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Effectiveness of a Therapeutic Preschool Curriculum based on Applied Behavior Analysis, Sensory Integration and Learning Approaches in Autism Spectrum Disorder

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Place of Research: SOCH, India, Sector 27, Gurgaon

Abstract: ***Objective: The purpose of this study is to investigate the effectiveness of a therapeutic preschool curriculum program in a group setting for children with Autism Spectrum Disorder aged between 18months - 4 years based on applied behavior analysis, sensory integration and learning approaches. Method: The curriculum involving a sample of 12 toddlers was implemented at SOCH Centre every day for one and a half hours for a total duration of 6 months. An ordinal scale "Social skills Checklist (Elementary/Pre-K) was used to evaluate the social engagement and reciprocation skills of the children with ASD. The assessment was conducted at baseline level and post intervention by the therapists conducting the preschool curriculum. The curriculum was selected based on Montessori principles and activities from sensory integration were incorporated. Behavior principles of shaping and prompting were also incorporated. Result: Wilcoxon signed ranked test was applied on pre and post values of the Social Skill Checklist. The entire domain (beginning play behavior, intermediate play behavior, advanced play behavior, understanding emotions, self regulation, flexibility and non verbal skills) have shown significant improvement as p value< 0.05. Conclusion: The preschool curriculum with incorporated therapeutic strategies used as intervention for ASD in a group setting was effective in improving social skills of children.***

Keywords: Autism Spectrum Disorder, Sensory integration, curriculum, preschool, social skills.

1. Introduction

Children with ASDs exhibit qualitative impairments in reciprocal social interaction and in patterns of communication and demonstrate restricted, stereotyped and repetitive repertoires of interests and activities. These characteristics correspond to the triad of social interaction, communication and imagination impairments identified by Wing and Gould in 1979.

Social impairments affect relationships with others and significantly affect the manner in which individuals with ASDs arrive at an understanding of themselves and of the world around them (Jordan, 2005). Children with ASDs will therefore require dynamics of social interactions, the concept of sharing, the capacity to classify and respond to pertinent information, and the modulating of levels of arousal (Jordan, 2005).

The challenge for programs of education for all children ,including those with autistic spectrum disorders (ASDs), lies in providing learning and teaching experiences that enable the children to become socially adapted while simultaneously developing each child' s individual identity and potential.

Communicative impairments are characterized by an absence of meaningful communicative intent, difficulties in interpreting verbal and non-verbal expressions and gestures, confusion with the semantic and pragmatic aspects of language, speech patterns characterized by echolalia, metaphorical language, neologisms, and pronoun reversals (Baron-Cohen and Bolton, 1993; Jordan and Powell, 1995).

Sherratt and Peter (2002) observe that children with ASDs seem to lack the urge to engage spontaneously in playful behavior. An education programme for children with ASDs will need to include structured and purposeful opportunities for them to develop creativity and imagination in order to provide a holistic and child-centered approach to learning and teaching.

1.1 Aims and Objectives of the Study

- To evaluate the effectiveness of therapeutic preschool curriculum program in a group settings on social skills of children with Autism Spectrum Disorder aged between 18 months- 4 years.
- To adapt a therapeutic preschool curriculum program for children based on applied behavior analysis, sensory integration and learning approaches.

1.3 Hypothesis

1.3.1 Null Hypothesis

- There is no significant effect of therapeutic preschool curriculum program in group settings on social skills of children with Autism Spectrum Disorder aged between 18 months- 4 years.

1.3.2 Alternate Hypothesis:

- There is significant effect of therapeutic preschool curriculum program in group settings on social skills of children with Autism Spectrum Disorder aged between 18 months- 4 years.

2. Methodology

2.1 Research Design

Pre and Post research design without control group.

2.2 Participants and Study Setting

Children between the age group of 18 months – 4 years, with autism having social and behavioral difficulties were taken in the preschool curriculum in an inclusive settings. The room was large enough to accommodate the 6 participants in morning session and 6 participants in evening session.

Techniques were incorporated from sensory integration, applied behavior analysis and behavior modification techniques.

2.3 Sampling

Convenient Sampling has been employed to involve the 12 subjects in the therapeutic program.

2.4 Selection criteria

Inclusion Criteria

- Children falling under the age group between 18 months - 4 years
- Children of both genders
- Children with provisional diagnosis of Autism Spectrum Disorder (ASD)

Exclusion Criteria

- Children who had hyperactivity and random activity of limbs which was potentially injurious/unsafe to other participants in the preschool scenario.

2.1.5 Variables

- **Independent**

Preschool- curriculum based intervention

- **Dependent**

1) Social Play and Emotional Development
2) Emotional Regulation
3) Communication Skills as tested by the Social Skill Checklist (Pre K/ Elementary

2.6 Outcome Measures

A rating scale Social Skill (Pre K/ Elementary) was used. It was rated as almost always, often, sometimes and almost always. It has the following three main domains 1) Social Play and Emotional Development, 2) Emotional Regulation and 3) Communication Skills.

The subdomains under the three are 1.1) Beginning Play Behavior, 1.2) Intermediate Play Behavior, 1.3) Advanced Play Behavior; 2.1) Understanding Emotions, 2.2) Self Regulation, 2.3) Flexibility, 2.4) Problem Solving and 3.1) Conversational Skills, 3.2) Nonverbal Conversational Skills, 3.3) Compliments.

2.7 Intervention/Specific Protocol

The therapeutic preschool runs for the time span of one and a half hours targeting at social and self regulation skills such as, developing social relationships and participating and bonding with peers.

3. Flow of Preschool Session and Handling

1) In the curriculum program, the therapist to child ratio w as one to one and each child in the preschool was superv ised and trained individually
2) This approach had variety of naturalistic teaching proce dures, scaffolding different types of cues, verbal and ph ysical prompts to ensure that children receive the necess ary amount of support and assistance.
3) The first segment consists of greeting and addressing th e group participants, by every child to promote the awar eness of the peers in group situation. This practice subst antially contributes the ability of children with autism to learn independent behavior and actively teaching bond within peers.
4) The visual and auditory cues provided by the therapist a nd educator help in increasing engagement during this t ask.
5) The children begin with different basic appealing toys (s oft blocks sensory toys, connecting joining links) to enc ourage play skills during free play time , instilled with c omponents of solitary play, parallel play in the initial w eeks and the progressing to associative play among all g roup members.
6) A classroom routine is a major expectation for toddlers beginning pre-school so there are activities like clean up time, carrying toy box, table for the craft activity and pr eparing and increasing the predictability of events and tr ansition.
7) In order to improve and sustain the quality of the social interaction, the children are taught to interpret behaviora l/ communication with the help of prayer and food time.
8) The classroom had one daily large group activity like a t heme for every day based on pre academic concepts for instance “number identification with picture cards, alph abet recognition like A, B, C with name of fruits and pre paring it into craft .Small group activities are also part o f the program that include cooperative games like music time with bubbles and light time to augment visual and auditory stimulating activity.
9) All the prompts whether verbal or physical or visual like pointing are judiciously used and faded, during the cour se of the program, hence promoting generalization. This is based on ABA principles.
10) Activities that engage the child in physical and kinesthe tic interaction with motor planning and gross motor task s such as crawling, walking making a queue, hitting skit tles, climbing and moving on slides, rocking on rocking -horse.

3.1 Results and Data Analysis

Data Analysis was carried out by Wilcoxon Signed Rank Test

"All the subjects under the study were evaluated at pre-intervention (baseline level) and post –intervention of 3 to 6 months by the therapists with the help of the Social Skill Checklist mentioned in outcome measures on its sub-domains under the three main domains."

3.2 Data Interpretation

Table 1.1: Beginning Play behaviors

		N	*Mean Rank*	*Sum of Ranks*	*Test Statistics*
VAR00002 - VAR00001	Negative Ranks	0[a]	.00	.00	
	Positive Ranks	12[b]	6.50	78.00	
	Ties	0[c]			
	Total	12			
Z					-3.074[b]
Asymp. Sig. (2-tailed)					.002

The sub-domain of "Beginning Play behaviors" has shown significant improvement post intervention as the p value is <0.05.

Table 1.2: Intermediate Play Behaviors

		N	*Mean Rank*	*Sum of Ranks*	*Test Statistics*
VAR00002 - VAR00001	Negative Ranks	0[a]	.00	.00	
	Positive Ranks	12[b]	6.50	78.00	
	Ties	0[c]			
	Total	12			
Z					-3.074[b]
Asymp. Sig. (2-tailed)					.002

The sub-domain of "Intermediate Play behaviors" has shown significant improvement post intervention as the p value is <0.05.

Table 1.3: Advanced Play Behaviors

		N	*Mean Rank*	*Sum of Ranks*	*Test Statistics*
VAR00002 - VAR00001	Negative Ranks	1[a]	2.00	2.00	
	Positive Ranks	6[b]	4.33	26.00	
	Ties	5[c]			
	Total	12			
Z					-2.043[b]
Asymp. Sig. (2-tailed)					.041

The sub-domain of "Advanced Play behaviors" has shown significant improvement post intervention as the p value is <0.05.

Table 2.1: Understanding Emotions

		N	*Mean Rank*	*Sum of Ranks*	*Test Statistics*
VAR00002 - VAR00001	Negative Ranks	0[a]	.00	.00	
	Positive Ranks	11[b]	6.00	66.00	
	Ties	1[c]			
	Total	12			
Z					-2.936[b]
Asymp. Sig. (2-tailed)					.003

The sub-domain of "Understanding Emotions" has shown significant improvement post intervention as the p value is <0.05.

Table 2.2: Self Regulation

		N	*Mean Rank*	*Sum of Ranks*	*Test Statistics*
VAR00002 - VAR00001	Negative Ranks	1[a]	3.00	3.00	
	Positive Ranks	9[b]	5.78	52.00	
	Ties	2[c]			
	Total	12			
Z					-2.520[b]
Asymp. Sig. (2-tailed)					.012

The sub-domain of "Self Regulation" has shown significant improvement post intervention as the p value is <0.05.

Table 2.3: Flexibility

		N	*Mean Rank*	*Sum of Ranks*	*Test Statistics*
VAR00002 - VAR00001	Negative Ranks	0[a]	.00	.00	
	Positive Ranks	8[b]	4.50	36.00	
	Ties	4[c]			
	Total	12			
Z					-2.546[b]
Asymp. Sig. (2-tailed)					.011

The sub-domain of "Flexibility" has shown significant improvement post intervention as the p value is <0.05.

Table 2.4: Non-verbal Conversational Skills

		N	*Mean Rank*	*Sum of Ranks*	*Test Statistics*
VAR00002 - VAR00001	Negative Ranks	2[a]	5.00	10.00	
	Positive Ranks	9[b]	6.22	56.00	
	Ties	1[c]			
	Total	12			
Z					-2.063[b]
Asymp. Sig. (2-tailed)					.039

The sub-domain of "Non-verbal Conversational Skills" has shown significant improvement post intervention as the p value is <0.05.

4. Discussion

The sub-domain of Beginning Play behaviors, Intermediate Play behaviors, Advanced Play behaviors under the domain of Social Play and Emotional Development has shown significant improvement post intervention as the p value is <0.05. It is known fact that play when applied therapeutically can provide an environment of empathy, understanding, project in children the self help skills and benefits such as hand-eye movement, energy conservation, and kinesthetic stimulation during play based activities.

The sub domains of Understanding Emotions, Self Regulation and Flexibility has shown significant improvement post intervention as the p value is <0.05. Thus, comprehensive /early childhood preschool curriculum for autistic kids promotes and establishes foundation for the development of basic emotional regulation skills.

The sub domain of Non-verbal Conversational Skills has shown significant improvement post intervention. This could be attributed as the program considered imitation to be an important dimension in relating to others and a critical tool in learning from others.

Therefore a provision of systematic training in imitating skills by embedding music, rhymes sequence, sharing, physical prompting, along with incorporating use of intraverbals, mands and tacts as part of verbal behavior under ABA in the preschool curriculum.

5. Limitations and Future Scope

This study has a limitation on account of the time duration varying for the subjects under the preschool program as some children dropped out due to personal reasons/ health issues from the group sessions so it may have affected the benefits of preschool curriculum for individual toddler

There have been kids who underwent one on one table top and occupational therapy sessions aiming at their complaints of social and behavioral complaints

The curriculum/ treatment protocol adapted has contributed well in overcoming a bulk of difficulties of the kids in the study but it needs to be validated and made standardized.

Study can also strongly emphasize to modulate the injurious and unsafe behavior of children with autism towards peers by adopting a preschool curriculum resembling to the current study.

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