $P < .01$ )	Zhu et al. [77]
2009	China	Random controlled trial	47 IAD patients were recruited from clinics and colleges were randomly divided into Group A: ( $n = 23$ ), CBT-only and Group B: ( $n = 24$ ), CBT + electroacupuncture (CBT + EA) group	Group A was treated with CBT, once every 4 days for 10 sessions in total. Group B was treated with EA once every other day, for 20 sessions, in combination with the same CBT as that in Group A	The total effective rate was 91.3% in Group B, better than that (59.1%) in Group A. Post-treatment, all scores (IAD scores, SAS, SDS, SRSHS except HAMA) in Group B, were significantly lower than those in Group A, respectively, with statistical significances ( $P < .05$ )	Zhu et al. [76]
2011	China	Random controlled trial	112 IAD patients were randomly divided into three groups: Group A: ( $n = 39$ ) EA; Group B: ( $n = 36$ ) CBT; and Group C: ( $n = 37$ ) CBT + EA	Group A: EA was applied once every two days, for 20 sessions in total; Group B: CBT was applied once every four days, for 10 sessions in total; Group C: both CBT and EA were applied with similar duration as group A (EA) and group B (CBT). In all three groups EEG was also measured before and after the treatment as to see the changes in the dopamine levels by measuring S11 spectrum	In Group C the results of IAT, VAS, and SAS (all $P < .01$ ) were reduced significantly after treatment; the score of IAT was lower significantly as compared with the other two groups and VAS score was lower in the three groups ( $P < .01$ ). EEG measurements showed decreased S11 spectrum in Group C significantly as compared with that before treatment ( $P < .05$ )	Zhu et al. [78]
2012	China	Random controlled trial	112 IAD patients were randomly divided into: Group A: ( $n = 39$ ) EA; Group B: ( $n = 36$ ) CBT; and Group C: ( $n = 37$ ) CBT + EA	Group A: EA was applied once every 2 days, for 20 sessions in total; Group B: CBT was applied once every 4 days, for 10 sessions in total; Group C: both EA and CBT sessions were applied. All treatments were carried out for 40 days and ERPs and MMN were measured before and after the treatment in all groups	After the treatment the score of IA self-rating scale was lowered significantly in all groups ( $P < .05$ ). Group B (CBT) exhibited further reduced IA score than the other two groups; whereas ERP and MMN measurements showed that EA + CBT could improve the cognitive function of IAD patients	Zhu et al. [79]

\*EA = electroacupuncture; IAT = Internet addiction test; SAS = self-rating anxiety scale; HAMA = Hamilton anxiety scale; NE = nor epinephrine; SDS = self-rating depression scale; SRSHS = self-rating sub-health scale; ERP = event-related potential; MMN = mismatch negativity (a component of the event-related potential to an odd stimulus in a sequence of stimuli); S11 indicates the dopamine levels measured by electroencephalogram; VAS = visual analogue scale; IA = Internet addiction.

approach not only alleviates IAD symptoms but also depression. When the neurotransmitters are regulated by exogenous chemicals then the treatment seems to be more effective [39,63].

During the process of our literature review, we also observed some shortcomings. First, there is no universal definition of IAD [72]; therefore the criteria for recruiting participants cannot be the same. This brought difficulties to compare and generalize results among the studies. Second, some studies need improvements on their sampling method [65]. This led to the bias in the sample, which may not represent the whole population of IAD sufferers. Help-seeking IADs may have some difference from the non-seeking ones in treatment effects [48]. Third, the bias in age and sex groups should be noticed, which may limit the power to generalize the results [23,62]. Fourth, there is no gold standardized assessment method. Validation of such an assessment tool will help to diagnose and prevent IAD cases in their development. Fifth, the evaluation of the therapeutic efficacy is not standardized, which limits the ability of comparison. Sixth, the design of the study can be strengthened. Some studies have no follow-ups [76,77]. Overcoming these issues will not only help researchers in better understanding CBT treatment in IAD but also to appreciate the development and consequences of the pathology.

We have noticed that in the present literature, the studies have vague objectives, lack of a double-blind design, lack of a universal definition of IAD, and no standard diagnostic tools. Therefore, there is a limitation in generalizing the conclusion. However, CBT has demonstrated a hope for IAD treatment, but more high quality research with larger samples, using double-blind case control design is needed. Universal diagnostic criteria need to be carried out to testify the effectiveness of CBT treatment. For further exploration of this field, studies that are more empirical are needed.

## 5. Conclusion

More research is needed as to identify the reasons and major causes for the onset of IAD. We recommend for synchronization of available diagnostic tools as to develop a standard evaluating scale to provide more solid evidence to prove the effectiveness of CBT. We proposed to recruit IAD patients from all age groups, sex, and race from different geographical locations as to have more understanding of the etiology for IAD. Moreover, we suggest developing more psychotherapeutic approaches and drugs for the treatment of IAD. We strongly believe that DSM and ICD should consider IAD as a serious psychiatric disorder with hazardous behavioral and cognitive effects.

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