

Pre and Post Intervention Analysis of Children with Low IQ and ADHD Features

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I. INTRODUCTION

Attention Deficit Hyperactivity Disorder (ADHD) is a disabling externalizing behaviour condition, affecting 1.4 to 6% of children¹. There is an existing evidence that ADHD is more common in children with Intellectual disability and the severity of symptoms increases with increasing severity of Intellectual disability². Studies of children with mild mental retardation, that is Intelligence Quotient (IQ) between 50-69 have identified ADHD in 8%-39% of cases³.

ADHD has been associated with core deficit in executive functioning of inattention⁴. Inattention often negatively affect the academic functioning of children. Thus, children with low IQ may have increased difficulty to cope with academics in presence of comorbid ADHD features. Attention training is an intervention in which various components of attention are viewed as skills that can be enhanced by training⁵. The rationale for attention training is based on the concept that efficiency increases after repetitive practice of specific cognitive operations of attention⁶, theoretically because practice produces adaptations in the underlying neuroanatomical networks linked to these processes⁷. There is a growing literature providing support for attention training in children with low IQ and comorbid ADHD features. Attention training leads to improvement in cognitive skills and academic efficiency⁸. This may lead to better occupational and social functioning in children with intellectual disability.

Apart from academic and behavioural problems, children with low IQ and ADHD features often have significant social problems. They exhibit problems in the area of social interaction and emotional regulation⁹. Social skills training was developed in the early 1970s and its aim is to teach micro skills of social interaction such as eye contact, smiling and body posture. Social skills are described as skills necessary to engage in developing and maintaining constructive social¹⁰. Social skills training in the current study includes behavioural approaches and was conducted within groups.

Thus, the current study attempts to explore the effective management plan for children with low IQ and behavioural and social deficits, with special focus on inattention and hyperactivity. Attention training and social skills training was practically applied through individual and group sessions in the target population.

II. MATERIALS AND METHODS

Aims and objectives: The current study attempts explore the effective management plan for children with low IQ and behavioural and social deficits, with special focus on inattention and hyperactivity.

The objectives of the study are twofold:

1. To assess and compare the effect of attention training in children with low IQ and ADHD, those undergoing pharmacotherapy only and those undergoing pharmacotherapy and psychotherapy conjointly.
2. To assess and compare the effect of social skill training in children with low IQ and ADHD, those undergoing pharmacotherapy only and those undergoing pharmacotherapy and psychotherapy conjointly.

This cross-sectional comparative study was carried out on patients of a private mental health clinic, Caring Minds, Kolkata, West Bengal from August 2016 to October 2016. A total 20 male and female subjects between the ages of 6-14 years were included in this study.

Study Design: Cross-sectional comparative experimental study

Study Location: This was a multi-specialty mental health clinic based in Kolkata, West Bengal.

Study Duration: August 2016 to October 2016.

Sample size: 20 subjects (10 study and 10 control).

Subjects & selection method: Purposive sampling was done for the study group (Children with ADHD features undergoing both pharmacotherapy and psychotherapy) and for the control group (Children with ADHD features undergoing only pharmacotherapy). Participants were taken based on the inclusion and exclusion criteria.

Inclusion criteria:

1. Age- 6-14 years
2. Both genders
3. Full Scale Intelligence Quotient (FSIQ) between 50-70 according to Malin's Intelligence Scale for Indian Children (MISIC)
4. In Conners III Parent's Form, inattention and hyperactivity T-score between 70-90.
5. Middle and upper socio-economic status according to Kuppaswamy's Socio-economic Status Scale
6. No history of separation between parents
7. For both the groups pharmacotherapy is not exposed before and has started at around the same time.

Exclusion criteria:

1. Family history of mental illness in three generations
2. History of any internalising childhood disorder
3. History of chronic physical illness and disability
4. History of known physical or sexual abuse

Tools

The clinical tools which were included in the present study are as follows:

Informed consent was taken from one of the parents or primary caregiver of each participant. Informed consent was obtained using the standard informed consent form laid down by Indian Council of Medical Research (ICMR, 2006), the apex body governing biomedical research in India.

Malin's Intelligence Scale for Indian Children¹¹: this test was developed by Dr. Arthur Malin. It is an Indian adaptation of Wechsler Intelligence Scale for Children and includes 11 subtests. The advantage of Malin's test is that both Hindi and English version of questionnaires are available which have been standardized by Malin himself. Verbal, Performance and Full Scale Intelligence Quotient (I.Q.) are obtained from this test. Full Scale IQ has been considered in the currently study.

Vineland Social Maturity Scale (VSMS)¹² is a psychometric assessment instrument designed to help in the assessment of social competence. It was developed by the American psychologist Edgar Arnold Doll. This test measures social quotient and social age using eight subtests namely communication skills, self help general ability, locomotion skills, occupation skills, self direction, self help eating, self help dressing and socialization skills.

Conner's III Parent's Form¹³, is a multi-informant assessment of children and adolescents between 6 & 18years of age that takes into account home, school and social settings. The Conners III features multiple scales that assess not only ADHD but also related problems in executive function, learning problems, defiance, aggression and peer-family relations. Internal consistency is between .77 to .97, four week test-retest reliability coefficient ranges from .70 to .98 and inter-rater reliability coefficients range from .52 to .94. Convergent and divergent validity is high.

Kuppaswamy's Socio-economic status scale¹⁴: This scale is based on a composite score considering the education and occupation of the head of the family along with monthly income of the family, which yields a score of 3-29. This scale classifies the study participants into high middle and low socio-economic status.

Procedure methodology

For both clinical and control group, the children coming to the clinic were screened through a clinical interview and by administering MISIC and Conner's III Parent's form. Children who scored above 70 in inattention and hyperactivity domains participated in the study. For both the clinical and control group, intelligence quotient (IQ) was assessed using the MISIC and those who obtained a full-scale IQ between 50 and 70 were included in the study. For study group only, 12 sessions each of occupational therapy, attention skills training and social skills training were conducted per week along with pharmacotherapy. Medication was given to control inattention and hyperactivity symptoms in both the groups by the consulting a neuro-psychiatrist. In terms of psychopharmacotherapy, Stimulants was the category of medication chosen for participants under study.

In terms of psychotherapeutic intervention, occupational therapy included physical activity along with sensory integration skills to reduce hyperactivity and restlessness in the children. For occupational therapy, individual sessions were conducted, whereas for attention training and social skills training group sessions were organized. There were five children in each group. Occupational therapy sessions were given as a part of

attention training and to facilitate better cooperation of children. Following psychoeducation, basic parental skills were discussed with primary caregiver of each participant. Attention training tasks included beading, sorting, coded colouring, letter and number cancellations. Further, social skills were improved through behavioural techniques of shaping and chaining for self care tasks. Further, social interaction was improvised through make believe play, cooperative group play and social story telling. Regular home tasks were given to the participants. Each Session lasted for approximately an hour.

Statistical analysis

Data was analyzed using SPSS version 16. The independent t-test was used to ascertain the significance of differences between mean values of two continuous independent variables whereas paired t test was used for pre post analysis of both the groups. The level $P < 0.05$ was considered as the cut-off value or significance.

III. RESULTS

After 12 sessions of intervention, statistical analysis was done. Independent t test was done to observe the significant difference if any, between the two groups following intervention. Paired t test was done within groups to observe significant difference if any before and after intervention.

TABLE 1: Post intervention analysis of control and study group.

VARIABLES	GROUP	MEAN	SD	t	Sig.
INATTENTION	CONTROL	82.50	4.39	0.357	.031*
	STUDY	70.10	3.21		
HYPERACTIVITY	CONTROL	71.20	4.18	1.29	.914
	STUDY	70.10	3.92		
LEARNING PROBLEM	CONTROL	80.10	5.29	2.55	.454
	STUDY	75.25	4.78		
EXECUTIVE FUNCTION	CONTROL	82.10	5.13	1.789	.783
	STUDY	78.50	4.95		
DEFIANCE	CONTROL	73.40	3.98	0.767	.510
	STUDY	69.10	4.20		
PEER RELATION	CONTROL	71.20	5.14	0.579	.822
	STUDY	67.80	4.79		
FAMILY RELATION	CONTROL	70.10	4.23	0.629	.311
	STUDY	66.95	5.12		
SOCIAL QUOTIENT	CONTROL	54.08	2.18	0.000	.500
	STUDY	62.25	1.95		

Results indicated significant difference in the scores of inattention between the two groups. Individuals undergoing both pharmacotherapy and psychotherapy showed significant improvement ($p > .05$).

TABLE 2: Pre-post intervention analysis for control group (only medication)

VARIABLES	CONDITION	MEAN	SD	t	Sig.
INATTENTION	PRE	78.10	3.92	1.714	.091
	POST	82.50	4.39		
HYPERACTIVITY	PRE	88.25	5.10	1.114	.031*
	POST	71.20	4.18		
LEARNING PROBLEM	PRE	83.90	4.57	2.34	.945
	POST	80.10	5.29		
EXECUTIVE FUNCTION	PRE	83.12	5.33	1.876	.791
	POST	82.10	5.13		
DEFIANCE	PRE	76.21	4.82	0.817	.514
	POST	73.40	3.98		
PEER RELATION	PRE	72.11	5.19	0.584	.910
	POST	71.20	5.14		
FAMILY RELATION	PRE	71.12	4.14	0.641	.414
	POST	70.10	4.23		

SOCIAL QUOTIENT	PRE	53.17	3.15	0.217	.871
	POST	54.08	2.18		

Pre post analysis reveals significant improvement in hyperactivity domain with pharmacotherapy only ($p > .05$).

TABLE 3: Pre-post intervention analysis for study group (both medication and therapy)

VARIABLES	CONDITION	MEAN	SD	t	Sig.
INATTENTION	PRE	86.11	5.19	2.15	.024*
	POST	70.10	3.21		
HYPERACTIVITY	PRE	88.52	5.12	1.244	.021*
	POST	70.10	3.92		
LEARNING PROBLEM	PRE	77.89	4.89	2.71	.981
	POST	75.25	4.78		
EXECUTIVE FUNCTION	PRE	84.18	5.41	1.215	.083
	POST	78.50	4.95		
DEFIANCE	PRE	71.32	4.59	0.754	.433
	POST	69.10	4.20		
PEER RELATION	PRE	72.10	4.19	0.673	.714
	POST	67.80	4.79		
FAMILY RELATION	PRE	70.90	3.51	0.874	.358
	POST	66.95	5.12		
SOCIAL QUOTIENT	PRE	55.80	2.86	0.815	.071
	POST	62.25	1.95		

Pre post analysis reveals significant improvement in inattention and hyperactivity domain with pharmacotherapy and psychotherapy conjointly ($p > .05$). With only medication, participants showed improvement in hyperactivity domain but not inattention. There is trend of improvement seen in social skills as reflected from social quotient scores following social skills training (p between .05-.10).

IV. DISCUSSION

Table 1 indicated significant difference in the scores of inattention between the two groups following intervention. Individuals undergoing both pharmacotherapy and psychotherapy showed significant improvement. According to Barkley's neuropsychological model of ADHD, central deficits in ADHD include response inhibition, working memory and motor control¹⁵. In the current study task like sorting, cancellation and beading facilitates improvement in all the three functions which may have led to better results. Further, children received sessions of sensory integration prior to attention training. Many children with ADHD also suffer from sensory processing disorder¹⁶, a neurological underpinning that contributes to their ability to pay attention or focus. Thus, children with ADHD might have difficulty in adjusting to sensory stimulation and may get easily distracted. Sensory integration therapy appeal to three basic senses: tactile system, the vestibular system and the proprioceptive system. This may also have led to better improvement in children undergoing pharmacotherapy and psychotherapy conjointly.

Table 2 and 3 suggested that pre-post analysis reveal significant improvement in more domains for patients who are undergoing pharmacotherapy and psychotherapy conjointly. Psychotherapy in the form of attention training facilitates changes in pre-frontal cortex¹⁷, which enhances attention and reduces impulsivity. Further social skill training was initiated owing to low IQ of the participants. Social skills training was largely based on the principle of shaping and chaining in the current study. Observation method was largely used. The two techniques are based on the principle of reward and law of effect. Research have shown the efficacy of both the principles which can also be implicated in the current study¹⁸.

The present study finding thus yield implications for intervention efforts. It gives an insight into effective psychotherapeutic program for children with low IQ along with features of ADHD. Study has successfully attempted to make a comparison between effectiveness of single intervention program and conjoint intervention program. Further, group psychotherapy is used which tends to be economical in terms of time and money, facilitating easy application.

No study is free from limitations and the current study also has a few short comings. The study consisted of 20 individuals, 10 in each group. However, a larger sample could have yielded more information, thereby enriching the study and increasing generalizability. The study entailed patient from only one clinic, thus leading to problems in generalizability and external validity. Rating Scale was used in the study which

automatically included the self-reporting biases along with the possibility of some faking. Group therapy was done for social skills, which might have overlooked individual concerns.

V. CONCLUSION

There is a significant difference in outcome between the study and the control group. With medication improvement is seen only in the domain of hyperactivity. However, with psychotherapy and medication conjointly improvement is observed in the domains of inattention, hyperactivity and social quotient. Thus, the current study facilitates in formulation of effective psychotherapeutic program to control ADHD features in Mild mental retardation.

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