

The Effect of Game Play Intervention on Children with Attention-Deficit Hyperactivity Disorder

Pooja Sengupta^{1*}, Dr. Tilottama Mukherjee²

ABSTRACT

Play helps children not only to express themselves, but also gives them opportunity to resolve their problems. The present research aims to examine the effect of play intervention (game play) on ADHD boys within the age range of 6-12 years. Total 15 participants, including children diagnosed with ADHD children without any active treatment (n=5), ADHD children under medication (n=5) and ADHD children in a waiting list control group to receive intervention later (n=5) were chosen for the research. The pre-post intervention measures were selected and those were- The Connors 3 Short form (Parent report) and Stroop test. The game that had been chosen for play interventions were 'Bubble Breath' and 'Beat the Clock'. The co-morbid disorders were screened out by administering Child Symptom Inventory (CSI) to the parents of ADHD children in all the three groups. The results were calculated in two parts, first, descriptive statistics (Median and Quartile Deviation) and secondly, three types of non-parametric tests. For comparison among pre-post intervention scores of selected measures for each group, Wilcoxin Signed Rank Test was computed. For comparison between three groups of ADHD children, Kruskal-Wallis was computed and subsequently Mann-Whitney U-test was computed where x² value appeared significant. The results of the present research suggested that play intervention was effective in reducing the one of the core symptoms of ADHD children, i.e., 'Inattention' and might also be used as a therapeutic or complementary method of treatment in combination with other treatment modalities.

Keywords: *Play Intervention, Games, ADHD, Complementary Method*

Play is the most fundamental companion of a child. Play does not judge, evaluate and compartmentalize children; it just offers its shades to all the children and hence it is the universal language of children. Play contributes to physical, cognitive, emotional and social development of a child just to name a few. Play helps a child to master a skill as well as to combat personal deficiencies, which eventually contributes to their ego strength, thereby promoting self-esteem and resilience. Children, those devoid of behavioural problems and those with behavioural problems, enjoy playing irrespective of any conditions. Play can easily be given a shape of therapy to reach out to children, especially those with psychological problems. Exactly this has been attempted by many psychologist, educationist, and pediatrician for many years in their own way. Different groups of disorders

¹College Whole Time Teacher, The Bhawanipur Education Society College, Kolkata, West Bengal, India

²Associate Professor, Department of Psychology, University of Calcutta, Kolkata, W.B, India

*Corresponding Author

Received: April 01, 2023; Revision Received: August 16, 2023; Accepted: August 19, 2023

The Effect of Game Play Intervention on Children with Attention-Deficit Hyperactivity Disorder

were targeted to relieve the sufferers and their attachment figures. Among these, one such disorder is Attention-Deficit Hyperactivity Disorder, which is one of the prevalent disorders among children nowadays. According to Diagnostic and Statistical Manual-V (DSM-V), the three main features of ADHD are inattention, impulsivity and hyperactivity. The last two features have been clubbed together in the current manual. To fight with such symptoms, parents often opt for psycho-stimulant medications, which have been found to increase attention while simultaneously decreasing impulsivity and motor activity (Yildiz et al, 2007). However, they always have a doubt about the side-effects of long-term use of such medication and they always look for alternatives such as parent training, behaviour modification, etc. The limitation, inconsistencies and failures of medication and traditional behaviour therapy as a treatment have resulted in new research to develop better ways to treat the ADHD children. Several researches have shown that play therapy is one of the most ideal methods to treat the symptoms of ADHD. One study showed that play therapy has had a positive impact on general behavioural problem's internalizing problems, externalizing behavioural problems, self-concept, self-efficacy, depression, anxiety and treatment compliance (Ray, Sckottelkork & Tsai, 2007). Schaefer et al (2002) proposed fifteen play therapy techniques based on cognitive-behavioural approaches and showed that these techniques decrease severity of hyperactivity and increases attention in children aged 4 to 12 years (Schaefer, 2002). In his studies, Hall et al. used 15 CBT-based play therapy techniques, which were designed to treat and reduce the symptoms of hyperactivity and the attention deficit in children with ADHD aged 4–12 years (Hall et al. 2002). Janatian et al. (2008) also studied the effectiveness of play therapy and found that it significantly reduced the severity of ADHD symptoms. Play therapy also helps to control impulsivity (Panksepp, 2007). Abdollahian E, Mokhber N, Balaghi A, Moharrari F (2013) showed that cognitive-behavioural play therapy appeared to significantly reduce the symptoms of ADHD.

Further research is needed to determine the efficacy of these approaches, with regard to both cognitive and behavioural outcome measures for children with ADHD (Toplak et al. 2008). In the current research, play intervention has thus been chosen with the reflection that treatment should always be suited to children and not be just a replica of adult therapies. One of the arguments in favour of this reflection is that treatment intervention must always ensure child's engagement in the treatment process, which can optimally be achieved by play intervention.

METHODS

Sample

Participants were selected from the Department of Psychology (University of Calcutta) as referred from the government hospitals and private psychiatrists of West Bengal. The participants were all boys and diagnosed as having Attention-Deficit Hyperactivity Disorder. Total 15 ADHD boys within the age range of 6-12 years and of average intelligence were selected for the study. The children in the three groups were matched on the basis of age range, intelligence and sociodemographic background.

Set-up

Children were then equally placed in three groups i.e., 5 children in each group. Children were randomly placed in Group I and Group III and Children in Group II were selected on the basis of their pharmacological criteria. Group I (Treatment Group-1) consisted of ADHD children, who previously received no other intervention and would receive play intervention in the present study. Group II (Treatment Group- 2) consisted of ADHD children, who were receiving only pharmacological intervention (Attentrol/Inspiral and Sizodon for not more

The Effect of Game Play Intervention on Children with Attention-Deficit Hyperactivity Disorder

than 1 year and not less than 6 months with same dosage). Group III (Control Group) consisted of also ADHD children, who previously received no intervention and would serve as a waiting list control group to receive intervention soon in the present study. Each child was seen individually by the researcher and the sessions were conducted in a separate noise-free room in the Department of Psychology, University of Calcutta (UCSTA campus).

Tools Used:

- Socio-demographic details of each case with parental consent were recorded in separate forms.
- Child Symptom Inventory 4 (CSI- 4, Kenneth D. Gadow, Ph.D. and Joyce Sprafkin, Ph.D.)
- CONNORS 3 (Parent Short Form), Conners 3rd Edition, 2013.
- Stroop Test- Colour and Word Test (Children Version for Ages 5-14)-A Manual for Clinical and Experimental Uses, Charles.J. Golden (2003).

Intervention Sessions

Session 1: Written consent was taken from the parents for their children's participation in the research and was narrated about the purpose of the study. Brief history of sociodemographic details and presenting symptoms of each child was then obtained from the parents. Child Symptom Inventory 4 (CSI-4) was then administered on the parents to rule out presence of any co-morbid disorders. Parents of all children were administered Connor 3- Parent Short Form (Conners 3rd edition, 2013) as a pre-intervention measure. In all the three groups' children were administered Stroop test-Colour and Word Test (Children Version for Ages 5-14, Charles.J. Golden, 2003).

Session 2-5: For treatment groups, the first session was followed by play intervention in the next two weeks, when they were intervened twice weekly along with a follow up session in the fourth week. The children of these groups were first exposed to the 'Bubble Breath' game. The children were told, for example, "Today we are going to practice some bubble blowing, because you have to take a slow, deep breath to make a big bubble, and you have to blow the bubble really slowly or it will pop! So, let's practice. Take a slow, deep breath in, hold it for a second, and then slowly blow one bubbles at a time." At the end of this game, the number of bubbles produced successfully by the children was counted. This game was used to target the hyperactivity and impulsivity in the children in a playful and interesting manner. The children were then exposed to the 'Beat the Clock' game. The game was somewhat modified to make it suitable for the present study; however, the essence of the game was kept same. The child was introduced to the activity by saying that, "We are going to play the game Beat the Clock. First, I will give you 10 coins. Here are some blocks. I am going to set the timer for 10 minutes. During that time, you are to build a tower with the blocks and not be distracted by anything around you. If you look up from your activity, you will pay me one coin. Each time you get distracted, ask me a question, or do anything except build the tower you will have to pay me one coin. Do not stop building until I say to stop. If you are able to stay on task for the entire 10 minutes, then I will give you another 10 coins. Again, if you lose coins in one segment of 10 minutes, there are chances that you can get back those coins in the next segment of 10 minutes but only if do not get distracted. After you earn 40 coins, you would earn a gift in exchange of 40 coins." Thus, the children were contracted through tokens. This game was targeted to increase the sustained attention by reducing tendency to get distracted.

The Effect of Game Play Intervention on Children with Attention-Deficit Hyperactivity Disorder

During this intervention period, the control group temporarily served as an untreated comparison group.

Session 6: Parents of children in all the three groups were again administered Connor 3-Parent Short Form and children were administered Stroop test-Colour and Word Test as post-intervention measures. Parents were debriefed about the intervention process and were given a feedback about the performance of their children in the intervention sessions.

Statistical Analysis

The data were statistically analysed. The data were subjected to appropriate statistical analysis using the “Statistical Package for Social Sciences” (S.P.S.S.), Windows Version 20.0. The descriptive statistics used were median and quartile. The non-parametric tests used to analyse the data were—Wilcoxin Signed Rank Test, Kruskal-Wallis One Way ANOVA by Ranks and Mann-Whitney U Test.

RESULTS

The result of the statistical computation accompanied by narration is divided into two sections- Descriptive (Median & Quartile) and Inferential (Wilcoxin Signed Rank Test, Kruskal-Wallis One Way ANOVA by Ranks and Mann-Whitney U Test).

Descriptive Statistics

Median and Quartile deviation of the Pre and Post-intervention scores of the selected measures of the three groups are presented.

Table – I: Median and Quartile deviation of the four measures (pre and post intervention) of the Stroop Test of Group-I, II and III of ADHD children are as follows:

TEST	GROUP-I				GROUP-II				GROUP-III			
	Pre-intervention		Post-intervention		Pre-intervention		Post-intervention		Pre-intervention		Post-intervention	
Stroop test	Median	Q. D.	Median	Q. D.	Median	Q. D.	Median	Q. D.	Median	Q. D.	Median	Q. D.
Word	53	11.75	53	11.75	54	5.5	59	5	50	2.5	53	3.75
Colour	45	6	51	4	54	3.75	58	4	47	1.75	53	4
Word-Colour	49	2.75	50	6.25	43	3	48	4	42	3.25	43	7.25
Interference	47	9.75	51	4.25	59	5.25	61	5.75	53	3.75	53	9.75

The Effect of Game Play Intervention on Children with Attention-Deficit Hyperactivity Disorder

Table –II: Median and Quartile deviation of the six measures (pre and post intervention) of Conners-3 of Group-I, II and III ADHD children are as follows

TEST	GROUP-I				GROUP-II				GROUP-III			
	Pre-intervention		Post-intervention		Pre-intervention		Post-intervention		Pre-intervention		Post-intervention	
	Median	Q. D.	Median	Q. D.	Median	Q. D.	Median	Q. D.	Median	Q. D.	Median	Q. D.
Inattention	85	5	73	8.25	81	8	63	4.25	80	6	82	8.5
Hyperactivity	90	5	84	11.5	85	4	69	7.5	76	5.5	76	5.75
Learning Problems	50	6.25	40	0.5	45	4.75	45	3.75	46	5.5	46	5
Executive Functions	69	8	61	3	53	15	60	8.75	60	7	60	6.5
Aggression	60	6.25	52	8.25	52	6.5	46	8.25	59	11	65	13.25
Peer Relation	46	10.5	46	7.5	46	18.75	46	8.25	45	11.5	46	19.25

Inferential Statistics

For comparison among pre-post intervention scores of selected measures for each group, Wilcoxin Signed Rank Test was computed. For comparison between groups of ADHD children on the measures employed, Kruskal-Wallis was computed. Subsequently Mann-Whitney U-test was computed where χ^2 value appeared significant.

Table III: Asymptotic significance value and the level of significance for pre-post intervention scores of different measures of Group-I are as follows:

Measures	Asymptotic significance	Level of Significance (at 0.05 level)
Stroop Test		
Word	.068	Not Significant
Colour	.345	Not Significant
Word- Colour	.141	Not Significant
Interference	1.00	Not Significant
Conners-3		
Inattention	.102	Not Significant
Hyperactivity	.109	Not Significant
Learning Problems	.066	Not Significant
Executive Function	.068	Not Significant
Aggression	.655	Not Significant
Peer Relations	.317	Not Significant

The Effect of Game Play Intervention on Children with Attention-Deficit Hyperactivity Disorder

Table IV: Asymptotic significance value and the level of significance for pre-post intervention scores of different measures of Group-II are as follows:

Measures	Asymptotic significance	Level of Significance (at 0.05 level)
Stroop Test		
Word	.042	Significant
Colour	.066	Not Significant
Word- Colour	.066	Not Significant
Interference	.180	Not Significant
Conners-3		
Inattention	.042	Significant
Hyperactivity	.042	Significant
Learning Problems	.414	Not Significant
Executive Function	.786	Not Significant
Aggression	.414	Not Significant
Peer Relations	.180	Not Significant

Table V: Asymptotic significance value and the level of significance for pre-post intervention scores of different measures of Group-III are as follows:

Measures	Asymptotic significance	Level of Significance (at 0.05 level)
Stroop Test		
Word	.078	Not Significant
Colour	.136	Not Significant
Word- Colour	.500	Not Significant
Interference	.496	Not Significant
Conners-3		
Inattention	1.00	Not Significant
Hyperactivity	.317	Not Significant
Learning Problems	1.00	Not Significant
Executive Function	.854	Not Significant
Aggression	.593	Not Significant
Peer Relations	.317	Not Significant

Table-VI: Mean Rank and corresponding x^2 values of all the pre-intervention measures among three groups of ADHD children

Measures	GROUP-I	GROUP-II	GROUP-III	x^2 value	Level of Significance (at 0.05 level)
	Mean Rank	Mean Rank	Mean Rank		
Stroop Test					
Word	8.80	8.50	6.70	.651	Not Significant
Colour	6.00	11.00	7.00	3.525	Not Significant
Word- Colour	11.70	7.10	5.20	5.615	Not Significant
Interference	5.60	10.90	7.50	3.624	Not Significant
Conners-3					
Inattention	10.10	6.80	7.10	1.674	Not Significant
Hyperactivity	1.10	8.70	5.20	3.315	Not Significant
Learning Problems	9.70	7.10	7.20	1.099	Not Significant
Executive Function	10.60	7.20	6.20	2.670	Not Significant
Aggression	8.60	6.00	9.40	1.621	Not Significant
Peer Relations	8.00	8.90	7.10	.455	Not Significant

Table-VII: Mean Rank and corresponding x^2 values of all the post-intervention measures among three groups of ADHD children

Measures	GROUP-I	GROUP-II	GROUP-III	x^2 value	Level of Significance (at 0.05 level)
	Mean Rank	Mean Rank	Mean Rank		
Stroop Test					
Word	8.30	9.00	6.70	.704	Not Significant
Colour	5.60	11.50	6.90	4.892	Not Significant
Word- Colour	10.40	7.20	6.40	2.252	Not Significant
Interference	4.80	10.90	8.30	4.744	Not Significant
Conners-3					
Inattention	9.40	3.90	10.70	6.538	Significant
Hyperactivity	9.50	5.30	9.20	2.770	Not Significant
Learning Problems	4.60	8.60	10.80	5.171	Not Significant
Executive Function	9.20	7.40	7.40	.555	Not Significant
Aggression	7.60	5.50	10.90	3.800	Not Significant
Peer Relations	7.70	7.50	8.80	.267	Not Significant

Table-VIII: U values for the significance of difference between the means of any two groups of ADHD children for 'Inattention' domain of Conners-3, administered on parents of ADHD children

Different Group of ADHD children	U Value	Level of Significance (at 0.05 level)
Group-I and Group-II	2.500	Significant
Group-II and Group-III	2.000	Significant
Group-I and Group-III	9.500	Not Significant

DISCUSSION

Researches shows that play therapy is effective across modalities, settings, age and gender, clinical and nonclinical populations, and different schools of thought, however, some factors seems to be more predictive of better treatment outcome than other mode of therapies.

Within Group: When the results were analysed for each group individually, it was found that treatment effect was most effective for second group of ADHD children who were receiving both medication and play intervention. The result indicated treatment effect both on the objective measure as well as symptom reduction as there had been a significant difference between pre and post scores of group-II in terms of 'Word' test (Stroop test) and 'Inattention' and 'Hyperactivity' domain assessed by Connors 3. Further analysis of the data shows that there are improvements in the post-intervention scores of both the objective measures and there had been a reduction in the core symptoms of ADHD in this medication group. Thus, play intervention acted well as an adjunct to the pharmacotherapy. On the other hand, there had been no significant effect of play therapy on ADHD children, from group I, who were receiving only play therapy. DuPaul and Stoner (2003) also claimed that play therapy has "minimal or no established efficacy" for helping children with ADHD. Kronenberger and Meyer (2001) reported that the use of play therapy alone is often not appropriate, unless anxiety, depression, anger, or trauma accompany the ADHD diagnosis. Further results show that on Stroop test the ADHD children scored more in the post intervention measures compared to the pre-intervention measures. Post-intervention

The Effect of Game Play Intervention on Children with Attention-Deficit Hyperactivity Disorder

reporting on Connors-3 showed that the scores had reduced for the core symptoms of ADHD as well as for the associated difficulties like Executive Functions, Aggression and Learning Problems. Thus, from these results, it appears that a reduction of the symptoms of ADHD is associated with the learning of mathematics, reading ability and problem solving; therefore, these variables can all be simultaneously influenced by play therapy (Moore, 2000). Thus, the play intervention though not significantly but seemed to have a positive effect on the attention of ADHD children. There exists no significant difference between pre and post scores of all the measures for ADHD children of Group-III. The result, therefore, indicates that there has been no change in the objective measures as well as symptomatology of the control group as a result of simple passage of time.

Between Group: There exists no significant difference between the three groups on the basis of all the pre-intervention measures in terms of 'Word', 'Colour', 'Word-Colour' and 'Interference' domain of Stroop test and domains of Inattention, Hyperactivity, Learning Problems, Executive Function, Aggression, Peer Relations of Connors 3. The result, therefore, suggests that the three groups are same on the basis of both symptomatology and the objective measures before the initiation of the intervention. Hence, the three groups are comparable to determine the effect of play intervention on the basis of post intervention scores. On the basis of post-intervention measure, results found that there exists a significant difference between the three groups on the post-intervention measure of 'Inattention' domain of Connors 3. Further analysis showed that on Connors 3, the scores on the core symptom of ADHD had reduced in the intervention groups in comparison to the control group. The result, thus obtained, indicates that there has been a decrease in the 'Inattention' symptom of ADHD children compared to the control group of ADHD children. The result is supported by the study of Janatian et al. (2008) who studied the effectiveness of play therapy and found that it significantly reduced the severity of ADHD symptoms. This result indicates that play intervention significantly reduced one of the symptoms of ADHD. This result is in line with the findings of Ebrahim Abdollahian and Naghmeh Mokhber (2012), Barzegary and Zamini (2011) and Jin-Ah Choi (Literature Review of Play Therapy Intervention for Children with ADHD, 2012). Similar findings were seen in the studies of Hall et al. (2002) who used 15 CBT-based play therapy techniques, which were designed to treat and reduce the symptoms of hyperactivity and the attention deficit in children with ADHD aged 4–12 years.

General Observations in the Intervention Process

- Children in the intervention groups were highly motivated to engage in the play activities.
- They remembered all the instructions and recalled them accurately from the second day of intervention till the last day.
- In the bubble breath game, they were motivated to produce one bubble at a time and also to increase the number of bubbles produced at the end of the day.
- Children seemed to have their own self-regulation strategies in order to remain attentive to the task, such as muttering to self, closing eyes, brief pauses.

CONCLUSION

In the light of past and present research and theoretical model, it can be concluded that play is full of meaning and imports purpose, however it depends on the skill of the therapist and researcher to utilize those soft skills of different games and play techniques to benefit

The Effect of Game Play Intervention on Children with Attention-Deficit Hyperactivity Disorder

children with different clinical conditions and rebuild their self-confidence and self-reliance to learn and adjust on their own based on the learning they earned from their play.

“Play is the highest form of Research” – Albert Einstein

REFERENCES

- Abdollahian, E., Mokhber, N., Balaghi, A., & Moharrari, F. (2013). The effectiveness of cognitive-behavioural play therapy on the symptoms of attention-deficit/hyperactivity disorder in children aged 7–9 years. *ADHD Attention Deficit and Hyperactivity Disorders*, 5(1), 41-46.
- Bratton, S. C., Ray, D., Rhine, T., & Jones, L. (2005). The Efficacy of Play Therapy with Children: A Meta-Analytic Review of Treatment Outcomes. *Professional Psychology: Research and Practice*, 36(4), 376.
- Bratton, S., & Ray, D. (2000). What the research shows about play therapy. *International Journal of Play Therapy*, 9(1), 47.
- Choi, J. A. (2012). Literature review of play therapy intervention for children with ADHD. *Journal of the Korean Home Economics Association*, 50(5), 125-138.
- Kaduson, H. G., & Schaefer, C. E. (Eds.). (2012). *Short-term play therapy for children*. Guilford Press.
- Kaduson, H., & Cangelosi, D. M. (Eds.). (1997). *The playing cure: Individualized play therapy for specific childhood problems*. Jason Aronson, Incorporated.
- Kaduson, H., & Schaefer, C. (2010). *101 favorite play therapy techniques (Vol. 3)*. Jason Aronson.
- Kelly-Vance, L., & Ryalls, B. O. (2008). *33 Best Practices in Play Assessment and Intervention*.
- Knell, S. M., & Dasari, M. (2011). Cognitive-behavioral play therapy. *Play in clinical practice: Evidence-based approaches*, 236-263.
- Ray, D. C., Schottelkorb, A., & Tsai, M. H. (2007). Play therapy with children exhibiting symptoms of attention deficit hyperactivity disorder. *International Journal of Play Therapy*, 16(2), 95.
- Ray, D., Bratton, S., Rhine, T., & Jones, L. (2001). The effectiveness of play therapy: Responding to the critics. *International Journal of play therapy*, 10(1), 85.
- Schaefer, C. E. (Ed.). (2011). *Foundations of play therapy*. John Wiley & Sons.
- Schaefer, C. E., & Cangelosi, D. M. (2002). *Play therapy techniques*. Rowman & Littlefield.
- Schaefer, C. E., & Kaduson, H. G. (Eds.). (2007). *Contemporary play therapy: Theory, research, and practice*. Guilford Press.
- Schaefer, C. E., & Reid, S. E. (Eds.). (2004). *Game play: Therapeutic use of childhood games*. John Wiley & Sons.
- World Health Organization. (1992). *The ICD-10 classification of mental and behavioural disorders: clinical descriptions and diagnostic guidelines*. Geneva: World Health Organization.

Acknowledgement

I gratefully express my indebtedness to Dr. Tilottama Mukherjee, Associate Professor, Department of Psychology, University of Calcutta, for her valuable guidance and advice along with support and encouragement throughout the research study. This research work wouldn't have been possible without the cooperation of parents and children through extensive interviews and question answer sessions.

The Effect of Game Play Intervention on Children with Attention-Deficit Hyperactivity Disorder

Conflict of Interest: The authors declare no conflict of interests. No funding was received to assist with the conductance of the study. The manuscript is an original research work and has not been published or is not in under consideration for publication elsewhere.

How to cite this article: Sengupta, P. & Mukherjee, T. (2023). The Effect of Game Play Intervention on Children with Attention-Deficit Hyperactivity Disorder. *International Journal of Indian Psychology*, 11(3), 2407-2416. DIP:18.01.226.20231103, DOI:10.25215/1103.226