



Cognitive behavioral intervention in dealing with Internet addiction among Arab teenagers in Israel

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Abstract

The current study examines the effectiveness of a cognitive-behavioral intervention program for improving self-control and reducing Internet addiction among Arab adolescents in Israel. The study sample included 160 students who were 7th to 9th graders, recruited from eight schools in northern Israel. All participants exhibited high scores on a questionnaire indicating elevated symptoms of Internet addiction. Students were randomized to one of two groups: the experimental group underwent a systematic intervention to reduce Internet addiction and the control group met once a week for a group conversation. The experimental group ($n=80$) included 58 boys and 22 girls with an average age of 13.45 ($SD=1.46$). The control group ($n=80$) included 54 boys and 26 girls with an average age of 13.91 ($SD=1.92$). Each intervention consisted of 8 sessions, with the experimental group receiving cognitive-behavioral treatment and the control group having a weekly classroom conversation. The results demonstrated preliminary efficacy for the intervention, as higher levels of self-control were reported among the experimental group ($p<.01$) but not the control group, and this contributed to a reduction in scores on the questionnaire assessing Internet addiction in the experimental group ($p<.01$). The findings suggest that cognitive-behavioral treatments may be a promising avenue for enhancing self-control and reducing symptoms of Internet addiction among this unique student population.

Keywords Cognitive behavioral intervention · Internet addiction · Self-control skills · Arab teenagers in Israel

Internet addiction is an emerging phenomenon of interest to multidisciplinary professionals, including physicians, psychiatrists, psychologists, nurses, addiction researchers, social workers, administrators, teachers, parents and more (Neverkovich et al. 2018). As Internet addiction is a newer empirical construct, the line between normative and pathological use is blurred and the operationalized definition of Internet addiction is inconclusive. Therefore, the idea of intervention programs for Internet addiction is in the nascent stages of development, formulation, and improvement (Zajac et al., 2017). Existing prevention programs for Internet addiction do not focus on the use of the Internet itself but rather

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encourage alternative activities for staring at screens, strengthening parental authority, building a daily schedule for children and adolescents, and providing tools to educators, teachers, and parents for treatment and prevention (Gaysina & Zakirova, 2017).

During the COVID-19 pandemic, the Internet has been a platform to help people stay connected to their proximal and distal environments, continue to study in schools or institutions of higher education, and maintain their vitality. (Elhadi et al., 2021) However, the pandemic has significantly increased Internet usage among people of all ages, which may have accelerated patterns of excessive use and dependence (Lin, 2020; Gupta et al., 2020). In response to COVID-19-related government guidelines and restrictions, such as isolation, social distancing, and school closures, there has been growing concern among parents, educators, and professionals about the hours of continuous screen time (Sun et al, 2020). In fact, the transition from traditional classroom teaching to distance learning from a computerized environment has raised a difficult dilemma for parents regarding whether they should limit children’s screen times and how to do so appropriately (Xiang et al., 2020). Considerations related to this dilemma are that schools require students to be online, teenagers tend to communicate through various apps, the presence of flourishing consumerism and entertainment industries online, and even spending more time online serving as a protective factor for reducing chances of contacting COVID-19 (Bar-Zohar & Josefsberg Ben-Yehoshua, 2021; King et al., 2012).

Internet Addiction

Addiction is a psychological disorder that reflects repeated execution of behavior (e.g., drug use, gambling) that causes an individual clinically significant impairment (e.g., interference in social relationships) or distress (The American Psychiatric Association, 2013).

The current version of the American Psychiatric Association’s Diagnostic Manual of Mental Disorders (DSM-5) does not define Internet addiction as a formal diagnosis but rather as a category of further study associated with impulse control disorder, obsessive–compulsive disorder, and addiction (The American Psychiatric Association, 2013). The DSM-5 text specifies Internet addiction as “a substance-free addiction within the category of Internet addiction, defined as a catalyst for addiction, depending on the nature, desire and desires of addicts: cyber-sexual addiction; relationship addiction; Internet compulsions, obsessive consumption of gambling and online shopping; overload, excessive web browsing times, wandering around the Internet and endless searching for information and computer addiction, details that are completely devoted to the computer” (Poli, 2017; Young, 1998; Young et al., 1999). Kushlev and Dunn (2019) argues that Internet pornography addiction, for example, works on the same conditioning mechanisms as substance-use disorders, since, in both cases, the brain experiences a “thrill,” which motivates repeating the rewarding behavior despite consequences.

Internet addiction has been thought of as a defense mechanism for escaping the problems of reality, which manifest in the intensive consumption of digital tools and problematic online actions. An individual with Internet addiction often prefers the online world, or virtual reality, more than face-to-face social experiences (Malinauskas & Malinauskiene, 2019). Further, while the Internet provides a platform for dispelling negative emotions, such as loneliness, stress, sadness, or anxiety, those with excessive use end up with increased emotional distress as a result (Erol & Cirak, 2019). Internet addicts tend to feel “disconnected from reality” when they are online, which interferes significantly with daily functioning, due to chronic patterns of use and wasted time (Erol & Cirak, 2019). For

instance, excessive Internet users tend not to meet deadlines at work and neglect familial and peer relationships. Without treatment, this situation is likely to be costly because the Internet is becoming increasingly present in Western life, with growing options for how to spend their time alone browsing the Internet, such as video games, chat apps, gambling sites, and pornography (Young, 2011).

Prior studies have focused on identifying the scope of Internet addiction, which helps to illustrate the severity of the problem. International studies have shown that in 2008, about 4.2% of the world's population had elevated symptoms of Internet addiction (Cheng & Li, 2014). In 2013, 6% of individuals in an international sample (Cheng & Li, 2014) and 13.5% of children and adolescents ages 9–18 (Wu et al., 2013) in the USA had indicators of Internet addiction. Thus, this problem appears to be particularly clinically relevant to children and adolescents (Bar-Zohar & Josefsberg Ben _Yehoshua, 2021).

Studies have also observed links between individual characteristics that heighten the risk of developing Internet addiction. For example, it was found that lonely, shy, introverted, insecure, socially anxious, impulsive, mentally unstable, and extroverted people were more likely to become addicted to the Internet (Ballarotto et al., 2018; Błachnio et al. 2019). Persons with Internet addiction are eager to find social and emotional support in online media, avoid competitive activities in real life, and are less likely to make in-person plans with friends (Tonioni et al., 2014). Further interference with social functioning was evidenced in a recent study showing that 95% of smartphone owners admitted to being on mobile devices during social gatherings. Notably, individuals with symptoms of Internet addiction show clinically significant signs of distress when they are unable to get online, such as aggressiveness, impulsivity, and pursuit of thrills (Erol & Cirak, 2019). Further, a recent study demonstrated that exhibiting excessive Internet use for two years worsened comorbid psychological symptoms or conditions, such as loneliness, depression, hyperactivity, ADHD, stress, social anxiety, and hostility (Erol & Cirak, 2019).

Internet Addiction Among Teenagers

Adolescents have long faced pressures and conflicts based on often inconsistent demands and influences of social and family circles. When this discrepancy generates intense tensions, adolescents in modern times are likely to retreat to the Internet, which constitutes a less regulated space without parental or school involvement. In addition to this broad tendency, there are specific individual characteristics that may increase the risk of Internet addiction. Prior studies have identified risk factors as drinking alcohol, drug consumption, experience of stressful events, school distancing, low grades, high-intensity family conflict, low family function, and living in peripheral areas (Boniel-Nissim, 2018). Many studies point to clinical problems related to excessive Internet use. For example, a meta-analysis of 28 studies including 48,090 adolescents found that 6548 (13.62%) were categorized as chronic Internet consumers, which was associated with poor self-esteem, social difficulties, and poor functioning or lack of communication in the family arena (Fumero et al., 2018).

This is particularly important because children and teenagers use the Internet frequently. As early as 2010, it was estimated that 60% of 9- to 16-year-olds across Europe used the Internet on a daily basis, and 59% had a social networking user account. In 2013, this increased to 70% of 14- to 18-year-olds being to social media daily basis and escalated even further in 2018, with 45% of adolescents spending time online “almost all the time” (Anderson & Jiang, 2018; Haddon & Livingstone, 2012; Tsitsika et al., 2014; in: Boniel-Nissim, 2018). Today, teenagers describe messaging apps as the most commons and

effective means of communication with their friends (Anderson & Jiang, 2018; Haddon & Livingstone, 2012; Tsitsika et al., 2014; in: Boniel-Nissim, 2018).

Adolescents are a demographic group that tends to adopt technology more easily and naturally, without the apparent fear and reluctance among higher age groups. This was especially apparent as the smartphones increased individuals' availability and access to information exponentially. Internet leisure activities are also an integral part of adolescents' lives, to a greater degree than older persons. These leisure activities bring adolescents pleasure and provide opportunities for developing a personal identity, establishing social networks, maintaining contact, and receiving peer support with fewer constraints on time and distance (Amichai-Hamburger, 2013; Andreassen & Pallesen, 2014; In: Boniel-Nissim, 2018). However, with more frequent Internet engagement inevitably comes psychosocial problems associated with excessive use. For instance, some adolescents report emotional dependence on the Internet and feel resentful and angry when forced to disconnect (Wolanski, 2020). Theoretical perspectives suggest that the dependence developed by adolescents is fueled by a desire to escape reality, towards a virtual fantasy version of life that distracts from their real-world emotions (Wolanski, 2020).

In the context of COVID-19, the negative consequences of Internet use may be amplified. The stay-at-home orders have provided increasingly extensive access to gadgets and online media, lack of other entertainment resources, dependence on the Internet to communicate with the outside world, and the modeling of parents who use the Internet themselves for long hours (Gupta et al., 2020). It is also known that as addiction begins at a younger age, the greater the chances of causing developmental damage among children and adolescents who have not yet developed their identity and are endowed with limited coping skills (Cheever et al., 2018; In: Boniel-Nissim, 2018). Thus, this time within COVID-19 represents a critical period for investigating trends in excessive Internet use among adolescents, in order to inform interventions that can appropriately reduce risk and improve.

Cognitive-Behavioral Therapy for Internet Addiction

Cognitive behavioral therapy (CBT) is the most evidence-based, transdiagnostic psychotherapy approach (Field et al., 2015) and is based on the premise that thoughts, feelings, and behaviors are interconnected and thus changing one's thoughts can facilitate behavioral change (Malak, 2017). CBT is the most commonly used psychological treatment for Internet addiction and is advantageous because it is less invasive than treatments for other addictive disorders (e.g., inpatient hospitalization or drug-replacement therapy for substance use) (Young, 2013). CBT is considered the most effective method of treatment for reducing Internet use and strengthening self-perception among chronic users (Lam & Lam, 2016), yielding improvements in just 8 weeks, which have been retained over 6 months ((Mihajlov & Vejmelka, 2017). This therapeutic method strives to reshape negative thoughts, help the individual to cast new meanings from routine and problematic actions, and motivate the creation of a more adapted, goal-oriented routine (Rodrigues et al., 2019).

Psychological interventions can help mitigate the severity of Internet addiction while striving for three main objectives: reducing usage hours; increasing functioning in key areas of life, and reducing exposure to content and problematic online operations (Malinauskas & Malinauskiene, 2019). According to Young (2015), CBT consists of three stages. The first is behavior modification, when the individual must begin to develop the ability to control when they are online and offline. During this time, Internet use is permitted, especially for essential needs, such as study and work, and at the same time, the therapist

helps the patient build a schedule packed with other non-Internet-related activities that help reduce pathological use. The second stage is cognitive reconstruction. The goal of this stage is to correct the cognitive conditioning that motivates the individual to initiate Internet use and identify and reverse the triggers for overuse. The third stage focuses on the patient's functional problems associated with their Internet use both personally and professionally, while striving to start seeing a marked improvement that can be maintained long-term.

In adolescents, the key evidence-based CBT strategies for reducing Internet addiction in adolescents are as follows: identifying the benefits and dangers of using the Internet; increased self-awareness, environmental awareness and awareness of others; identifying and understanding the catalysts that lead to compulsive Internet consumption (e.g., disconnection from certain applications, complex emotional state, environmental effects and key events); developing emotional regulation and impulse control in connection with Internet access (e.g., relaxing techniques and relaxing muscles and breathing exercises); acquisition and management of time management strategies; strengthening interpersonal and social communication skills; and investing time in alternative fields of interest, such as art, sports and dance (Cash et al., 2012; Huang et al., 2010; Young, 2017).

CBT programs for the treatment of Internet addiction in adolescents are considered effective in reducing symptoms of addiction to video games in particular and overuse of the Internet in general—especially short term. For instance, one study that followed a short CBT program among 54 9- to 19-year-olds (16.7% were Internet addicts) in Germany found that there was a marked reduction in Internet usage times and the emotional and physical consequences of use (Szasz-Janocha et al., 2020). The improvement began after the four weekly sessions offered by the program and was maintained over the next 12 months (Szasz-Janocha et al., 2020). These programs are especially effective when parents are involved in their adolescent's treatment, given the parents' roles in moderating Internet usage. Typically, parental involvement in CBT interventions can be direct, such as including them in sessions and conversations with their adolescent, or collaborative, such as inviting them to participate in workshops and learning tasks (Ortega-Barón et al. 2019).

Gap in the Literature

Although the aforementioned studies provide support for the utility of CBT for reducing Internet addiction, more research is needed to understand its efficacy among adolescent populations, especially from diverse cultural backgrounds. This need was highlighted in a recent study that examined 30 CBT programs for Internet addiction among adolescents in 2007–2016 years in Asia. It was found that although CBT is considered best suited to treat the phenomenon, it is still difficult to determine its properties and benefits unequivocally for the following reasons: the phenomenon of Internet addiction remains inconsistent in terms of definition, diagnosis, and scalable severity; and it is very difficult to control the development and accelerated dependence on the Internet among teenagers due to social norms (Yukan et al., 2018). Notably, given that Internet addiction is in its nascent stages as an empirical construct, little is known about the long-term effects of CBT for reducing Internet addiction in adolescents, particular cross-culturally (Zajac et al., 2017).

One understudied group in the realm of CBT and Internet addiction is adolescents in Arab society living in Israel. The unique cultural influences of this group may pose a heightened susceptibility to Internet addiction and an opportunity to adapt the

evidence-based CBT tenets to a novel population. In Israel, adolescents' leisure activities heavily involve the Internet. As of 2014, about 32% of 11, 13, and 15-year-olds reported spending 4 h or more every day, which escalated in just 1 year to 46% of 12- to 17-year-olds reporting surfing the Internet for 4 h or more a day in 2015 (Boniel-Nissim, 2018). Lavie-Dinur et al (2020) examined 8181 Israeli students ages 8–14 in 257 schools in a code-drafting program for safe Internet browsing. The researchers they found that Israeli students were aware of the dangers related to Internet use, including shaming and cyberbullying, and even feared them.

The theoretical model that guides the present intervention proposes that adolescents who possess self-skills acquired by the CBT intervention will have improved outcomes, such as problem-solving, thinking positively, distraction, decision-making, and the ability to manage emotions and thoughts. These capacities are vital in the development of adaptive behaviors and coping with risk situations, and these skills have particular relevance to Arab adolescents living in Israel. Israeli-Palestinian adolescents face a weighty challenge to their identity as Israeli-Palestinians in a Jewish country. This dual identity as Israeli/Israeli-Palestinian presents the basic challenge of belonging to the minority population complicated further by the history of the Israeli-Palestinian conflict in the region. Israeli-Palestinian students may experience a more difficult adolescence in which they need to cope with dilemmas pertaining to their sense of belonging and personal identity that are more intense than the expected, normative challenges faced by Jewish and other majority adolescent populations. Israeli-Palestinian adolescents must navigate the tension between being an Israeli-Palestinian in a non-Palestinian country, especially due to the history of conflict between their home country—Israel and other Arab countries. Thus, this represents a particularly important understudied group of individuals who may derive great benefit from this novel CBT intervention for Internet addiction.

Current Study

The objectives of the current study were to adapt an evidence-based CBT for teenagers with Internet addiction and to assess the efficacy of these methods in a novel sample of adolescents in Arab society living in Israel. The present study has two hypotheses.

Study Hypotheses

1. Individuals who receive the CBT intervention will exhibit an improvement in self-control and a decrease in Internet addiction, relative to baseline.
2. Among the control group, there will be no changes in the level of self-control and Internet addiction, relative to baseline.

Methodology

The study sample included 160 students who were 7th to 9th graders, recruited from eight schools in northern Israel over the course of 3 months. During the recruitment period, 1243 individuals were screened for eligibility to enroll the 160 students. Participants were eligible for inclusion if they exhibited high scores on Young's (1998) Internet Addiction Test questionnaire, indicating elevated symptoms of Internet addiction. All participants

attending these eight schools who were in 7th–9th grade and exhibited elevated symptoms of Internet addiction were eligible for the study. Students were randomized using allocation concealment, whereby a random number generator ensured equal assignment to one of two groups and a 50% chance that any participant would receive the experimental intervention. The experimental group underwent a systematic intervention to reduce Internet addiction, and the control group met once a week for a group conversation. The experimental group ($n=80$) included 58 boys and 22 girls with an average age of 13.45 ($SD=1.46$). The control group ($n=80$) included 54 boys and 26 girls with an average age of 13.91 ($SD=1.92$). Each intervention consisted of 12 weekly sessions, with the experimental group receiving cognitive-behavioral treatment and the control group having a weekly classroom conversation. The choice of small groups was made to balance disseminating the therapy efficiently while also optimizing the ability to provide individualized attention and skill development (Bierman, 2007; Eppel, 2007).

Measures

Adolescence Self-Control Scale

The questionnaire was originally developed by Rosenbaum (1980) with the objective of measuring individual differences in self-control. The questionnaire was adapted for children and adolescents by Rosenbaum and Ronen (1991) and includes 32 items expressing different parameters in self-control skills, such as delay of gratification, overcoming pain, planning abilities, use of independent instructions. Each participant was asked to evaluate each of the items on a 6-point Likert scale from 1 (very uncharacteristic of me) to 6 (very characteristic of me). Example questions are as follows: “I frequently find it difficult to overcome my anger on my own” and “I can’t stop thinking about mistakes I committed in the past.” Internal consistency was good among adults and adolescents ($\alpha=0.87$) (Rosenbaum, 1998) and acceptable among children ($\alpha=0.69$). In a previous study of Arab adolescents, internal consistency was good ($\alpha=0.83$) (Agbaria, 2020). In order to test validity and reliability coefficients within the present sample of Arab students in Israel, all the items loaded in factor analyses >0.40 , and the total score had a Cronbach’s alpha of $\alpha=0.81$.

Internet Addiction Questionnaire

The 20-item Internet Addiction Test (IAT) was developed by Young (1998). It measures characteristics and behaviors associated with compulsive use of the Internet that include compulsivity, escapism, and dependency. Questions also assess problems related to personal, occupational, and social functioning stemming from Internet use. Participants respond to each statement on a Likert scale ranging from 1 and 5 to indicate the extent to which they endorse that particular behavior. The IAT conceptualizes Internet addiction as an impulse-control disorder where the term *Internet* refers to all types of online activity. The IAT is the most widely used Internet addiction scale in the world and has been translated into several languages including English, Chinese, French, Italian, Turkish, and Korean. In a previous study of Arab adolescents, internal consistency was good ($\alpha=0.85$) (Agbaria, 2021). In order to test validity and reliability coefficients in the present sample, all the items loaded in factor analyses >0.40 , and the total score had a Cronbach’s alpha of $\alpha=0.82$.

Procedures

After receiving approvals from the Ministry of Education (trial protocol 13,412), there was an appeal to the school administrators to run the program and the research, when the parents were asked to give their consent to the examination of children. Prior to the start of the group meetings, a meeting was held with the parents, during which the parents gave their consent to their children's participation in the program. Students were then asked to fill out the two study questionnaires as a marker of pretest baseline scores before the intervention. Then, students were randomized to either the experimental or control group condition, and the parents of the students of the experimental group again gave their consent to their child to participate in a cognitive-behavioral group.

The experimental groups were led by 16 therapists (two therapists per ten students), consultants, with 5 years of seniority or older, who were trained under the guidance of the groups. The consultants participated in an annual 56-h-a-week course in which they learned about cognitive-behavioral therapy for addictive behaviors, with an emphasis on developing self-control skills. The course's content was as follows: the foundations of cognitive-behavioral intervention, the principles of intervention programs, self-control, problem solving, and alternative thinking in the context of Internet addiction. The training also included actual experience with children and was supported weekly throughout the course. The 16 consultants were randomly divided into eight experimental groups, two consultants per group. At the end of the intervention, the questionnaires were re-submitted in each experimental and control groups to assess the effects of the interventions.

The Intervention Plan

The program included 12 weekly sessions of 1.5 h each, held in schools in the hours after afternoon. Each group meeting began by examining participants' homework from the previous session, then new structured intervention material was introduced, and the groups finished with giving homework for the next session. The sessions included presenting movies, presenting cases, and identifying addictive Internet behaviors. Below are details about the contents of the group meetings:

- Familiarity between the group members, presentation of the program's objectives, and coordination of expectations.
- Identifying addictive Internet behaviors—analyzing behaviors, identifying pre-stimuli triggers, and identifying behavior consequences. The purpose of the meeting was to increase the ability of participants to identify the environmental conditions that trigger their addictive Internet use, the reinforcements preserve these behaviors, and how they respond to the behaviors.
- The relationship between thoughts, behaviors, and emotions—highlighting the cognitive component in the context of behaviors. The purpose of this meeting was to increase understanding of the relationship between problematic thoughts associated with interpreting events that serve as triggers for Internet addictive behaviors. This was achieved through activities and role-playing games.
- Negative thinking and alternative thinking—provided tools for dealing with negative thinking. The purpose of this meeting was to increase participants' understanding of

the negative thinking implications of behavior and to give tools to promote adaptive thinking.

- Developing self-control skills, such as distraction, identifying internal stimuli, delaying gratification, and developing mediated thinking.
- Solving the problems in interpersonal and social communication—this meeting was intended to increase the experience of branching thinking, identify the results of their actions, and reduce the use of uncontrolled automated thinking.
- Methods of relaxation and guided imagination—imparting relaxation methods and guided imagination as way to engage in self-relaxation.
- Stress management, particularly in social settings—providing tools for identifying physical, emotional, and cognitive signals associated with stress, and facilitate adaptive strategies for stress management.
- Choosing adaptive, reinforcing social and educational behaviors—helping students choose positive social behaviors that will earn them symbolic reinforcements, such as “help at home,” “do homework,” and “invite friends.”
- Continuing the issue of choice of positive social and educational behaviors—strengthening skills in identifying unwanted Internet addictive behaviors to reduce.
- Summary and feedback.

Data Analytic Plan

The primary outcomes were assessing changes in the experimental versus control groups in the IAT and self-control questionnaires at the end of the 12 weekly intervention sessions, relative to baseline. The assumptions of normality and equal variances were explored to test the appropriateness of the statistical approach. Independent sample *t*-tests were first conducted to examine pre-intervention differences in the IAT and self-control questionnaire. Then, paired-sample *t*-tests were conducted for the IAT and self-control questionnaires in order to assess significant changes within the experimental and control groups, respectively.

Results

Table 1 details the pre-intervention descriptive statistics for the IAT and self-control questionnaires by group, as well as an independent *t*-test to examine between-group differences. No significant between-group differences were observed.

Table 1 Pre-intervention descriptive statistics and between-group differences

	Experi- mental (<i>n</i> = 80)		Control (<i>n</i> = 80)		<i>T</i>	95% CI	<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Self-control	2.95	0.37	3.03	0.43	0.09	-.21 to .04	.20
Internet addiction	4.23	0.41	4.11	0.50	0.19	-.02 to .26	.26

Next, paired-sample *t*-tests were conducted for participants in the experimental group in order to examine whether the study intervention yielded differences in the IAT and self-control questionnaires. Consistent with the first study hypothesis, Table 2 reveals significant improvements in the self-control score and decreases in Internet addiction.

Then, paired-sample *t*-tests were conducted for participants in the control group in order to examine whether the control intervention (classroom conversation) yielded differences in the IAT and self-control questionnaires. Consistent with the second study hypothesis, Table 3 reveals no significant within-group differences pre- versus post-participation in the control intervention.

Lastly, Table 4 details the post-intervention descriptive statistics for in the IAT and self-control questionnaires by group, as well as an independent *t*-test to examine between-group differences. As expected, given the improvements only observed in the experimental group, there were significant between-group differences between the experimental and control conditions in the IAT and self-control questionnaires.

Discussion

The current study was conducted among 7th–9th graders in Arab middle schools in Israel. The purpose of the current study was to examine the effectiveness of a cognitive-behavioral intervention program to improve self-control and reduce Internet addiction among these

Table 2 Within-group differences pre- and post-intervention period (experimental group)

	Pre-test (<i>n</i> = 80)		Post-test (<i>n</i> = 80)		<i>T</i>	<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Self-control	2.95	0.37	3.77	0.29	**8.23	2.47
Internet addiction	4.23	0.41	2.99	0.24	**11.11	3.69

* *p* < .05, ***p* < .01

Table 3 Within-group differences pre- and post-intervention period (control group)

	Pre-test (<i>n</i> = 80)		Post-test (<i>n</i> = 80)		<i>T</i>	<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Self-control	3.03	0.43	3.07	0.63	0.36	.07
Internet addiction	4.11	0.50	3.99	0.71	0.49	.20

Table 4 Post-intervention descriptive statistics and between-group differences

	Experimental (<i>n</i> = 80)		Control (<i>n</i> = 80)		<i>T</i>	95% <i>CI</i>	<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Self-control	3.77	0.29	3.07	0.63	8.31**	.55 to .85	1.42
Internet addiction	2.99	0.24	3.99	0.71	10.52**	– 1.17 to – .83	1.89

* *p* < .05, ***p* < .01

students. Consistent with study hypotheses, participants in the experimental cognitive-behavioral group exhibited increases in self-control and decreases in Internet addiction, whereas no changes were observed for the control condition.

These findings align with theoretical conceptualizations for why cognitive-behavioral therapy is effective for addictive disorders more broadly, such that self-control of behavior can be improved by addressing the underlying cognitive skills to help control impulses and increase goal-oriented behavior (Huang et al., 2010; Young, 2017). The findings of the current study were also in line with previous findings based on cognitive-behavioral interventions to reduce Internet addiction levels in adolescents (Khazaal et al., 2012; Mihajlov & Vejmelka, 2017; Szasz-Janocha et al., 2020). Thus, these findings reinforce the assumption that training through a cognitive-behavioral program leads to an improvement in the level of self-control and a reduction in Internet addiction among the unique sample of Arab students living in Israel.

Validity for the mechanisms of action in the present intervention can be gleaned from the changes in self-control that were observed only for the experimental group and not for the control group. The intervention directly addressed skills that would enhance self-control, which was hypothesized as a key therapy ingredient for reducing addictive Internet behaviors. This improvement in the level of self-control in students likely contributed to the simultaneous reduction of addiction that was again observed only for the experimental group. This finding can be explained by the intervention program, which focused on imparting skills on how to control internal stimuli, that is, to teach students to be aware of their impulsive and automatic behavior that leads to addiction on negative habits (Lam & Lam, 2016; Rodrigues et al., 2019).

Specific self-control skills used in the present intervention that warrant consideration when replicating this intervention were: identifying negative automatic thoughts, identifying the relationship between external and internal triggers, and recognizing impulsive, automatic behaviors that are not adaptive. Adaptive coping strategies were also emphasized, such as distraction, rejection of immediate gratification, alternative thoughts, healthier lifestyle management, and adequate interpersonal and social communication. Thus, self-control appears to be an essential key to cognitive-behavioral approaches for reducing addictive Internet behaviors in adolescents, including this unique sample of Arab students living in Israel.

Another important characteristic of the intervention that may have directly facilitated change was that the intervention was conducted through small groups. Participants were a fairly homogenous group of seventh- and ninth-graders, who were similar in terms of the intensity and prevalence of their addictive Internet behavior. Dividing participants into small and structured groups had a number of advantages. First, the group is a framework that allows many different opportunities to satisfy basic self-needs due to the multiplicity of interactions within it. Second, in the group, the students are satisfied for the needs of their reflection, since other participants act as “mirrors.” Further, in a small group, all participants are more likely to engage in the process and acquire group skills (Jiang & Vance, 2010).

The current study has several limitations. First, the main focus on cognitive-behavioral therapy was intended to help change cognitive, behavioral, and emotional distortions that underpin the disorder. Because the behavior of the individual is a product of the interpretations, he or she gives to the events he experiences, the cognitive-behavioral approach emphasizes the need of the individual, as well as his ability, to learn and acquire new skills. In the current study, the intervention program consisted of 12 sessions, and it is possible that a greater number of sessions could have contributed more in the training and practice

of the skills learned, thus helping the patient internalize the desired behavior more. A second limitation involves the timing of the intervention, since the intervention took place after school hours. The students may have been more tired after the school day, which could have affected their participation in the sessions, which would limit the benefit from the behavioral activities that occurred in groups. A third limitation is that the study is based on self-reporting questionnaires, which may be biased by reporting error, social desirability, or lack of insight into one's behavior. Additional methods to assess the intervention efficacy would improve the approach of future research, such as behavioral observation and measurements of actual Internet use. Fourth, the current study did not examine individual differences that may have moderated the treatment efficacy, such as an adolescent's level of impulsivity or executive functioning, which warrant explicit attention in subsequent studies in this population. Fifth, the treatment consisted of 12 sessions that represented unique therapeutic agents, which could be isolated in future work to determine which components of a CBT approach are most effective for treating Internet addiction in Arab adolescents living in Israel.

In conclusion, the cognitive-behavioral intervention in the current study focused on imparting self-control skills, which served as a unique therapeutic lever to reduce Internet addiction in Arab students living in Israel. This research may be the basis for many therapeutic applications and studies in the future, such as testing additional variables that affect Internet addiction. In order to examine more comprehensively the effect of intervention in cognitive-behavioral access on Internet addiction, future research can consider increasing the sample size, recruiting a more heterogeneous sample to understand cultural differences in the efficacy of this treatment, and including more qualitative assessments alongside the quantitative outcome measures to better understand the participants' experiences in the treatment.

Declarations

Ethical Approval and Consent to Participate All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee (include name of committee + reference number) and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Conflict of Interest The manuscript has only been submitted to *The International journal of mental health and addiction*; it will not be submitted elsewhere while under consideration, and it has not been published elsewhere—either in similar form or verbatim. I am responsible for the reported research, and all authors have participated in the concept and design, analysis and interpretation of data, and drafting or revising of the manuscript, and I have reviewed/approved the manuscript. There are no conflicts of interest.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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