Cognitive-Behavioral Therapy for Treating Videogame Dependence in School-aged Children

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ABSTRACT: This study examined the effectiveness of cognitive-behaviour therapy on schoolchildren with videogame dependency in a sample of Nigerian schoolchildren. This study was conducted in Enugu metropolis Enugu State Nigeria. A randomized-controlled pretest and posttest design was adopted. Out of 86 schoolchildren that participated in the study, 43 children were exposed to the intervention while 43 did not receive treatment as usual (TAU). The treatment lasted for eight weeks with one session per week. During the study, the participants were assessed at three time points using videogame addiction scale for children. The data collected were statistically analyzed using the multivariate statistical tool. The multivariate statistical result showed that cognitive-behaviour therapy in reducing videogame dependency among schoolchildren. The practice implications, limitations, and conclusions were also drawn in line with the outcome of this study. This study is one among the few studies in Nigeria that have investigated videogame dependency. Another strength is that study tested the participants at three time points to ascertain the impacts of the intervention.

INTRODUCTION

Game dependence is defined by the American Psychological Association (APA) as a pattern of excessive and prolonged Internet gaming that leads to a cluster of cognitive and behavioral symptoms, such as accelerated loss of control over gaming, tolerance, and withdrawal symptoms, similar to those seen in substance use disorders (APA, 2013). The latest videogames have more engaging visual and audio effects, as well as faster event rates that stimulate ongoing play (Ng et al. 2005). This can lead to people spending too much time playing video games. Excessive gaming can also be influenced by motivations and expectations (Haagsma et al., 2013). As a result, some people believe that playing video games too often can lead to behavioral addiction (Griffiths, 2005).

According to Griffiths (1991), there are two types of addiction: primary and secondary. The person is addicted to the activity and enjoys partaking in it in basic addictions. The individual engages in the habit as a way of coping with other underlying issues in secondary addiction. According to Griffiths (2005), primary addictions are more difficult to cure because the person actually enjoys the activity and would not want to give it up freely, whereas secondary addictions are easier to treat because the excessive behavior is a sign of underlying issues. The addictive behavior should reduce if the underlying problem is addressed appropriately.

These include inability to control one's actions and continuing to do so despite negative consequences (Henderson & Fredrickson, 2001), an excessive and compulsive use of videogames that causes social and/or emotional problems and the gamer's inability to control this excessive use

despite these problems (Henderson & Fredrickson, 2001), and an excessive and compulsive use of videogames that causes social and/or emotional problems and the gamer's inability to control this excessive use despite these problems (Henderson & Fredrickson, 2001; Lemmens et al., 2009).

According to the findings, children in Nigeria spend an excessive amount of time on digital technology on a daily basis (Adepetun, 2021). They do this by watching television, playing video games, or going online. On average, a Nigerian child can spend up to three hours every day in front of a screen. In extreme circumstances, some children may spend up to 10 hours or more every day in front of the computer, bordering on addiction. Nigeria was ranked sixth from the bottom of a list of 30 peer countries in the 2020 Child Online Safety Index report, which demonstrated higher levels of disordered use of technology among children in Nigeria. The Nigerian Communications Commission (NCC) conducted the study, which found that digital technology addictions take many forms, including excessive video clip viewing, obsessive video game playing, and uncontrolled browsing and conversing on social media. The survey found that children around the world enjoy watching video content, listening to music, and spending time on social media. It was also stated that Nigerian children spend a significant amount of time on their mobile devices playing already downloaded videogames. According to the findings, WhatsApp is the most popular social networking app among Nigerian children, with 87 percent using it, followed by Facebook with 85 percent and Instagram with 57 percent (Adepetun, 2021). This addicted behaviour has been shown to have relationship with conduct problem. When schoolchildren are victims or offenders in peer-to-peer interactions, such as bullying, revenge porn, self-harm, destructive and violent behaviors like "happy slapping," conduct risk rises to the fore. Radicalism, racism, tribalism, hate speech, and other discriminating materials and imagery are among the others (Adepetun, 2021).

Excessive online game playing has been linked to melancholy, anxiety, aggression, trait anxiety, neuroticism, loss of appetite, sleep disturbances, and physical inactivity in a number of studies (e.g., Anderson & Murphy, 2003). Excessive and compulsive videogame play has also been linked to poor psychosocial well-being (Lemmens et al., 2011), lower daily life satisfaction (Wang et al., 2016), poor academic performance, aggression and narcissism (Gentile et al., 2004). Many studies have found benefits of videogame playing, such as high intrinsic motivation (Chiou & Wan, 2007), enjoyment (Lim & Lee, 2009), educational, social, or therapeutic advantages (Griffiths, 2005), skills enhancement (Gee, 2011), simulation opportunities to explore environments without risk (Aldrich, 2005), and knowledge promotion of computer memory concepts (Griffiths, 2005). One of the most popular pastimes among children is playing video games. They appear to prefer videogames to television because they provide them more power and allow them to participate more actively (Aldrich, 2005). Children aged 2 to 17 in the United States spend an average of 7 hours a week playing video games (Gentile et al., 2011). In diseases and their treatment, cognitions play a critical role. Children with anxiety and mood disorders, for example, report having more dysfunctional and negative beliefs than children without these disorders (Beck 2005). Past studies have recommended cognitive-behavioural techniques for individuals with psychological disturbances (e.g., Ede et al., 2020; Obiweluozo et al., 2021).

The cognitive-behavioral therapy (CBT) approach posits that faulty cognitive processes play a role in the development and persistence of maladaptive behaviors (King et al., 2010). Some studies have employed CBT techniques to assist problem users of the Internet and computer technology (Orzack & Orzack, 1999; Young, 2007). CBT has also been used with moderate to high levels of success in treatment studies for problem gamblers, who – at least conceptually – bear numerous similaritiesto problem video game players (Sylvain et al., 1997; Petry et al., 2006). For instance, Fisher & Griffiths (1995) identified multiple structural similarities between electronic gambling machines and video games (e.g., flashing lights, sound effects, bonuses for skillful play, digital displays of

winning scores, etc.). Griffiths (1991) went as far as to argue that some forms of video game playing (i.e., arcade machines) may be considered a non-financial form of gambling. As in a more recent review on CBT, suggestions to validate past studies owing to methodologic shortcomings, lack of randomization and adequate controls, inconsistencies of assessment, insufficient information on recruitment and samples, and lack of manualized treatments (King et al., 2017). To fill these gaps, this study becomes imperatives. It is also disturbing that to date, there have been very few clinical studies that assess the effectiveness of methods of treating problem video game playing (King et al., 2010). With these issues in minds, the present researchers tested the effect of cognitive behaviour therapy (CBT) on videogame dependence in a sample of Nigerian schoolchildren residing in Enugu state. Given this aim, it was hypothesized that there will be significant impact/effect of the intervention on schoolchildren exposed to treatment group and waitlist control group. Gender is not a significant factor (moderator) when schoolchildren are exposed to treatment (CBT).

METHODS
Design
A randomized-controlled pretest and posttest design was adopted. A randomized-controlled pretest and posttest design is a type of experimental design used in research studies. In this design, participants are randomly assigned to either an experimental group or a control group. The pretest is conducted before the intervention (experimental manipulation) and measures the baseline level of the outcome variable. After the intervention, a posttest is conducted to measure changes in the outcome variable and determine the impact of the intervention. By comparing the pretest and posttest scores of the experimental and control groups, researchers can determine if the intervention had a significant effect on the outcome variable. The use of randomization helps to control for extraneous variables and increases the internal validity of the study.

Ethical Compliance
The approval to conduct this study was obtained from the Faculty of Education, University of Nigeria. The parents of the children gave their informed consent orally when they gathered for the Parents-Teachers Association meeting. All the children whose parents gave their consent were assessed using conditions measures and inclusion criteria.

Dependent Measures
Videogame Addiction Scale for Children (Monacis, Griffiths, Cassibba, Sinatra, & Musso, 2020) is a 24-item self-report measure that assessed the children on videogame addictive levels. The scale (VASC) consists of four factors or dimensions such as impaired self-control (1-6 items), reward/reinforcement (7-15 items), problems (14-17 items), and involvement (18-21 items). The reliability of VASC was reported and ranges from 0.75 to 0.80. Specifically, each of the subscales reliability values was 0.85 for impaired self-control, 0.87 for reward/reinforcement, 0.75 for problems (14-17 items), and 0.75 for involvement (18-21 items). The earlier version of VASC was also reliable (0.89) as in Yilmaz et al. (2017). The VASC was measured on a five-point Likert scale from 1=never to 5=very often. The score is obtained by summing total items (i.e., 21 items) to 105 representing that the higher scores show a greater level of videogame addiction. To confirm the internal consistency, the present researchers trial-tested it using children populations in Nigeria.

The Children's Automatic Thoughts Scale-Negative/Positive (CATS-N/P) (Hogendoorn et al., 2010) is a 50-item self-report measure that assessed the children's negative and positive thoughts. The scale (VASC) has five dimensions such as physical threat, social threat, failure, hostility, positive thoughts, and total negative thoughts. Each subscale consists of 10 items. The reliability of VASC was

reported and ranges from 0.75 to 0.80. Specifically, Alphas were all satisfactory to good (Physical threat .84; Social threat .89; Failure .87; Hostility .83; Positive thoughts .86; and Total negative thoughts .94). The alpha for the Total internalizing negative thoughts scale was .94. The final items of the CATS-N/P were scored on a five-point scale, ranging from ''not at all'' (0) to ''all the time'' (4). Higher scores on the five subscales reflect a higher amount of negative or positive thoughts. The range of each subscale is 0–40. As the Total score of the CATS-N/P represents the extent to which a child has negative thoughts, the positive items are not added to the total score on the CATS-N/P. Therefore, the range of the total score is 0–160. To confirm the internal consistency, the present researchers trial-tested it using children populations in Nigeria.

Participants and Procedure

This study was conducted in Enugu metropolis Enugu State Nigeria. Out of 86 schoolchildren that participated in the study, 56 children were males and 30 were females. They were screened using the dependent measures to identify the baseline of the problem. Besides that, they were assessed for eligibility using inclusion and exclusion criteria. The inclusion criteria were a) must be within the age range of 4 to 12, must have the characteristics of the disorder as specified in the International classification of diseases and DSM-IV, must be permitted by the parents, those between 4 to 12 years, being in the basic level of education, possession of school identification cards, among others. Those that were excluded did not have the permission of their parents, have other disorders-related issues, and unavailable for the study. Thereafter, 43 children were exposed to the intervention while 43 did not received treatment rather they were waitlisted. Kindly see Figure 1 for additional illustration of sample allocation.

The treatment lasted for eight weeks with one session per week. Sessions one to three focused on introduction, familiarization, meaning of game, types of game, examples, and what are thinking each time they playing game. Session four to six focused on videogame, ways to play videogaming, dysfunctional thoughts, how automatic thoughts leads to uncontrollable gaming behaviours, and how to identify excessive videogaming behaviours. Sessions seven and eight addressed how to deal with automatic thought that leads to excessive video game participation, self-help on how to monitor regular videogaming, and termination. During this treatment implementation, cognitive-behavioural techniques were applied, for example, reinforcement, cognitive restructuring, reframing, relapse prevention, motivational enhancement and interviewing, etc. Before, the participants departed from the venue, they completed the Videogame Addiction Scale for Children and Children's Automatic Thoughts Scale-Negative/Positive as second time of assessment. Few weeks later (8 weeks), the researchers sent the two dependent measures through google form links to the parents, requesting them to assist the children to complete the form. This was third time of assessment. After retrieval, the data collated was sent for data analysis.

Data Analysis

The data collected were statistically analyzed the data collected using the crosstabulation (frequency, percentage, chi-square) and inferential (multivariate) statistics to analyze the data collected using this study. Specifically, Analysis of Covariance (ANCOVA) to test the effect and moderators of CBT on videogame dependence.
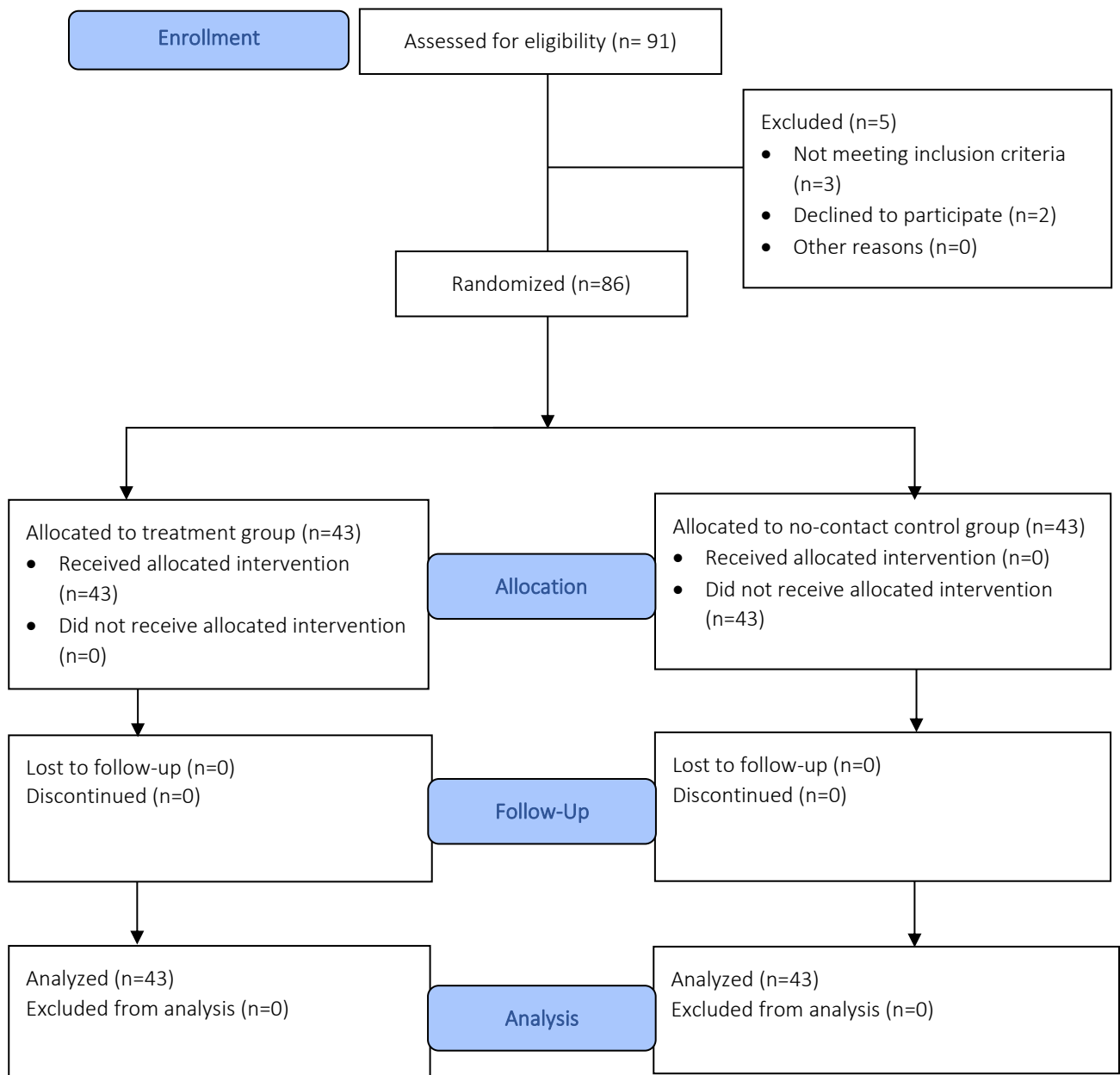
Figure 1. Consort Flow diagram for Participants Allocation

Table1. Demographic Characteristics of the Schoolchildren (Participants)

Characteristics	CBT Group N(%)	Waitlist Control Group N(%)	Statistic (χ^2)	Sig. (p)
Gender				
Male	28(50.0)	28(50.0)	9.001	1.001
Female	15(50.0)	15(50.0)		
Age				
1 to 4Years	4(66.7)	2(33.3)	4.723	0.094
5 to 8Years	18(39.1)	28(60.9)		
9 to 12 Years	21(61.8)	13(38.2)		

Note: n= number of participants, CBT=Cognitive Behaviour Therapy, %=Percentage, χ^2=Chi-square, sig=Associated probability

RESULTS AND DISCUSSION
Results

Table 1 shows that there is no significant difference in the demographic characteristics of schoolchildren (participants) in the CBT group and waitlisted control group. The results show that the CBT group and waitlisted control group has no significant difference with regards to the participants' gender ($\chi2$=9.001, p=1.001); age ($\chi2$=4.723, p=0.094).

During the three evaluation periods, Table 2 compares the treatment outcomes of participants in the CBT with those in the control group (CG). Table 2 shows that there was no significant difference between the treatment and control groups at the baseline evaluation of videogame dependence in participants as determined by VASC, F (1, 85) = 4.959, p=0.029, η_p^2=0.058, ΔR^2=0.274. The intervention had a significant effect on participants' videogame dependence as measured by VASC at the post-treatment level (Time 2), F(1, 85) =632.637, p=.0.001, η_p^2= 0.886, ΔR^2=0.892; and after the post-treatment, a follow-up (Time 3) result still shows that the intervention had a significant effect on participants' videogame dependence as measured by VASC, F(1, 85) =791.233, p=0.001, η_p^2= 0.907, ΔR^2=0.912. At Time 2, F(1, 85) =0.498, p=0.483, η_p^2= 0.006. The findings also demonstrates that there is no interaction impact of therapy and gender (male and female). At Time 2, the videogame dependence had an impact size of 0.886 on the independent variable. This value indicates that the treatment variable had a considerable impact on the participants' ratings of videogame dependency.

Table 2. Multivariate analysis of the effect of the independent variable on dependent variable

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	VASCPretest	896.755[a]	4	224.189	9.034	.000	.308
	VASCPosttest	11610.862[b]	4	2902.716	176.244	.000	.897
	VASCFollowup	12037.333[c]	4	3009.333	222.271	.000	.917
Intercept	VASCPretest	34099.846	1	34099.846	1374.116	.000	.944
	VASCPosttest	27116.744	1	27116.744	1646.442	.000	.953
	VASCFollowup	26914.553	1	26914.553	1987.925	.000	.961
Age	VASCPretest	99.434	1	99.434	4.007	.049	.047
	VASCPosttest	4.158	1	4.158	.252	.617	.003
	VASCFollowup	16.200	1	16.200	1.197	.277	.015
Group	VASCPretest	123.072	1	123.072	4.959	.029	.058
	VASCPosttest	10419.472	1	10419.472	632.637	.000	.886
	VASCFollowup	10712.520	1	10712.520	791.233	.000	.907
Gender	VASCPretest	10.128	1	10.128	.408	.525	.005
	VASCPosttest	291.532	1	291.532	17.701	.000	.179
	VASCFollowup	431.237	1	431.237	31.851	.000	.282
Group * Gender	VASCPretest	508.185	1	508.185	20.478	.000	.202
	VASCPosttest	8.195	1	8.195	.498	.483	.006
	VASCFollowup	7.881	1	7.881	.582	.448	.007
Error	VASCPretest	2010.083	81	24.816			
	VASCPosttest	1334.062	81	16.470			
	VASCFollowup	1096.660	81	13.539			
Total	VASCPretest	624384.344	86				
	VASCPosttest	478666.108	86				
	VASCFollowup	487715.354	86				
Corrected Total	VASCPretest	2906.837	85				
	VASCPosttest	12944.924	85				
	VASCFollowup	13133.994	85				

a) R Squared = .308 (Adjusted R Squared = .274); b) R Squared = .897 (Adjusted R Squared = .892); c) R Squared = .917 (Adjusted R Squared = .912).

Discussion

The aim of this study was to test the effect of cognitive behaviour therapy on videogame dependence among schoolchildren in Enugu State Nigeria. The result revealed that CBT had a significant effect on participants' videogame dependence among schoolchildren in Enugu State Nigeria. The result of the follow-up assessment also showed that the schoolchildren videogame dependence was reduced significantly due to CBT treatment. The therapist can help someone replace thoughts about gaming in order to change behavior patterns. Behavioral interventions will include setting boundaries around gaming and encourage other healthy behaviors (Glowiak & Troy, 2022). The result of the present treatment confirms past study that cognitive behavioral therapy appeared to be an effective treatment for patients with gaming disorder, according to a randomized control trial (Wölfling et al., 2019). Specifically, the active group showed improved self-reported components of gaming disorder, including internet addiction symptoms (effect size 1.19), time spent online (effect size 0.88), and psychosocial functioning (effect size 0.64). There is some debate over its official classification and some clinicians believe that gaming disorders are actually byproducts of underlying conditions like social anxiety (Wölfling et al., 2019).

The treatment outcome of this study is consistent with past study that cognitive behavioral therapy (CBT) has been suggested for the treatment of Internet addiction (IA), addressing dysfunctional cognitions, social and behavioral deficits, motivation to change, and re-establishment of alternative behaviors (King et al., 2012). A preliminary meta-analysis1(Winkler et al 2012) including 16 intervention studies found large effect sizes of CBT on IA symptoms (g = 1.48; 95% CI, 0.84- 2.13). Individual vs group, female, older, and North American participants indicated better treatment responses. In this randomized clinical trial of 143 men, a strong remission rate for internet and computer game addiction was noted with cognitive behavioral therapy in the treatment group vs a wait-list control group. Similarly, cognitive-behavioral therapy (CBT) is rationalized to be a highly appropriate treatment modality for problem and addicted users of video games (King et al., 2010). In line with our findings, King et al. (2010) suggest that CBT for IGD is an effective short-term intervention for reducing IGD and depressive symptoms. However, the effectiveness of CBT for reducing actual time spent gaming was unclear. Given the limitations of this evidence base, there is a need for more rigorous studies to determine the potential long-term benefits of CBT for IGD (Stevens et al., 2019).

Given the rise in treatment demand for internet gaming disorder (IGD) and problematic gaming, it is necessary to determine which treatments are most effective for whom and under which conditions. This review shows that cognitive-behavioural therapy for IGD, which is often considered the first-line therapy, can improve IGD symptoms and comorbid depression (Stevens et al., 2019). However, treatment gains tend to be short-term and their effect in reducing time spent gaming is unclear. Programs that target problematic gaming may be improved by additional support beyond the standard program of therapy sessions. More funding and resources are needed to support the development of a more rigorous evidence base on IGD and its treatment (Stevens et al., 2019). This study also supports Ede et al. (2020) that reported the benefits of CBT in reducing pathological gambling in Nigeria.

Implications

As in other qualitative and quantitative studies, the implications of the present findings are far reaching especially among primary schools, counsellors, parents, and caregivers. This study,

therefore, suggests that these experts should use the assumptions of CBT in helping children who surf internet associated games excessively both home and school. Some of the children may be doing it without knowing the adverse implications. Counsellors and primary school teachers should work with parents who may provide important information that could the professionals to treat and guide such children in their respective schools.

Limitation and Strengths

This study has some methodological flaws that may affect the generalizability of the present findings. Firstly, there was no analysis of the automatic thoughts at pretest, posttest and follow-up assessments. Though the schoolchildren were assessed at pretreatment level, but we should have presented the result as it was shown before determining the baseline according the automatic thoughts scale. Given this reason, we suggest that future researchers in the field of CBT and childhood. Regarding the strengths, this study is one among the few studies in Nigeria that have investigated videogame dependency. Another strength is that study tested the participants at three time points to ascertain the impacts of the intervention.

CONCLUSION

Given the advancement of technology in recent times, people across ages use internet for business, education, banking and entertainment. Children and young adolescents use it to entertain themselves at homes, schools and social environments. However, the alarming rates of engagement and dependence on internet videos, games and other media contents are pervasive and worrisome. This concern brought about this research to investigate how cognitive behaviour therapy could help those population. This study concluded that CBT had a long-term significant effect on male and female schoolchildren's videogame dependence in Enugu State Nigeria. The reduction in videogame dependence implies that helping professionals rooted in psychosocial field could maximize CBT-principles in cushioning the effect of excessive videogaming among young population like schoolchildren.

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AUTHOR CONTRIBUTION STATEMENT

All authors have read and approved the final version of the manuscript.

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