CHAPTER - V
FINDINGS AND DISCUSSION

5.0.0 INTRODUCTION

The results along with their interpretations have been presented in the previous chapter. From the results, the following findings have emerged. These are being discussed in this chapter and presented under different captions.

5.1.0 FINDINGS

1. Interventions increased the attention span, but did not decrease the deportment in the students with ADHD in the classroom setting, as assessed by the teachers’ ratings.

2. Interventions decreased the inattention, decreased the aggression and increased the peer interaction in students with ADHD in the classroom setting, as assessed by the parents’ ratings.

3. Interventions decreased inattention, decreased impulsivity and reduced hyperactivity in the students with ADHD in the classroom setting, as assessed by the researcher’s ratings.

4. Interventions enhanced the class based performance of students with ADHD in the areas of English reading, English writing, English spelling, math calculation and math application, as assessed by the change in class based grades.

5. Interventions enhanced the academic skills in the areas of word reading, reading comprehension, decoding, spellings, written expression, math calculation and math reasoning in students with ADHD, as assessed by the change in the standard scores on WIAT-II achievement test.

6. A statistical significant assessment was also observed in the academic skills in the areas of word reading, reading comprehension, decoding, spellings, written expression, math calculation and math reasoning of students with ADHD, who were not given any intervention, although the
percent of increase in scores is higher in students who were given the interventions than students who were not given interventions.

7. The interventions were effective in increasing the attention span, decreasing hyperactivity, impulsivity, aggression and peer interaction, but were not effective in decreasing deportment, considering the pre intervention scores as covariate.

8. The interventions were effective in enhancing academic skills and academic performance, considering the pre intervention scores as covariate.

5.2.0 FINDINGS PERTAINING TO CLASSROOM BASED BEHAVIORS

5.2.1 Comparison of Attention Span and Deportment before and after interventions, as assessed by teacher ratings

The first hypothesis postulated that there is a significant difference between the pre and post intervention mean scores of Experimental Group, Control Group1 and Control Group2; and among the three groups in the mean scores at pre and post intervention on teacher rated measure Attention and Deportment. The discussion pertaining to the findings on this hypothesis is given in detail. On analyzing the data related to this hypothesis, it was observed that the interventions were successful in increasing the attention span of the students in the class based setting, as measured by the teacher ratings. Findings also suggest that interventions were not successful in decreasing the deportment in students with ADHD who were given the interventions. This indicates that the students with ADHD showed improvement in overall attention span and academic performance such as staying focused, starting the task in time and finishing it in time, but continued to manifest problems such as maintaining and adhering to the rules of the classroom.
5.2.2 Comparison of Attention Span, Aggression and Peer Interaction before and after interventions, as assessed by parent ratings

The second hypothesis postulated that there is a significant difference between the pre and post intervention mean scores of Experimental Group, Control Group1 and Control Group2; and among the three groups in the mean scores at pre and post intervention on parent rated measure Inattention, Aggression and Peer Interaction. On analyzing the data related to this hypothesis, it was observed that the interventions were successful in increasing the attention span, decreasing the aggression and increasing the peer interaction, of the students with ADHD in the class based setting, as measured by the parent ratings.

5.2.3 Comparison of Attention Span, Impulsivity and Hyperactivity before and after interventions, as assessed by researcher’s ratings

There is a significant difference between the pre and post intervention mean scores of Experimental Group, Control Group1 and Control Group2; and among the three groups in the mean scores at pre and post intervention on researcher rated measure Inattention, Impulsivity and Hyperactivity. Analysis of data related with this hypothesis indicates that the interventions were successful in increasing attention span and decreasing the impulsivity and hyperactivity in the students with ADHD as rated by the researcher.

5.2.4 Discussion pertaining to classroom based behaviors: Combined ratings by parents, teachers and researcher

Findings indicate that all three raters, parent, teacher and researcher observed a significant change in the classroom related attentive and less impulsive behaviors. The current findings are in alignment with the work done by Schulman, Suran, Stevens and Kupst (1979) demonstrated that classroom activity level can be reduced in hyperactive boys using activity feedback and positive reinforcement. In Taiwan, Li, Lin, Chang and Hung (2004) explored the temporal mechanism of attention deficit in children with ADHD and
concluded that training to control blinking (magnitude and time incidents) and thus closing gates of attention can reduce the various academic and attention related impairments in children with ADHD. Current findings are also supported by the work done by Swanson (1992) who concluded that classroom based behavior modification program and small group training program, along with academic and parent training is critical in improving the inattentive and hyperactive behaviors, and thus overall academic performance. Work done by University of California, Irvine, (Swanson, 1992) revealed the similar results that skill training for cognitive and social skills with continuous reinforcement was successful in increasing skills such as cooperation, communication, participation, validation, assertion without aggression etc., and ability to follow rules (raising hand to talk, staying seated, following directions etc.).

The current interventions although were not successful in increasing the students’ ability to follow the rules; non-significant change in deportment. The review by Du Paul and Stoner (2003) also substantiate that behavior therapy has solid scientific evidence demonstrating its effectiveness in treating children with ADHD for inattentive and hyperactive behaviors. In another study Du Paul, Weyandt and Janusis (2011) emphasize that collaborative behavioral interventions, along with modifications to academic instruction, and home-school communication programs are effective in optimizing the school success of students with ADHD. Bray and Kehle (2011) described and supported that effective classroom based interventions include frequent feedback, token reinforcement, contingency contracting and training for self-management, which enhance the compliance behavior in the classroom setting.

5.3.0 FINDINGS PERTAINING TO ACADEMIC SKILLS AND PERFORMANCE

5.3.1 Comparison of class based academic performance in English Reading, Writing, Spelling, Math calculation and Math Application as assessed by class based grades
Hypothesis four postulated that there is a significant difference between the pre and post intervention mean scores of Experimental Group, Control Group1 and Control Group2; and among the three groups in the mean scores at pre and post intervention on the class-based-grades (percent of marks) in English Reading, English Writing, English Spelling, Math Calculation and Math Application. Results indicate that the students with ADHD showed a significant improvement in the academic performance in all the areas, followed by the intervention. Their scores are significantly higher than the students with ADHD who didn’t receive any intervention.

5.3.2 Comparison of academic skill learning in Word Reading, Reading Comprehension, Decoding, Spellings, Written Expression, Math in English Reading, Writing, Spelling, Math Calculation and Math Reasoning as assessed by WIAT-II achievement test

Fifth hypothesis postulated that there is a significant difference between the pre and post intervention mean scores of Experimental Group, Control Group1 and Control Group2; and among the three groups in the mean scores at pre and post intervention on the achievement test WIAT-II in Word Reading, Reading Comprehension, Decoding Skills, Spelling, Written Expression, Math Calculation and Math Reasoning. Finding supported the research hypothesis that interventions enhanced the academic skills in the areas of word reading, reading comprehension, decoding, spellings, written expression, math calculation and math reasoning, in students with ADHD, as assessed by the change in the standard scores on WIAT-II achievement test.

5.3.3. Discussion pertaining to academic skill learning and academic performance

Current findings are in alignment with several previous research findings that multimodal interventions are efficient in improving the academic performance. Swanson (1992) concluded that academic and social-behavioral skill training improved the overall academic and behavioral performance of
children with ADHD. Smith, Waschbuoch, Willoughby and Evans (2000) also observed that children given the training in the areas of note taking, self-monitoring training, functional assessment and behavioral interventions, and family-based interventions demonstrated promising initial results in academic and behavioral domains. A one year pilot study by Evans, Axelrod and Langberg (2004), implementing the school based academic and behavioral intervention program—called as Challenging Horizons Program—also revealed the similar findings that the treatments including educational, social skills and family interventions designed to target school functioning, peer relations, and family functioning, yielded significant effect on measures of inattention and school functioning. Grades and measures of family functioning and peer relations yielded small to moderate effect.

Results of current study are in line with results by Rutherford, Du Paul and Jitendra (2008). To determine the relationship between treatment-induced changes in academic achievement and social skills in elementary school-age children with attention-deficit hyperactivity disorder, they worked with a sample of 123 children in grades 1 through 4 with symptoms of inattention, impulsivity and/or hyperactivity, and significant achievement problems in math or reading. Participants were exposed to academic interventions mediated by their teachers, parents, peers, computers, or the student themselves. Data were collected on academic competence using the Woodcock-Johnson III Test of Achievement and the Academic Competence Evaluation Scales; social skills were assessed using the Social Skills Rating System. Correlations between changes in academic competence and social skills from pre-intervention to approximately 10 months later were calculated. Results showed that as teacher ratings of reading improved, there were corresponding improvements in social skills. For students in peer-mediated math interventions, increases in math fluency were correlated with improvements in self-control.

Current findings are also supported by recommendations by Jitendra, Du Paul, Someki, and Tresco (2008) that specific evidence-based academic
interventions including academic interventions for reading and mathematics, teacher-mediated interventions focusing on basic skills such as phonological awareness in reading, basic skills in mathematics computation and higher-level cognitive skills such as collaborative strategic reading, and schema-based instructions are successful in addressing behavioral and academic impairments.

In a study conducted by Volpe, Du Paul, Jitendra and Tresco (2009), teachers implemented consultation based academic interventions over 15 months, and all children were assessed 1 year following the suspension of treatment. The findings highlighted the need for sustained intervention efforts to ameliorate the educational functioning of children with attention deficit hyperactivity disorder. Similar research by Corkum, McGonnell and Schachar (2010) explored the impact of medication on the academic achievement of 85 children with ADHD employing subjective (parent/teacher ratings) and objective (standardized tests) academic achievement measures, and assessed the impact of in-school academic supports, covariates (baseline performance, IQ, psychosocial adversity) and total use of medication over 12 months. Current findings are also being supported by his results, which highlighted the need for school-based multimodal interventions to improve academic performance in children with ADHD.

Another research by Tresco, Lefler and Power (2010) supports multimodal interventions for the improvement in academic performance in children with ADHD, comprising of classroom based academic and behavioral interventions, non-classroom-school-based interventions, and home based interventions. In a study with 33 students with ADHD for activities related with reading comprehension, Hart, Massetti, Fabiano, Pariseau and Pelham (2011) observed that children with ADHD were more on task during small-group instruction than both whole-group and independent seatwork instructional conditions, and suggested small group training and instructional approach for the academic improvement. Findings of the current study are also supported by the work done by Daley and Birchwood (2010) who suggested a multi-
dimensional intervention program, comprising of peer and parent tutoring, task/instructional modifications, classroom based functional assessment procedures, self-monitoring strategy training and homework-focused interventions. Authors support notion that deficits in executive functioning are the heart of ADHD-related academic underperformance.

5.4.0 FINDINGS PERTAINING TO ADJUSTED MEAN SCORES AT POST INTERVENTION LEVEL FOR ALL CRITERIA

5.4.1 Comparison of mean scores at pre assessment and post assessment level for all criteria considering the respective pre-score as covariate

Hypothesis six stated that there is no significant effect of pre-assessment scores on the post assessment scores, on all criteria (individually) considering the respective pre-score as covariate. Findings indicate that the significant variability in the post assessment mean scores is directly attributed efficiency of the implemented multimodal intervention programme, and is not dependent on the variability in the pre assessment score, as indicated by the results that after adjusting the mean scores of three groups at post intervention level, estimated mean scores of three groups differ significantly; considering the pre intervention scores as covariates. The findings were consistent that interventions were successful and that the pre-assessment scores were not producing the error in determining the efficacy for all the criteria in the behavior and academic domains – including teacher rated attention, parent rated inattention, aggression, peer interaction, researcher rate inattention, impulsivity, and hyperactivity, academic skill learning on word reading, reading comprehension, decoding, spelling, written expression, math calculation, and math reasoning, and academic performance in the areas of English reading, reading comprehension, writing, math calculation and math application. The findings were inconsistent in the area of teacher rated deportment and showed that interventions were not successful. Previous sections of the current chapter provide substantial studies who support that multimodal interventions are effective in improving behavior and academic
performance in the classroom setting (Swanson, 1992; Rutherford, Du Paul & Jitendra, 2008; Daley and Birchwood, 2010; Tresco, Lefler &d Power, 2010; Bray & Kehle, 2011; and Du Paul, Weyandt & Janusis, 2011).

Inefficacy of the current multimodal intervention program can be understood from different perspectives. As a limitation of the study, the criteria of deportment, indicating the difficulty in following rules by the students with ADHD is not directly assessed by the other raters, including the researcher and the parents. The teacher rating may be biased as the expectations are increased when the students receive interventions, and even marginal problems are considered as the considerable problems. The students with ADHD who were given the interventions, did improve significantly on other behavior and academic domain; but were still far behind than the students in Control Group two, i.e. the students without ADHD. At the same time, it should also be noted that children with ADHD need more reminders, reinforcements and training to learn the skill to follow the rules (Kazdin, 2002).

5.5.0 DISCUSSION PERTAINING TO PARENT AND TEACHER TRAINING

5.5.1 Role of Parent and Teacher Training in overall efficacy of multimodal intervention program

An integral part of the current multimodal intervention program was to train the parents and the teachers of the students of Experimental Group, i.e. students with ADHD with interventions. The current interventions are being observed to be successful in all areas but deportment. The finding, that multimodal intervention program is effective in treating behavioral and academic impairments, has been supported by numerous studies(Swanson, 1992; Rutherford, Du Paul & Jitendra, 2008; Daley & Birchwood, 2010; Tresco, Lefler & Power, 2010; Bray & Kehle, 2011; and Du Paul, Weyandt & Janusis, 2011). The current section discusses the importance of role of parent and teacher training.
Nadeem and Jenson (2009) support the teacher training, and concluded that teacher consultation, as well as relationship variable between the teacher and the parent and among the different teachers of student, are important to bring behavioral and academic change in students with ADHD. The findings indicate that the multimodal intervention program was effective in developing the teachers’ knowledge and teaching skill along with building a relationship between the parent and the teacher, which helped in increasing overall attentive behavior in classroom setting. The current findings are also in line with work done by Vereb and DiPerna (2004) who indicated that teacher’s knowledge of ADHD is an important factor in enhancing classroom behavior and academic learning and performance. Study by Jurberg, Palcic and Kelly (2010) supports the role of parent training and teacher training along with collaboration between the parents and teachers in increasing the on-task and attentive behaviors in students with ADHD. They evaluated whether parent involvement is an essential treatment component or whether teacher feedback alone would be sufficient to produce children's behavior changes. The effectiveness of Daily Behavior Report Card with teacher feedback to students and parent delivered consequences (PC) was compared to teacher feedback to students only (no parent delivered consequences, NPC) for increasing appropriate classroom behavior and academic productivity in African American, low income, elementary school children with Attention-Deficit/Hyperactivity Disorder (ADHD). Both treatments led to increase on-task behavior, although PC was superior to NPC.

Regarding the parent involvement and parent training, the current findings are supported by the work done by Coldwell, Pike and Dunn (2006), where they concluded that household chaos and parenting are predictive of children’s problem behavior and parent training is important to enhance the treatment program. Similar results were observed by Mokrova, O’Brien, Calkins and Keane (2010), that home chaos and parental ADHD symptoms translate into ineffective parenting and ADHD features in children and authors
concluded that parent training is an important aspect for bringing positive change in behavioral problems in children with ADHD. Tresco, Lefler and Power (2010) support that families serve a critical role in educational process. Family involvement through the use of homework interventions and problem solving partnerships with teachers adds substantially to the effectiveness of a psychosocial intervention.

5.6.0 CONCLUSION

Overall findings indicate that the current study has been successful in developing and implementing the multimodal intervention program for children with ADHD addressing academic and behavioural performance in the classroom setting. Six months of multimodal interventions through, 72 hourly sessions of direct interventions with 40 children with ADHD, five sessions with teacher and six sessions with the parents yielded significant improvement in the children with ADHD in terms of increasing the attention span, decreasing hyperactivity, impulsivity, aggression and peer interaction, enhancing academic skills and academic performance, in comparison to their peers (with and without ADHD), in two control groups. The current multimodal intervention programme was not effective in decreasing deportment in the classroom setting. The study is important in its nature as it addresses the need of psycho-educational interventions for an increasing population of children with ADHD. It addresses the multifaceted problems in terms of behaviours pertaining to impulsivity, inattention, hyperactivity, and learning of academic skills and overall academic performance. It focuses on different academic areas such as reading, writing and math and is not limited to only reading. It involves students along with parents and teachers, thus builds a base for more comprehensive approach in managing the problems related with ADHD. Study also has far reaching implications for students, parents, teachers, teacher educators and further research as it provides a promising base as an efficient and effective psycho-educational, non-medical, multimodal intervention program.