The Effectiveness of Applied Behavior Analysis Therapy in Children with Autism Spectrum

Sheida Rafiee[1]; Zaynab Khanjani[2]

[1] Graduate Student, Department of Psychology, Islamic Azad University, Tabriz Branch, Iran

[2] Assistant Professor, Faculty Member of Tabriz University, Iran

Email: rrafiee46@gmail.com: zeynabkhanjani@yahoo.com

Abstract

The present research aimed to determine the effectiveness of applied behavior analysis therapy on eye contact enhancement, stereotypical behaviors and reduction of behavioral problems in children with autism spectrum. The statistic population of research were all of children with autism spectrum in Tabriz city during 2015-16 which 40 of them were selected as available samples and were assigned randomly in experimental and control groups. The pre- test was done at first by using GARS (1994) and ASSQ (1993) questionnaires and ABA therapy was performed on experimental group. Researcher`s self-made therapeutic package was used for therapy and both questionnaires were filled again on control and experimental groups as post- tests. Spss software was used to analyze the data and obtained results of Covariance analysis revealed that applied behavior analysis therapy was essentially effective on eye contact and social interaction enhancement and stereotypical and masochistic behaviors reduction.

Keywords: *Autism Disorder; Applied Behavior Analysis Therapy; Eye Contact; Social Interaction; Stereotypes Behaviors; Masochistic Behaviors*

1.   Introduction

Autism is a neurological disorder appearing in the first years of childhood. In this disorder, the brain cannot function well in social behaviors and communicational skills. Consequently, the learning process of how to communicate with others and the social interaction is disturbed (Fombonne and Tidmarsh, 2003). According to American Psychiatric Association, autism disorder is a severe and intrusive impairment in several developmental aspects such as social interaction skills, communicational skills or existence of behavior, interests and stereotyped activities. It is a developmental and neurological disorder that appears in early childhood and is diagnosed by limited social interactions and/or repetitive behaviors (Lam, Aman and Arnold, 2006). Therefore, diagnosis is of outmost importance in early childhood and interventions will have greater effects.

The DSM-5 has reduced the diagnose autism spectrum disorder criteria into two including impaired social interactions and communications (these two are considered a problem) and limited behaviors (Wing, Goud and Gilberg, 2011). Children with autism entail undesirable behaviors such as stereotyped movements, aggression and self-harm behaviors (Vetlion and Deytis, 2007). Most of these behaviors include banging their heads, biting hands, scratching the body and even infecting their blood. They also have problem coordinating their body movements (Dan, Miles and Orer, 2002). Low or high sensitivity to hearing, olfactory, tactile and visual stimuli have also been reported among children with autism (Rogers and Ozonoff, 2005).

Unlike a normal child, an autistic child seems to have serious difficulties interacting with others. They are unable to interpret other people's thoughts and feelings and social signs like a smile, wink or making faces might be meaningless or of little meaning to them.

They refuse to stare at others or stare at them. They are weak in eye contact, although they are aware of the time and place. They also have problems in postures and signs.

Many autistic children might have monotonous stereotyped movements in specific body parts and not having repetitive actions will distress them. They insist on repetitive actions in more details and might have low reactions to pains. Self-injurious actions also can be seen among these children which might be the result of over sensitivity to environmental stimuli.

Over the years, various treatments have been invented by different philosophies to cure autism. The treatments include behavioral interventions, transitional interventions and cognitive-behavioral interventions. Although each intervention is derived from its underlying philosophy, they overlap to a great extent (Corsleau, 2005). Today, many different treatments are used on autistic children such as social stories, applied behavior analysis (ABA), picture exchange communication system (PECS), drug therapy and music therapy (Rafeii, 2011). Applied behavior analysis (ABA) is derived from the conditioning principles of Skinner.

This treatment was presented by Lavas (1987) which came to be known as the applied behavior analysis (ABA). The applied behavior analysis is the basis for intervention that is used to cure individuals suffering from developmental disabilities, especially for autism spectrum (quoted by Dillenburg and Kin, 2009).

In 2007, clinical reports by American Childhood Disorders Association showed the effects of the applied behavior analysis as an intervention in autism spectra. In the reports, children who had received early severe behavioral therapies had significantly increased in IQ, language, performing tutorials and behavioral adaptation and several social behaviors (Meyers and Jonson, 2007).

This method divides each educational objective into its smallest components by the use of ABA such that each part can be easily evaluated and studied and any probable mistakes can be corrected and overcome. The first positive results of ABA were obtained in 1960 and then developed into the current forms (Malot, 2005). ABA is the basis for intervention that is used to cure individuals who suffer from developmental disabilities, especially for autism spectra (Dillenburg and Kin, 2009).

The study conducted by the use of the applied behavior analysis by Cohen, Howard, Emirian, Dickson, Mila, Smith and Tristram in 2009 showed that children under treatment significantly obtain higher scores in IQ and adaptive behavior than the control group. In addition, another study conducted on autistic children (20-32 months old) by the use of early behavioral interventions by Stra Ben Atazak and Disa. e. Zakoor in 2006 showed that children under treatment outperform the control group in learning three developmental areas of acquiring a language, expressive language and game skills.

Many researchers have stated that in case this method is performed accurately and intensely, it will be more effective in autistic children (Green, 2001).

Shingov and Zigel showed that the IQ of the participants had increased after applying the intervention program (Shin Kopoff and Sigul, 1998). In general, the positive outcomes of using ABA have been reported in studies to reduce the problems of autistic children. Lopez, Lincoln, Ozonoff and Lay (2005) studied the relationship between cognitive processes and the limited and repetitive syndromes of autistic disorder. Results of their study showed that some of the executive functions such as working memory, cognitive flexibility and inhibition of response with limited and repetitive syndromes are related to autism disorder, while other executive processes such as planning and fluidity with repetitive and limited syndromes were not correlated.

The study of Luvus (2002) which was conducted on a group of 19 children (experimental group) and compared it with two control groups of one including 20 children and the other one 21 children (all three groups included children at preschool level) for two years under intense working of 40 hours a week. The trainers worked with children individually and results showed that about 40 percent of the experimental group with the IQ of 107 succeeded in entering normal schools, 42 percent of them entered special classes for aphasiac children apart from attaining self-help and general skills and the remaining 11 percent were sent to the retarded classes for autistic children, while in the control group, only 2 percent of the children had managed to enter normal schools, 45 percent entered aphasiac classes and 53 percent were sent to the retarded classes for autistic children.

Another study which followed the study of Luvus was carried out by McEachin, Croxdale and Markley (1993). Results of the study showed that the effects of training in ABA approach are stable. Eight of the 9 children who had succeeded in Luvus study had managed to function totally similar to normal people and continue their studies in public classes and only one of the children needed special classes to continue their studies. On the contrary, none of the children in the control group had managed to enter normal schools.

Intervention programs have to be designed in such a way to facilitate the skills and communications outside the treatment environment of the hospital for autistics and the speech and language pathologies. The families of these children should cooperate and support these children's treatments by presenting family-centered interventions. In fact, the therapists improve the children's skills and social relationships in all environments by taking a multi-aspect approach. They also design treatment programs to improve the communication skills of these patients at school and deliver them to the teachers and assistants. Consequently, when the verbal and social skills improve in children, they show better advancements. They specially have far better social relations at school and cooperate with others (Cable and Weimar, 2016).

Treatment methods for children suffering from autism spectrum disorder: updating behavioral interventions indicate that the interventions have had significant and positive effects on different aspects of social skills, verbal skills and game skills in children suffering from autism spectrum disorder such that the level of disorders at each of the aforementioned aspects is reduced significantly (Moasser, 2014).
In a meta-analysis study, it was found that ABA influences non-verbal intelligence, expressive and perceptive language and adaptive behavior (Peters, Schafer, Diden, Kozilius and Starami, 2011).

The two meta-analysis studies of Eldevik, Hastings, Hughes, Jahr, Eikeseth and Cross (2009) and Reinchow and Wolery (2009) showed that the ABA intervention method have been effective on IQ changes and adaptive behaviors. However, no comprehensive studies have been carried out on the effectiveness of ABA method on symptoms of these children like eye contact, while clinical experiences indicate an increase in the number of autism diagnosis in recent years (Armaghan, 2013). This requires

more attention to identify the causes of this disorder. For reasons of hard work with autistic children, difficulty in having access to them and lack of cooperation on the families of these children, researchers are not willing enough to study this disorder. On the other hand, few studies have been carried out in different countries due to inabilities and problems in development of communicational, interaction, verbal and cognitive skills. Therefore, considering the significance and necessity of the program, the present study attempts to increase the eye contact and reduce stereotyped behaviors and behavioral problems of autistic children with the aim of studying the effectiveness of treatments based on applied behavior analysis.

2.   Methodology

This is a semi-experimental study including pretests and post tests on control and experimental groups.

2.1. Statistical Population:

The statistical population of the present study includes all children suffering from the autism spectrum disorder in Tabriz City in 2015-2016.

2.2. Sampling and Statistical Samples:

The subjects in this study were selected from among autistic children in Tabriz City who were selected by convenience sampling method. Hence, 40 of the children suffering from autism spectrum disorder in Pouyesh and Hasti centers who were previously diagnosed by physicians to be autistic were selected conveniently and then divided randomly in control and experimental groups.

2.3. Data Collection:

GARS and ASSQ questionnaires were used for data collection. The former used to evaluate stereotyped behaviors and problems related to social interactions among children and later used to measure the level of eye contact and self-injurious behaviors. The treatment was also accompanies by the researcher-made ABA package. These tools will be described in the following

2.4. Research Tools:

2.4.1.   GARS Scale

This scale is a check list that helps diagnose autistic people. This scale was used in this research method to evaluate stereotyped behaviors and problems related to children's social interactions. This scale was standardized in 1994. GARS is appropriate for individuals of 3 to 22 years old and can be filled in by parents and specialists at schools or home. GARS includes four subscales.

The first subscale: stereotyped behaviors that include items 1 to 14.

The second subscale: establishing communications that includes items 15 to 28.

The thirds subscale: social interactions that include items 29 to 41.

The fourth subscale: developmental disorders that include items 42 to 56.

In the present research, items 1-14 have been used to measure stereotyped behaviors and items 29-41 have been used to test the problems related to the children's social interactions.

The scoring of the test follows Likert spectrum including the scores never=0, rarely=1, sometimes=2 and often=3. Scoring of the subscales of social interactions is vice versa and they were recoded. The higher the score is, the higher the stereotyped behavior is and the higher social interaction is between the children.

The studies conducted show an alpha coefficient of 90.0 for stereotyped behaviors, 89.0 for communications, 93.0 for social interactions, 88.0 for developmental disorders and 96.0 for autism symptoms. GARS is the only test that not only reports on the reliability of the method of test-retest, but more importantly, includes the reliability among scorers.

This test was credited in Iran by Ahmadi et al. (Ahmadi and Shahi, 2010). This test which was carried out on 100 autistic people in Isfahan showed that the reliability of the test based on Cronbach's Alpha for stereotyped behavior, establishing communications, social interactions and developmental issues subscales was 74.0, 92.0, 73.0 and 80.0 and 89.0 in total. The concurrent validity of this test with CARS test was measured and the correlation coefficient for stereotyped behavior, establishing communications, social interactions and developmental issues on GARS test was 84.0, 63.0, 48.0 and 54.0, respectively and the correlation coefficient of GARS test and CARS was 80.0 in total. The sensitivity of GARS scale was 99 percent and its specificity was estimated to be 100 percent. The cutoff point was also 52 (quoted by Nasoudi, 2010).

2.4.2. ASSQ

ASSQ was designed by Ehlers and Gilberg (1993). This questionnaire was used in this study to test the eye contact and self-injurious behaviors. This test contains 44 items that can be filled in by the parents or teachers. Scores of 0-4 are considered for each item and the total score of each person determines if he/she suffers from high functioning autism spectrum disorder. When the questionnaire is completed, the scores are added up and the children whose total score is 22 (if completed by teachers) and 19 (if completed by parents) will be selected as autistic children. This questionnaire consists of three subscales:

In the present study, items 1-15 of eye contact and items 30-44 of self-injurious behaviors in children were tested.

Likert scale was used to score the test: none=0, very little=1, little=2, average=3 and severe=4. Scoring the eye contact subscale (the first subscale) is vice versa.
The higher the score is, the more the eye contact is and the higher the self-injurious behaviors will be among the children.

This questionnaire was standardized in 2011 by Kasechi at the University of Biosciences. The Cronbach's Alpha of ASSQ were estimated for normal children's parents (77.0), autism spectrum children's parents (65.0), normal children's teachers (81.0) and autistic children's teachers (70.0) and the reliability coefficient of ASSQ was also estimated for autistic children in parents' group (r=467.0) and teachers' group (r=614.0). In order to estimate the convergence validity of ASSQ, its correlation with the two rater questionnaires of CSI-4 was calculated. The correlation coefficient of ASSQ in parents' group and rater was 715.0 and it was 486.0 in parents' group of ASSQ and CSI-4. It was 495.0 in teachers' group of ASSQ and rater and 411.0 in teachers' group of ASSQ and CSI-4. There was a significant positive relationship between the scores of parents and autistic children in ASSQ. The obtained

Cronbach's alpha was appropriate for normal children's teachers' group and high functioning autistic children (Kasechi; quoted by Barzegar, Nejati and Pouretemad, 2014).

The reliability of the questions in both questionnaires was evaluated by the researcher such that40 autistic children were used to calculate the Cronbach's alpha and the alpha value of each of the subscales are as follows: eye contact (94.0), self-injurious behaviors (91.0), stereotyped behaviors (92.0) and social interactions (94.0).

3. *Data Analysis*

Finally, after the carrying out the necessary prerequisites, the parametric analysis of covariance (ANCOVA) was used to test the relationships between the variables.

ABA Treatment Package
This is a researcher-made treatment package whose main source is the book "training children with intellectual disabilities" by Luvus (1987). In the treatment presented in this study, 20 treatment sessions, each session lasting about 50 minutes were selected and performed according to Otzak and Zakoor (2006).

Sessions One to Three:
Objective: guiding and maintaining the child's attention and increasing the eye contact
This part of the plan consists of two steps:

1. The child is taught how to pay visual attention to our face (making eye contact).

2. It includes general methods to teach basic behaviors to the child such as having visual attention to the objects in the environment you guide the child's attention to.

"Look at me"
The phrase "look at me" is used to make eye contact. Before this process, it should be made sure that the child has well learned how to sit down and pay attention.
Step 1: sit the child on a chair in front of you.
Step 2: command the child "look at me" every 5 or 10 second.
Step 3: encourage the child by food or reward when he/she is looking at you with attention and performs the order.
Step 4: command the child "look at me" in case he/she looks at you in an interval of 2 seconds. Look aside for 5 seconds and then command again.

Session Four:
Objective: one other objective of the treatment is to motivate children to make and increase eye contact
Step 5: some children do not look at you at the command "Look at me". Hence, the response needs to be motivated. You can make the eye contact by keeping the treat on a direct line between your eyes and the child's eyes and command him/her at the same time. Therefore, you need to repeat the command and present the motivational items at the same time (move the treat towards the child's eyes and adjust your eyes).

Session Five:
Objective: gradually reducing external incentives o make eye contact

Step 6: when a 2 second eye contact is made after 10 consecutive commands, gradually and systematically make the incentives by hiding them in your hands or reducing hand movements in consecutive commands.

Step 7: gradually delay in giving the treat and reward to the child to increase the duration of the eye contact.

Session Six:
Objective: expanding and guiding the eye contact to different situations
When the child has learned to look at you while sitting on a chair, ask him/her to look at you while he/she is standing and then do it in other rooms, etc. Then give him/her rewards for it. Encourage the child to make long eye contacts. Start by 1 second and gradually increase it to 2 or 3 seconds and more and reward him/her.

Session Seven:
Objective: repeating the previous session to stabilize the eye contact
There are three major strategies regarding social interactions and increasing desirable behaviors among the developmentally retarded children.

1. The strategy of teacher or therapist's direct reward
2. The strategy of rewarding the peer group
3. The strategy of rewarding the peers. The teacher selects the child that he notices is socially able and asks him/her to be a model of making social communications for the developmentally retarded children and the teacher helps him/her.

Session Eight:
Objective: making social interactions
Peripheral objective: keeping others' company, saying their name and hello
Step 1: the issue is about the desirable behaviors that do not exist in the autistic children's treasury of behaviors, which are better to be created in them. Sitting beside them and approaching them such that they can be touched and coddled. Each and every part of these steps needs to be followed.

Session Nine:
Objective: increasing social interactions
Peripheral objective: saying their name and hello
This is the rest of the previous session.
Step 2:
Step Two: during this session, after sitting beside the child, approaching him/her and making eye contact with him/her, we approach our hand as a sign of hello and say hello.
You can ask the child's classmates to do this step, too and stand beside the other person to get to know him/her and learn the etiquettes. The classmate says hello, reaching his/her hand to shake his/her classmate's hand.

Session Ten:
Main objective: making verbal communications in social interactions
Step 3: at this step, the child should say his/her name and ask his/her friend's name and use appropriate postures like smiling.

Session Eleven:
Objective: increasing verbal communications in social interactions with peers
Step 4: at this step, apart from saying his/her name, the child should be able to ask his/her friend's name such that as he/she stood in front of his/her classmate and said his/her name, he/she should begin asking his/her classmate's name in a similar way and ask "What is your name?". The teacher will reward every appropriate move of the child to achieve the final behavior.

Session Twelve:
Objective: increasing social interactions through playing games and observing turns
Step 5: at this step, the child learns how to play and observe turns while playing.

Session Thirteen:
Objective: repeating the previous session to increase verbal communication in social interactions

Session Fourteen:
Objective: increasing social interactions through exchanging toys and food, etc.
Step 6: playing around and with his/her toys, the child learns to offer them to his/her friends.

Session Fifteen:
Objective: increasing social interactions through expressing the needs and demands and listening to others
Step 7: listen to other people and respond appropriately to their demands.
A command is given to the child to receive an appropriate response; e.g. "Give me the book". Before the child finds the opportunity to make a mistake, show him/her the action of giving the book and encourage him/her. This step is repeated several times until the final behavior is achieved, that is, the child gives you the book as soon as he/she hears the command "Give me the book".

Session Sixteen:
Objective: social interactions through responding to simple needs and expressing one's demands
Step 8: following the previous step that the child listened to others and provided them with appropriate responses, he/she learns to express his/her needs and demands. For example, he learns to say "Will you give me that food or toy?" In general, he/she learns to express what he/she needs.

Session Seventeen:
Objective: increasing social interactions through adaptive social behaviors
Step 9: the child learns to help those in need. He/she learns to help his/her friends if something happens to them while playing.

Session Eighteen:
Objective: asking adults for help in case of needing help
Autistic children's undesirable behaviors can be reduced in two ways:

1. Gradually and indirectly reducing their undesirable behaviors and replacing them by desirable behaviors.
2. Directly reducing their undesirable behaviors. Methods used to this end are called negative methods of reducing behaviors.

Session Nineteen:
Objective: elimination of undesirable behaviors (stereotyped behaviors)
Self-action behaviors reduce the level of responsive reaction to external incentives. In other words, if the child self-acts during the lesson, the possibility of paying attention to the teacher reduces and the rewards

for self-acting are often stronger that the rewards the teacher provides. It is recommended that the teacher suppress children's self-acting behaviors during the lesson.

Session Twenty:
Objective: eliminating or reducing stereotyped and self-injurious behaviors
Step 2: according to the stereotyped and self-injurious behavior, attempts are made to identify similar appropriate behaviors to replace. As it was mentioned earlier, the self-injurious behaviors are ideal bases to create games and sports. The child that strongly moves and hurts himself/herself while self-acting can be guided to bring the least amount of injuries while unleashing his/her excitement.

4.   Results

The descriptive data related to dependent variables, that is, eye contact, stereotyped behaviors, social interaction and self-injurious behaviors are presented in the following. The data include the mean and standard deviation.

Table 1: distribution of dispersion of autistic children's problems in experimental and control groups in pre test and post test

Group		Group	Number	Mean	Standard Deviation
Eye Contact	Experimental	Pre-test	20	14.3	10.33
		Post-test	20	24.9	9.1
	Control	Pre-test	20	36.8	17.09
		Post-test	20	34.6	16.55
Stereotyped Behavior	Experimental	Pre-test	20	30.5	7.99
		Post-test	20	20.7	6.39
	Control	Pre-test	20	13.95	7.17
		Post-test	20	16.05	7.93
Social Interaction	Experimental	Pre-test	20	7.05	4.5
		Post-test	20	17.85	4.02
	Control	Pre-test	20	20.9	11.26
		Post-test	20	19.1	10.76
Self-injurious Behavior	Experimental	Pre-test	20	37.8	11.45
		Post-test	20	28.9	9.32
	Control	Pre-test	20	15.65	10.7
		Post-test	20	18.2	11.18

Covariance analysis is used to statistically analyze the data related to the hypotheses and to control the effects of the pretest as pretests and posttests were used in this study. Primary investigations were conducted to assure that no violations have been done on the hypotheses of the variance being normal, regression slope and homogeneity of variance. The assumptions were confirmed as follows.

1. Normal Distribution of Data:

Table 2: Smirnov Kolmogrov test to determine normal distribution of the value of the research variables

Variables	Group	Test	Level of Significance
Children's eye contact – pretest	Experimental	1.008	0.26
Children's eye contact - posttest		1.006	0.26
Children's eye contact - pretest	Control	0.86	0.44
Children's eye contact - posttest		0.73	0.64

Variables	Group	Test	Level of Significance
Children's stereotyped behavior – pretest	Experimental	0.56	0.9
Children's stereotyped behavior - posttest		0.58	0.87
Children's stereotyped behavior - pretest	Control	0.41	0.99
Children's stereotyped behavior - posttest		0.45	0.98

Variables	Group	Test	Level of Significance
Children's social interaction – pretest	Experimental	0.86	0.45
Children's social interaction – posttest		0.83	0.48
Children's social interaction - pretest	Control	0.63	0.81
Children's social interaction – posttest		0.7	0.69

Variables	Group	Test	Level of Significance
Children's self-injurious behavior – pretest	Experimental	1.08	0.19
Children's self-injurious behavior – posttest		0.91	0.37
Children's self-injurious behavior – pretest	Control	0.66	0.77
Children's self-injurious behavior – posttest		0.95	0.32

Results of Smirnov Kolmogrov test shows that the data distribution is normal because the level of significance is above 05.0.

Table 3: results of the regression slope test for eye contact, stereotyped behaviors, social interactions and self-injurious behaviors in the two groups

	Sum of squares	Degree of freedom	Mean of squares	Variance value	Level of significance
Pretest	4754.09	1	4754.09	457.91	0.000
Groups	15.47	1	15.47	1.49	0.23
Error	373.75	36	10.38		
Pretest	1823.91	1	1823.91	441.26	0.000
Groups	37.88	1	37.88	9.16	0.054
Error	148.8	36	4.13		
Pretest	1048.47	1	1048.47	255.68	0.000
Groups	2.27	1	2.27	0.55	0.46
Error	147.62	36	4.1		
Pretest	3812.22	1	3812.22	654.2	0.000
Groups	46.92	1	46.92	8.05	0.07
Error	209.78	36	5.82		

2. Assumption of the Equality of Variances:

Table 4: results of Levene test to compare the variance of eye contact, stereotyped behaviors, social interactions and self-injurious behaviors in the two groups

F value	Degree of freedom 1	Degree of freedom 2	Level of significance
1.02	1	38	0.31
4.12	1	38	0.04
3.68	1	38	0.06
9.71	1	38	0.03

As it can be seen in table 4, Levene assumption holding the equality of variances of eye contact in the society (F=02.1, p>05.0), Levene assumption holding the equality of variance of stereotyped behaviors in the society (F=02.1, p>05.0), Levene assumption holding the equality of variance of social interaction in the society (F=68.3, p>01.0) and Levene assumption holding the equality of variance of self-injurious behaviors in the society (F=71.9, p>05.0) are confirmed.

Table 5: results of covariance analysis of the experimental and control group for eye contact, stereotyped behaviors, social interactions and self-injurious behaviors

	Sum of squares	Degree of freedom	Mean of squares	Variance value	Level of significance	Eta squared
Pretest	6391.36	1	6391.36	607.55	0.000	0.94
Groups	720.1	1	720.1	68.45	0.000	0.64
Error	389.23	37	10.52			
Pretest	1788.46	1	46.1788	354.45	0.000	0.905
Groups	471.92	1	92.471	93.53	0.000	0.71
Errors	186.69	37	5.04			
Pretest	2358.45	1	2358.45	582.15	0.000	0.94
Groups	780.56	1	780.56	192.67	0.000	0.83
Error	149.89	37	4.05			
Pretest	3772.29	1	3772.29	543.71	0.000	0.93
Groups	413.18	1	413.18	59.55	0.000	0.61
Error	256.7	37	6.93			

As it can be seen in table 5, results of covariance analysis show that there is a significant relationship between eye contact (64 percent), stereotyped behaviors (71 percent), social interactions (83 percent) and self-injurious behaviors (61 percent) in the experimental and control groups.

5.   *Discussion*

The first finding of the present study showed that applied behavior analysis based treatment increases the eye contact in autistic children. In other words, teaching Treatments based on ABA entails positive effects in increasing the eye contact among the autistic children. This finding of the present study is consistent with the findings of Bruce et al. (2009), Peters-Schafer et al. (2011) and Buckner (2010). Bruce et al. (2009) believe that staring is a powerful social sign which is socially significant from the first developmental stages. The newborn babies also respond to the eye direction of other people. On the other hand, it has been found that autistic children and those with asperger syndrome delay in creating the theory of mind and this makes them suffer from mental blindness at different degrees. Consequently, they find other people's behaviors confusing, unpredictable and even frightening. The problems these people have in reading people' mind is an evidence to confirm this claim. Results of extensive studies of the Effective Health Care Plan (2014) titled treatment methods for children with autism spectrum disorder: updating behavioral interventions indicated that the interventions have significant and positive effects on different areas of social skills such as autistic children's eye contact such that the level of these disorders at each of the aforementioned areas significantly decreased (Peters-Schafer et al., 2011; Buckner, 2010). Weakness in social relations is one of the major problems of these children. Usual dependence to parents and other people cannot be seen. These children refrain from looking in the eyes of other people (even their parents). They do not even use body movements, signs and gesture to establish communication with others.

The techniques and treatment methods used in sessions one to seven of the treatment can be used to explain this finding. The researcher used several treatment sessions to attempt to increase the eye contact. In order to improve the eye contact among these children, the researcher applied 7 treatment sessions of 50 minutes. The objective of these treatment sessions was to increase the children's attention to others and their eye contact. The treatments were done in two steps.

1. The child is taught how to visually pay attention to our faces (making eye contact)
2. The other method includes general methods to teach basic behaviors to the child such as having visual attention to the objects in the environment you guide the child's attention to.

"Look at me"

The phrase "Look at me" is used to make eye contact. Before beginning the process, it should be made sure that the child has learned how to sit properly and pay attention.

In the first step, the child was sat on a chair in front of us. In the second step, we commanded "look at me" every 5 or 10 seconds. Due to the overlearning technique, the previous two steps will be repeated at the start of each new step and then the new step is presented.

The second finding of the study indicated that Treatments based on ABA have positive effects in reducing autistic children's stereotyped behaviors. This finding of the present study is consistent with results of the studies conducted by Mc.Gaha Mayes (2013), Pachko (2013), Lomond et al. (2012), Jif (2010) and Bovid et al. (2009).

ABA method seems to have significantly improved social behaviors and reduced stereotyped behaviors in autistic people (Jif, 2010). In explanation of this finding holding the effects of Treatments

based on ABA in reducing stereotyped behaviors in autistic children, considering the hypotheses and studies, it can be inferred that children's stereotyped behaviors happen do to a kind of feeling that most of the times gives peace to autistic children. In fact, any time these children feel incondite in their emotional, sensory and perceptive system, they begin to have stereotyped behaviors. In this disorder, the person might follow methods (e.g. putting hands in their shirts or pants or pockets) to control his/her self-injurious behaviors. In this case, if the inhibition faces a barrier or is stopped, the target behavior relapses. Moving body, head banging, pulling hair, chewing nails and teeth grinding are the most common stereotyped behaviors.

The probable explanation for the second finding of this study might be achieved by examining ABA treatment methods and techniques. Whenever the autistic child showed a stereotyped behavior during the treatment, the researcher confined him physically or said the word "No" loudly and stopped or limited the self-injurious behavior through the physical limitations like holding the child's hands and verbally and practically encouraging him/her to stop the stereotyped behavior. In addition, the researcher used self-injurious behaviors as a base to create games and sports and by involving the child in activities such as playing games, watching movies and listening to music, prevented the child from such behaviors. Most of these behaviors decrease gradually through overlearning.

The third finding of this study indicated that teaching Treatments based on ABA has positive effects on increasing the autistic children's social interactions. Results of this finding are in line with studies conducted by Scatton et al. (2006), Cable and Vaimer (2016), Jif (2010), Eldevik et al. (2009), Reinchow and Wolery (2009) and Rajabi Shamami et al. (2013).

Autistic children manifest a deep lack in social interactions and often do not express their feelings. They tend to echolalia and repeat other people's words or phrases.

Cable and Vaimer (2016) concluded that intervention programs should be designed in such a way to facilitate the outside of the treatment environment skills and relations of autistic patients and the speech and language pathologies. The families of these people should cooperate and support these patients' treatments by presenting family-centered interventions.

In explanation of the third finding which indicates the improvement of social interactions in research subjects, it can be stated that the applied methods in treatment process such as the gradual communication with the child and encouraging him/her to use the dolls and animal toys to touch and trigger the child's emotions, continuous practice to establish interactional methods like saying hello, saying their names, smiling, using the technique of "gradual disappearance of the stimuli", teaching the child to observe turns while playing games, exchanging toys and food with other children, asking for help and teaching how to respond to other people's simple demands, teaching them how to help their peers in need and motivating each of these behaviors through verbal and non-verbal boosters seem to be the main factor in improving the social interaction among the subjects. In explanation of this finding which indicates the effect of Treatments based on ABA on increasing the social interaction of autistic children and considering the hypotheses and studies, it can be inferred that social interaction is a two-way process through which children can begin their relations with others and keep in touch with them. In order to establish social interaction with others, the person needs to be able to code his/her thoughts well for the other person so that he/she can understand the sender's message. Establishing effective relations requires a common social structure. Therefore, effective relation will be formed when the involved groups are in relation with one another and have things in common.

Through ABA method, autistic children can improve to a great extent and act independently in their daily life by the visual signs they have been taught. In fact, by establishing continuous communication with problematic children and also using social and communicational skills in their living

circle, their communicational characteristics can be improved and their circle of communications will be expanded.

Another finding of this study revealed that the level of self-injurious behavior in experimental and control groups are different and significant. In other words, Treatments based on ABA have positive effects on autistic children's self-injurious behaviors. Results of this hypothesis is consistent with Nelson and Isabel's theory (2003) and studies conducted by Buckner (2010).

During the treatment by ABA, the self-injurious behaviors can be reduced by some techniques. Considering the type of the self-injurious behavior, it is identified and then similar appropriate behaviors are replaced for it. Self-injurious behaviors are a base for proper behaviors such as sports and playing games. For example, when a child moves a lot and bangs his/her head, jump boards (trampolines) are used. Autistic children might have a habit of self-injurious behaviors like hurting their eyes and/or biting their hands. They might not even respond to pain or burns. Sometimes, it has been observed that these children attack others for no reason. The reasons for these actions in autistic children are indefinite and complicated. However, some specialists believe that disorders of the five senses of the children can lead to these behaviors and these children attempt to meet their emotional needs through such behaviors (Nelson and Israel, 2003).

In fact, it was clarified in this study that the autistic patients' performance improved after the intervention. In explanation of this finding which indicates Treatments based on ABA reduce self-injurious behaviors of autistic children and considering the hypotheses, it can be inferred that self-injury might be the consequence of oversensitivity of these children towards environmental stimuli. This characteristic leads to sensory excitation and manifest itself in the form of stereotyped behaviors and hurting oneself. It might also appear in different other forms: banging heads to the wall and other surfaces, biting hands or arms, pulling hair, putting fingers into eyes, hitting heads or faces, scratching, pulling skins and moving heads hard. Hence, autistic children have complicated needs and in case of inability to learn, such behaviors will be more probable to observe. Nonetheless, self-injurious behaviors might be observed in conditions and in any of the patients at any age. These behaviors in children might be repeated in adulthood at the time of having stress, diseases or experiencing changes. Therefore, parents and therapists' attention to this issue is significant and vital because self-injury can have negative effects on formation of weak personality in the child apart from hurting the person. Consequently, consultancy and treatment are very important in this regard.

6. Suggestions for Further Studies

According to the research results, involving families in treatment programs of children with autism spectrum disorder is essential to generalize the learned skills and treatment programs for autism spectrum disorder should be based on the relationship between children-parents so that the social interactions and communications are improved along with generalization of their skills.

In addition, it is recommended that the psychotherapists use the child's favorite objects to increase eye contact and refrain from physical contact while applying the applied behavior analysis.

Furthermore, considering the significance of the applied behavior analysis in improving social skills and reducing self-injurious behaviors, it is suggested that this program and method be provided for the parents of these children in the framework of family-centered programs at home environment so that promising results can be expected beside real involvement of parents in reducing autistic children's self-injurious behaviors.

References

American Psychiatric Association. (2014) Diagnostic and Statistical Manual of Mental Disorders. (Translated by Yahya Seyed Mohammadi). 5th ed, Tehran, Ravan Publication, summer 2014.

Alavosius, M., Dagen, J., & Newsome, W. D. (2009). Differential reinforcement of low rate behavior. In W. T. O'Donohue & J. E. Fisher Eds.), *General principles and empirically supported techniques of cognitive behavior therapy* (pp. 240–245). Hoboken, NJ: Wiley.

Alexander, J., Ayres, K. & Smith, K. (2015). Training teachers inevidence-based practice forindividuals with autism specturn disorder: A review of the literature. *TeachEduc SpecEduc*; 38(1). pp: 13-27.

Anan, R. M., Warner, L. J., McGillivary, J. E., Chong, I. M. & Hines, S. J. (2008) .Group Intensive Family Training (GIFT) for preschoolers with autism spectrum disorders. *Behav Intervent*; 23(3). pp:165–80.

Arman, S., Hakimiyan, S. & Goulabi, P. (2005). Comparison of three methods of treatment efficacy in children with autism. *J Isfahan Med School;* 78(23): 44-48.

Backner, W. (2010). *Autism and early intensive behavioral interventions.* Training School Psychologists to be Experts in Evidence Based Practices for Tertiary Students with Serious Emotional Disturbance/Behavior Disorders, Autism Interventions, Us office of education 84. 325 K. May 1, 2010.

Baron Chohen S. (2008). *Autism and Asperger syndrom. Gangei M.* (Persian translator)**.** First editation.Tehran: Savalan, pp: 63-84.

Bauminger, N. (2002). The facilitation of social emotional understanding and social interaction in high - functioning children with autism: Intervention out comes. *Journal of autism and Develop mental Disorders;* 32; pp: 283-98.

Broz, F., Kose-Bagci, H., Nehaniv, C. L. & Dautenhahn, K. (2009). *Learning behavior for a social interaction game with a childlike humanoid robot [Online]*. 2009 [cited 2009 Boyd, B. A., McBee, M., Holtzclaw, T., Baranek, G. T. & Bodfish, J. W. (2009). Relationships among repetitive behaviors, sensory features and executive funcions in high functioning autism. *Research in Autism Specturn Disorders;* 3(4). pp: 959-66.

Cable, A. & H. Wiemer. (2016). *Social skills intervention: Children with autism spectrum disorder.* Clinical Review, Published by Cinahl Information Systems, Jan 8.

Case-Smith, J., Arbesman, M. (2008). Evidence-based review of interventions for autism used in or of relevance to occupationaltherapy. *Am J Occup Ther*. 62. pp: 416-429.

Centers for Disease Control and Prevention (CDC). (2013). *Prevalence of autism spectrum disorders Autism and Developmental Disabilities Monitoring Network,* 14 Sites, United States. MMWR SS; 56 (No.SS-1).

Centers for Disease Control and Prevention (CDC). (2007). *Prevalence of autism spectrum disorders Autism and Developmental Disabilities Monitoring Network,* 14 Sites, United States, MMWR SS; 56 (No.SS-1).

Chakrabarti, S., Fombonne, E. (2012). *Prevalence of autism specturn disorders. Autism and Developmental Disabilities Monitoring Network*, United States. www.cdc.gov.

Christy, Hicks., Keri, S., Bethune, Charles, L., Wood, Nancy, L., Cooke, & Pamela, J.(2011). Effects of direct instruction on the cquisition f prepositions by students with intellectual disabilities. *Journal of Applied Behavior Analysis,* 44, pp: 675-679.

Demouy, J., Plaza, M., Xavier, J., Ringeva, F., Chetouani, M., Périsse, D., Chauvin, D., Viaux, S., Golse, B., Cohen, D. & Robel, L. (2011*). Differential languagemarkers of pathology in Autis, PervasiveDevelopmental Disorder Not Otherwise Specifiedand Specific Language Impairment.* Res AutismSpectrDisord; (5). pp: 1402–12.

Dillenburger, K. & Keen, M. (2009). None of the As in ABA stand for autism: Dispelling the myths. *J lantellect Dev Sisabil,* 34(2). pp: 193-5.

Doherty, M. J. (2011). *Theory of mind: how children understand others thoughts and felling.* Khanjani Z, Hadavand Khani F. (Persian translator). First editation. Tehran: Samt. pp: 304-19.

Effective Health Care Program. (2014). *Therapies for children with autism spectrum disorder: Behavioral interventions update.* Comparitive effectiveness review Number 137. AHRQ Publication No. 14-EHC036-EF.

Eikeseth, S. (2009). Outcome of comprehensive psycho-educational interventions for young children with autism. *Research in Developmental Disabilities*, 30(1). pp: 158-78.

Eldevik, S., Hastings, R. P., Hughes, J. C., Jahr, E., Eikeseth, S. & Cross, S. (2009). Meta analysis of early intensive behavioral intervention for children with autism. *Journal of Clinical Child & Adolescent psychology;* (38). pp: 439- 45.

Fombonne, E., Tidmarsh, L. (2003). Epidemiologic data on Asperger disorder. *Child Adolesc Psychiatr Clin N Am.* 12(1). pp:15-21, v-vi.

Fortenberry, B., Chenu, J., Eaton, D., Movellan, J. R. (2004). RUBI: A Robotic Platform for Real-time Social Interaction. *Proceedings of the 11th Joint Symposium on Neural Computation;* 2004 May 15; California, USA.

Fox, R. A., Keller, K. M., Grede, P. L., & Bartosz, A. M. (2007). A mental health clinic for toddlers with developmental delays and behavior problems. *Research in Developmental Disabilities,* 28. pp: 119–129.

Gidley, J. C. & Mostofesky, S. H. (2008). *Evidence that the* pattern of visuomotor sequence learning is altered in children eith Autism. *Autism Res*; 1(6). pp: 341-53.

Goldsmith, T. R. & LeBlanc, L. A. (2004). Use of technology in interventions for children with autism. *Journal of Early and Intensive Behavior Intervention*; 1(2). pp: 166-78.

Gould, P. & Sullivan, J. (2004). *The inclusive early childhood classroom*. Beltville, MD: Gryphon House.

Green, V. A., Pituch, K. A., Itchon, J., Choi, A., Oreilly, M. & Sigafoos, J. (2006). Internet survey of treatments used by parents of children with autism. *Res Dev Disabil.* 27(1). pp:70-84.

Hess, K. L., Morrier, M. J., Heflin, L. J. & Ivey, M. L. (2008). Autism treatment survey: services received by children eith autism specturn disorders in public school classrooms. *J Autism Dev Disord.* 38(5). pp: 961-71.

Hilton, C., Graver, K. & La Vesser, P. (2007). Relationship between social competence and sensory processing in children with high functioning autism spectrum disorders. *Res Autism Spect Disord,* 1. pp: 64-73.

Howard, J. S., Sparkman, C. R., Cohen, H. G., Green, G. & Stanislaw, H. (2005). A comparison of intensive behavioranalytic and eclectic treatments for young childrenwith autism. *Res DevDisabil.* (26). pp: 359−83.

Jaffe, E. (2010). *A case study: Use of Applied behavior analysis with an autistic adolescent.* Digital commons @ PCOM. Philadelphia College of Osteopathic Medicine. Student Dissertations, Theses and Papers. December 2010.

Jarvinen-Pasley A., Heaton P. (2007). *Evidence for reduced domain- specificity in auditory processing in autism. Devsci,* 10(6): 796-93.

Jasmhn E, Couture M, McKinley P, Reid G, Fombonne E, Gisel, E. (2009). Sensory- Motor and Daily Living Skills of Preschool children with Autism Spectrum Disorders. *Journal of Autism and Developmental Disorders.* 39(2). pp: 231-41.

Koegel, L. K., Singh, A. K. & Koegel, R. L. (2010). Improving motivation for academics in children with autism. *J Autism Dev Disord.* 40(9). pp:1057-66.

Koegel, R. L., Koegel, L. K., Fredeen, R. M., Tran, Q. H., Sze, K.M. & Bruinsma, YEM, et al. (2005). *Pivotal Response Treatments for Autism:* Communication, Social, and Academic Development. 1st edition. Baltimore, Md: Paul H. Brookes Publishing Co.

Konstantinidis, E. I., Luneski, A., Frantzidis, C. A., Nikolaidou, M., Hitoglou-Antoniadou, M. & Bamidis, P. D. (2009). Information and communication technologies (ICT) for enhanced education of children with autism spectrum disorders. *The Journal on Information Technology in Healthcare;* 7(5). pp: 284-2920.

Kozima, H., Nakagawa, C., Yasuda, Y. (2007). Children-robot interaction: a pilot study in autism therapy. *Prog Brain Res*; 164. pp: 385-400.

Kwon, S., Kim, J., Choe, B. H., Ko, C., Park, S. (2007). Electro physiologic assessment of central auditory processing by auditory brainstem responses in children with autism spectrum disorders. *J Korean Med Sci.* 22(4): 656-9.

Lam, K. S. L., Aman, M. G., & Arnold, L. E. (2006). Neurochemical correlates of autistic disorder: A review of the literature. *Research in Developmental Disabilities,* 27, pp: 254–289.

Lang, R., Davis, T., O'Reilly, M., Machalicek, W., Rispoli, M., Sigafoos, J., Lancioni, G., & Laura, L. Grow., James, E. Carr., Tiffany, M. odak., & April. N. Kisamore. (2011). A comparison of methods for teaching receptive labeling to children with autism spectrum disorders. *Journal of Applied Behavior Analysis,* 44, pp: 475-498.

Laura, L. Grow., James, E. Carr., Tiffany, M. Kodak., & April. N. Kisamore. (2011). A comparison of methods for teaching receptive abeling to children with autism spectrum disorders. *Journal of Applied Behavior Analysis,* 44, pp: 475-498.

Lemonda, B. C., Holtzer, R. & Goldman, S. (2012). Relationship between executive functions and motor stereotypies in children with Autistic Disorder. *Research in Autism Specturn Disorders.* 6(3). pp:1099-106.

Levin Allen S. (2010*). Social cognitive abilities and social functioning in children with Asperger's disorder: comparison with deficit/hyperactivity disorder.* [Thesis for the degree of philosophy in psychology]. Drexel University. From http://www.researchgate.net.

Levine S. &Mody T. (2003). The long -term psychobiologicalconsequences of intermittent postnatal separation in the squirrelmonkey. *Neuroscience and Biobehavioral Reviews;* 27 (12). Pp: 83-9.

Liu, C., Conn, K., Sarkar, N. & Stone, W. (2007). *Online affect detection and adaptation in robot assisted rehabilitation for children with autism.* Proceedings of the 16th IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN 2007); Aug 26-29; Jeju Island, Korea;. Pp: 558-93.

Lopez, B. R., Lincoln, A. J., Ozonoff, S. & Lai, Z. (2005). Examining the relationship between executive functions and restricated, repetitive symptoms of autistic disorder. *Journal of Autism and Developmental Disorders.* 35(4). pp: 445-60.

Lovaas, O. L. (2002). *Teavhing individuals with developmental delays*: Basic intervention techniques. Austin, TX: Pro- ed.

Malott, R. W. (2005). Behavioral systems analysis and higher education. In W. L. Heward, T. E. Heron, N. A. Neef, S. M. Peterson, D. M. ainato, G. Cartledge, et al. (Eds.), *Focus on behavior analysis in education* (pp. 211–236). Upper Saddle River, NJ: Pearson ducation.

Matson, J. L., & Boisjoli, J. (2007). Differential diagnosis of PDD-NOS in children. *Research in Autism Spectrum Disorders,* 1, 75–84.

Matson, J. L., & Wilkins, J. (2008). Nosology and diagnosis of Asperger's syndrome. *Research in Autism Spectrum Disorders,* 2, pp: 288–300.

McGaha Mays, M. N. (2013). *Using antecedent aerobic exercise to decrease stereotypic behavior in children with autism.* Scholar Works @ Georgia State University. Educational Psychology and Special Education Dissertations, Department of educational psychology, social education and communication disorders.

Mussen, PH. et al. (2007). *Child development and personality.* Yassayi M. (Persian translator). 7th editation. Tehran: Nashre Markaz; pp: 101-93.

Myers, S. M., Johnson, C. P. (2007). Mamagment of Children with autism sprcturn disorders. *Pediatrics,* 120(5). pp:1162-82.

Naoi, N. (2009). Intervention and Treatment Methods for Children with autism Specturn disorders. In Matson JL. *Applied Behavior Analysis for Children with Autism Specturn Disorders New York: Springer.* Pp: 74-81.

Newschaffer, C. J., Croen, L. A., &. Daniels, J. (2007). The epidemiology of autism spectrum disorders. *Journal of Annual Review of Public Health,* 28. pp: 235-58.

Pacheco, I. (2013). The effect of Art therapy on the language abilities of Autistic children. *Mount Saint Mary College Journal of Psychology Research Proposals,* Vol. 3, Fall 2013. Pp: 11-16.

Peters-Scheffer, N., Diden, R., Korzilius, H. & Sturmy, P. A. (2011). Meta-analytic study on the effectiveness of comprehensive ABA-based early intervention programs for children with Autism Spectrum Disorders. *Research in Autism Spectrum Disorders.* pp; (5): 60-9.

Rapin, I. & Tuchman, R. F. (2008). Autism: definition, neurobiology, screening, diagnosis. *Pediatr Clin North Am.* 2008 Oct; 55(5). Pp :1129- 46.

Reichow, B. & Wolery, M. (2009). Comprehensive synthesis of early intensive behavioral interventions for children with autism based on the UCLA young autism project model. *Journal of Autism and Developmental Disorders*; 39(1). pp: 23-41.

Rust, J. & Smith, A. (2006). How should the effectiveness of Social Stories to modify the behavior of children on the autistic spectrum be tested?. *Autism: The International Journal of Research & Practice.* Vol 10, Issue 2.

S. Aghababayi, A. Abedi, A. Yarmohammadian and N. Zamani Foroushani. (2015). Meta-Analysis of the Effectiveness of Applied Behavioral Analysis Intervention on Language Skills in Autism Children. Journal of Clinical Psychology, 7 (2) – 26, Summer 2015. Pp. 78-87.

Samadi, S. A., Mahmoodizadeh, A. & McConkey, R. (2012). *A national study of the prevalence ofautism among five-year-old children in Iran. Autism*.16(1). pp: 5-14.

Sands, D. J., Kozleski, E. B., &. French, N. K. (2000). *Inclusive Education for the 21 (st) centuries.* Belmont: Wadsworth , Inc.

Schultz, R. & Anderson, G. (2003). *The Neurobiology of autism and the pervasive developmental disorders. Child study Center,* Yale University School of Medicine.

Scattone, D. Tingstrom, D. &. Wilczynski, S. (2006). Increasing Appropriate Social Interactions of Children with Autism Spectrum Disorders Using Social Stories. *Journal of Focus on Autism & Other Developmental Disabilities.* Vol 21, Issue 4.

Severtson, J. M., Carr, J. E., & Lepper, T. L. (2009). *Noncontingent reinforcement is an empiricallysupported treatment for problem behavior exhibitedby individuals with developmental disabilities.* ResDevDisabil. (30). pp: 44−57.

Shaw, R. & Simms, T. (2009). Reducing attentionmaintained behavior through the use of positive punishment, differential reinforcement of tow rates, and response marking. *Behavioral Interventions*, 24, pp: 249–263.

Sherer, M. R. & Schreibman, L. (2005). Individual behavioral profiles and predictors of treatment effectiveness for children with autism. *J Consult Clin Psychol.* 73(3). pp: 525–38.

Solomon, R., Nechels, J., Ferch, C. & Bruckman, D. (2007). *Pilot study of a parent training program for young children with autism:The PLAY Project Home Consultation program.* Autism, 11. pp: 205-224.

Steiner, A. M., Cengoux, G. W., Klin, A. & Chawarska, K. (2013). *Pivotal response treatment for infants at-risk for autism spectrum disorders:* a pilot study. J Autism Dev Disord. 43(10). pp: 91-102.

V. Shiri, S.A. Hosseini, E. Pishyareh, V. Nejati and A. Biglarian (2015). Study the Relationship of Executive Functions with Behavioral Symptoms in Children with High-Functioning Autism. Quarterly of Rehabilitation 16 (3). Pp. 208-217.

Volkmar, F. R., Paul, R., Klin, A. & Cohen, D. (2005). *Handbook of autism and pervasive developmentaldisorders.* Wiley Sons Publication.

Watlin, R.L. & Dietz, J. (2007). Immediate effect of Ayres'ssensory integration–base occupational therapyintervention on children with autism spectrumdisorders. *Am J OccupTher*. (61). pp: 574-83.

Wing, L., Goud, J. & Gilberg, CH. (2011). Autism spectrum disorders in the DSM-V: *Better or worse than the DSM-V? Res Dev Disabil.* (32). pp:768-73.

Torana, H., Yasina, M. H. M., Chiria, F. & Tahara, M. M. (2010). Monitoring Progress using The Individual Education Plan for Students with Autism. *Procedia-Social and Behavioral Sciences,* 7(0). pp: 701-6.

Xi, C., Zhu, Y., Zhu, C., Song, D., Wang, Y. & Wang, K. (2013). Deficit of theory of mind after temporal lobe cerebral infarction. *Behavioral and brain functions: BBF*. Pp: 9:15.