

## A study of pre and post intervention programme on pre-reading and writing skills among children with autism spectrum disorder in pre-schools

Jyoti V. Kharat<sup>1,\*</sup>, Arun Banik<sup>2</sup>

<sup>1</sup>Special Educator, NMMC E. T. C. Center, Vashi, Navi Mumbai, Maharashtra, <sup>2</sup>Reader & HOD, Dept. of Outreach & Extension Services, Ali Yavar Jung National Institute of Speech & Hearing Disabilities, Mumbai, Maharashtra, India

**\*Corresponding Author:**

Email: jyotikharat127@gmail.com

---

### Introduction

Autistic spectrum disorder (ASD) is characterized by impairments in social interaction and communication, along with restricted, repetitive, and stereotyped patterns of behavior (American Psychiatric Association, 2000). Autism is an enigmatic disorder of unknown etiology that affects almost all areas of development and is present from birth. Across the country, states are reporting increases in the number of children with this disorder being served each year in the education system, with an average increase of more than 800% since 1992 (Individuals with Disabilities Education Act [IDEA]).

Autism a complex neurobehavioral condition that includes impairments in social interaction and developmental language and communication skills combined with rigid, repetitive behaviors. Because of the range of symptoms, this condition is now called Autism Spectrum Disorder (ASD). It covers a large spectrum of symptoms, skills, and levels of impairment. ASD ranges in severity from a handicap that somewhat limits an otherwise normal life to a devastating disability that may require institutional care.

Life skills can be challenging for children with ASD, but is essential for independence. Life Skills for child with ASD thoroughly describes a systematic approach that parents and educators can use to teach basic self-care to children. An important part of becoming more independent is developing the life skills we all use on a day-to-day basis. Some of these tasks can be complex; some can be regarded as 'simple'. But for a child with ASD these skills, which we take for granted, can be hugely challenging.

Pre academics are very essential for all students for both subsequent academic successes as well as for functional daily survival as adults (Kliewer & Landis, 1999). The contemporary educational expectation is that all students can acquire some degree of reading writing skill. While some students with autism may not be able to attain full academic literacy (the ability to understand and use academic material), functional literacy is essential in order for them to be able to live, work, and engage in their community (Alberto, Fredrick, Hughes, McIntosh, & Cihak, 2007).

### Statement of the problem

The purpose of study is to find out "the pre and post intervention programme on pre-reading and writing skills among children with Autism Spectrum Disorder in pre-schools."

### Objectives

To develop and validate a tool for intervention program towards pre-reading and writing skills for Pre-school children with Autism Spectrum Disorders.

To assess the pre-intervention programme for children with Autism Spectrum Disorders towards pre-reading and writing skills in pre-schools.

To assess the post-intervention programme for children with Autism Spectrum Disorders towards pre-reading and writing skills in pre-schools.

To compare the pre-test and post-test intervention programme for children with Autism Spectrum Disorders towards pre-reading and writing skills in pre-schools.

### Hypothesis

There will be no significant difference among the pre-test and post-test intervention programme for children with Autism Spectrum Disorders towards pre-reading and writing skills in pre-schools.

The Literacy based design is more effective for intervention programme among the high as well as low performers of children with autism spectrum disorders towards pre-reading and writing skills in pre-schools.

There will be more effectiveness intervention programme in pre-reading and writing skills to improve using Literacy based design method among children with autism spectrum disorders in pre-schools.

### Review of Literature

**Lauren Parsons et al (2017)** indicated that A systematic review of pragmatic language interventions for children with autism spectrum disorder. There is a need for evidence based interventions for children with autism spectrum disorder (ASD) to limit the life-long, psychosocial impact of pragmatic language impairments. This systematic review identified 22 studies reporting on 20 pragmatic language interventions for children with ASD aged 0–18 years. The characteristics of each study, components of the

interventions, and the methodological quality of each study were reviewed. Meta-analysis was conducted to assess the effectiveness of 15 interventions. Results revealed some promising approaches, indicating that active inclusion of the child and parent in the intervention was a significant mediator of intervention effect. Participant age, therapy setting or modalities were not significant mediators between the interventions and measures of pragmatic language. The long-term effects of these interventions and the generalization of learning to new contexts are largely unknown. Implications for clinical practice and directions for future research are discussed.

**Ronadora E. Deala(2017)** indicated that Multi-Approach Intervention in Enhancing Adaptive Behavior of ASD: A within-subject Experimental Design. This paper evaluated the effectiveness of music, play and augmentative alternative communication (AAC) with a new found technique called "Ilin-Ilin" (creatively use of music, play and AAC along humor and fun), altogether called Multi-Approach Intervention to enhance adaptive skills in domains and sub domains of communication, daily living, socialization, motor and maladaptive behavior of children diagnosed with Autism Spectrum Disorder (ASD). The study was conducted for 24 h sessions, three to four times a week involving five children aged 2-5 years. From five, three participants satisfactorily met the inclusion criteria, whose results were reported in this study. Pre and post data of each participant were gathered through interview with the participant's mother and teacher using VABS-II. Paired t-test was used to examine whether there was a significant change in adaptive skills among the participants after the intervention. Result reveals that Multi-Intervention Approach has positive effects to the general adaptive behavior. The helpfulness of the interventions were found statistically evident in enhancing communication (receptive), socialization (interpersonal relationship, play and leisure time and coping skills), and motor skills (gross and fine) and in impeding maladaptive behavior particularly the internalizing sub domain but less influenced in the daily living skills of the participants (only in personal sub domain). To sum up, the intervention is found most effective in enhancing the socialization and motor skills including their sub domains.

**Irene E Drmic, Mariam Aljunied , Judy Reaven (2017)** studies the Feasibility, Acceptability and Preliminary Treatment Outcomes in a School-Based CBT Intervention Program for Adolescents With ASD and Anxiety in Singapore. It Studied the Adolescents with autism spectrum disorder (ASD) are at high risk for anxiety difficulties and disorders. Clinic-based cognitive behavioral therapy (CBT) is effective; however, few published school-based CBT programs for youth with ASD exist. In the study, the Facing Your Fears CBT protocol was adapted for delivery and piloted within a school setting by non-clinicians, with

culturally appropriate adaptations. 44 samples in the age range of 13-15 youth with ASD from 22 mainstream schools in Singapore participated. Feasibility, acceptability and preliminary treatment outcomes were examined. Decreases in youth and parent reported anxiety symptoms were reported. Staff and parents found the program useful. Stakeholder support was important for implementation. Initial findings reflect the importance of carefully bridging research-to-practice for youth with ASD and anxiety.

**Therese McNamee and Sandra Patton (2018)** studies on Teachers' perspectives on handwriting and collaborative intervention for children with Autistic Spectrum Disorder. The purpose of the study aims was to investigate teacher perspectives on teaching handwriting to children with autistic spectrum disorder (ASD) and collaboration with occupational therapists. A descriptive design was applied in the study. Purpose-designed surveys were distributed to teachers of children with ASD (aged 4-12 years) in the Republic of Ireland. A response rate of 35 per cent (N = 75) was obtained, with 25 responses analyzed using descriptive statistics of closed questions and content analysis of open-ended questions. The findings out of 139 children with ASD, 80 children (58 per cent) were reported to have difficulties with handwriting. Teachers reported specific difficulties with pencil grasp, letter formation and task concept among the children with ASD. Fourteen children (56 per cent, N = 25) respondents did not give handwriting as homework. Teachers valued occupational therapy advice, individualized programmes and ongoing consultation during implementation. Interest in occupational therapy education regarding handwriting was reported. The Practical implications of Occupational therapy collaboration to address handwriting difficulties for children with ASD should include involvement in teacher education, coordination of teacher-parent collaboration and the need for involvement in early intervention provision within an emergent literacy framework. The study Originality valued the Handwriting development is challenging for children with ASD. There is limited information on teaching or teacher-occupational therapy collaborative practices to address handwriting difficulties of children with ASD.

### Methodology

- a. **Research Design:** Pretest-Post-test experimental design
- b. **Sample:** The sample for the present study consists of 20 students with Autism Spectrum Disorders who is studying in pre-primary school under NMMC etc Education, Training & Services Centre for PWDs at Navi Mumbai Municipal Corporation
- c. **Criteria for subject selection**

- i. Children in the age group of 6-9 years.
- ii. Diagnosed as Autism spectrum disorders.
- iii. Studying in pre-school.
- iv. Studying in English Medium schools
- v. Hearing within the normal limits (as per school record)
- vi. No other associated physical deformities excluded.

**d. Tool**

The investigator has developed and validated a tool for intervention program towards pre-reading and writing skills for Pre-school children with Autism Spectrum Disorders. For validation of the tool was given to 7 Professional having more than 5 years experience in the field dealing with ASD children and who have adequate experience in the field of special education.

Based on the suggestions given by the experts, maximum agreed items were only included in the tool and few items were deleted from the tool. The revised tool consisted of 388 items in Pre Reading and Pre Writing Dimensions.

**e. Scoring Pattern**

The questionnaire consisted of in pre reading 187 and pre writing 201 items. The keys used were Correct Response and Incorrect Response. The Correct Responses were given a score of "One" and the Incorrect responses were given a score of "Zero". The maximum Score was 1 and minimum score was zero.

**f. Administration of Tool**

The Tool was administered in two session i. e (i) Pre-test and (ii) Post test session. In pre-test was taken by researcher to the Students with ASD and recorded their responses. In posttest session, parents were given instruction to use the tool at home and after intervention with a gap of one month, post -test evaluation was done.

**g. Statistical Techniques**

The statistical analysis of data was done through computer application using statistical package for social sciences (SPSS). The independent t-test and ANOVA was used to see the relationship between the dependent variables and the independent variables.

**Data Analysis**

**Table 1: Summary of ANOVA of the Pre-Test and Post-Test Intervention Programme for children with Autism Spectrum Disorders towards Pre-Reading and Post Reading skills**

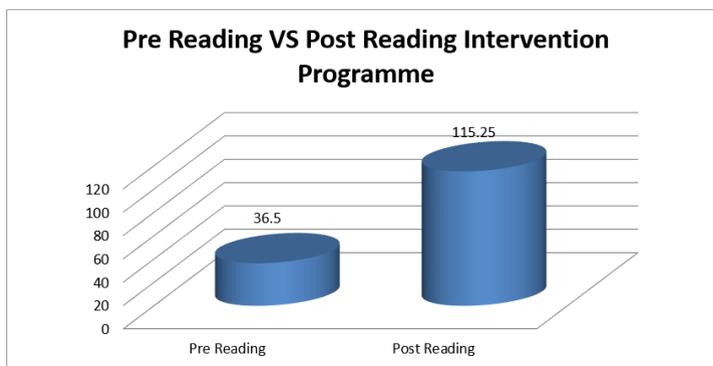
Domains	Source of variation	Sum of Squares	Degree of freedom	Mean Square	F	Sig.
Pre Reading Intervention Programme	Between Groups	1272.544	2	636.272	1.118	.350
	Within Groups	9672.456	17	568.968		
	Total	10945.000	19			
Post Reading Intervention Programme	Between Groups	2382.461	2	1191.231	.580	.571
	Within Groups	34945.289	17	2055.605		
	Total	37327.750	19			

From the Table 1 it shows that with respect to Pre Reading Intervention Programme obtained F ratio is 1.118, therefore, the calculated value is less than table value ( $p > 0.05$ ) with degree of freedom 2. It is found that there is significant difference relationship between the towards Pre-Reading Intervention Programme.

Hence the hypothesis ( $H_0$ ) that there is no significant difference in attitude of the Pre-Test and Post-Test Intervention Programme for children with Autism Spectrum Disorders towards Pre-Reading and Post Reading skills. However with respect to Post

Reading Intervention Programme obtained F ratio value is .580, therefore the calculate value is less than table value ( $p > 0.05$ ) with degree of freedom 2. Hence the reveals that there is significant difference relationship between Post-Reading Intervention Program. Therefore the hypothesis ( $H_0$ ) is accepted.

Therefore the hypothesis, there is significant difference in the pre-test and post-test intervention programme for children with Autism Spectrum Disorders towards Pre-Reading and Post Reading skills.



**Fig. 1: Graphical representation of Paired Differences analysis percentage on significant difference among the pre-test and post-test intervention programme for children with Autism Spectrum Disorders towards pre-reading and post reading skills**

These results indicate that the **Pre-Post Intervention** programme had a significant effect on for children with Autism Spectrum Disorders towards Pre- Post Reading Skills.

**Table 2: Summary of ANOVA of the Pre-Test and Post-Test Intervention Programme for children with Autism Spectrum Disorders towards Pre-Writing and Post Writing skills**

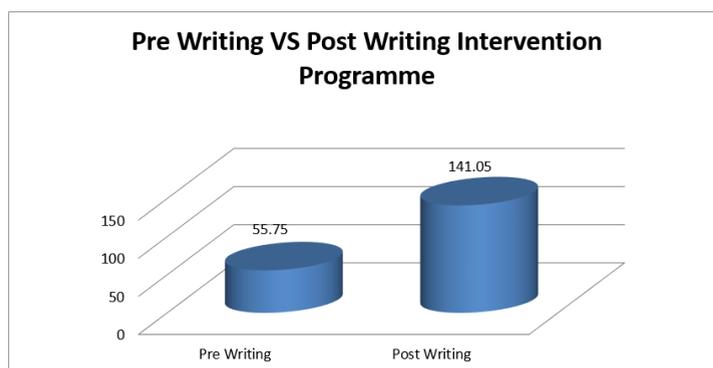
Domains	Source of variation	Sum of Squares	Degree of freedom	Mean Square	F	Sig.
Pre Writing Intervention Programme	Between Groups	3232.361	2	1616.181	1.592	.232
	Within Groups	17253.389	17	1014.905		
	Total	20485.750	19			
Post Writing Intervention Programme	Between Groups	4417.294	2	2208.647	.826	.454
	Within Groups	45429.656	17	2672.333		
	Total	49846.950	19			

The above table 2 indicated that summary of ANOVA of the Pre-Test and Post-Test Intervention Programme for children with Autism Spectrum Disorders towards Pre- Writing and Post-Writing skills. From the table it shows that with respect to Pre Writing Intervention Programme obtained F ratio is 1.592, therefore the calculated value is less than table value ( $p > 0.05$ ) with degree of freedom 2. It is found that there is no significant difference relationship between the towards Pre- Writing Intervention Programme.

Hence the hypothesis (Ho) that there is significant difference of the Pre-Test and Post-Test Intervention

Programme for children with Autism Spectrum Disorders towards Pre- Writing and Post Writing skills.

However with respect to Post Writing Intervention Programme obtained F ratio value is .826, therefore the calculate value is less than table value ( $p > 0.05$ ) with degree of freedom 2. Hence the reveals that there is significant difference relationship between Post-Writing Intervention Program. Therefore the hypothesis (Ho) is accepted. Therefore the hypothesis, there is significant difference in the pre-test and post-test intervention programme for children with Autism Spectrum Disorders towards Pre- Writing and Post Writing skills.



**Fig. 2: Graphical representation of Paired Differences analysis percentage on significant difference among the Pre-test and Post-test intervention programme for children with Autism Spectrum Disorders towards Pre-Writing and Post Writing skills**

These results indicate that the **Pre- Post Intervention** Programme had a significant effect on for Children with Autism Spectrum Disorders towards Pre-Post Writing Skills.

### Results and Discussion

1. An examination of the responses to the domain wise expressing benefits showed that the hypothesis, There is significant difference among the Pre-Test And Post-Test Intervention Programme for children with Autism Spectrum Disorders towards pre-reading and writing skills in pre-schools is rejected at 0.05 level.
2. Similarly it was also observe the null hypothesis; The Literacy based design is more effective for intervention programme among the high as well as low performers of children with autism spectrum disorders towards Pre-Reading and Pre-Writing skills in pre-schools in pre-schools is accepted at 0.05 level.
3. It was also indicated that the null hypothesis, there is more effectiveness intervention programme in pre-reading and pre-writing skills to improved using Literacy based design method among children with autism spectrum disorders in pre-schools is accepted at 0.05 levels.
4. Despite these findings there are few studies in literature that incorporate a parent Training component formally within the intervention plan that includes Pre Reading and Writing Intervention Programme for student with ASD.
5. Both studies showed that the Student with ASD significantly improved their knowledge of Pre Reading and Writing Skills and improved overall pre academics skills as reported by parents.
6. In this study parents were trained in the cognitive context to further skills to other environments.
7. How to take Pre Reading and Writing Skills Training was introduced after pre- test to provide training within a natural context, utilize typical settings and intensify the treatment through training and facilitation of practice throughout the day.
8. Parents met with researcher on a regular basis to discuss the skill reviewed and received the activity tool and they received the training in terms of implementing the supports and facilitating practice in their environments.
9. Maintaining interactions also shows improvement in terms of effect size in both conditions.
10. Unique to the intervention program, however, is the significant improvement of student with ASD on all pre reading and writing skills.
11. It's also shown To compare with Pre Reading and Pre Writing Activities students with ASD has develop more skills of pre writing activities than pre reading skills. Pre reading activities take more time to practice.

### Research Findings

1. Literacy development starts early in life and is highly correlated with school achievement.
2. All of the domains of a child's development-physical, social-emotional, cognitive, language and literacy-are interrelated and interdependent.
3. The more limited a child's experiences with language and literacy the more likely he or she will have difficulty learning to read.
4. Key early literacy predictors of reading and school success include oral language, Alphabetic Code, and print knowledge.
5. Well-conceived standards for child outcomes, curriculum content, and teacher preparation help establish clarity of purpose and a shared vision for early literacy education.
6. Increased demands for program accountability are often heavily focused on assessments of children's early literacy development.
7. Highly capable teachers are required to implement today's more challenging early literacy curriculum.
8. Teacher knowledge, respect and support for the diversity of children's families, cultures, and linguistic backgrounds are important in early literacy development.

### Summary and Conclusion

#### Recommendation

Based on the finding of the study the following recommendations were made:

1. Pre-Writing and Pre-Reading activities help children develop their visual memory, their attention span, and the ability to identify objects (visual discrimination). In terms of fine motor skills, these activities aim to refine children's ability to move their fingers and their hands. Children who are stimulated at a young age will be more comfortable with pencils, paintbrushes, and a pair of scissors and will therefore avoid useless energy expenditures.
2. Pre-reading is the step before actual reading. Observing an illustration (interpreting emotions, characters, identifying time, corporal, and spatial concepts) contributes to the efficient development of children's attention span and their ability to discriminate. Associating illustrations to words helps children discover that everything they see can be written and read.
3. Pre-writing precedes actual writing. Pre-writing exercises help children develop their fine motor skills. To be more precise, fine motor skills can be divided into four main components: hand-eye coordination (the eye directs the hand), finger dissociation (moving fingers individually), the ability to stop and start when required, and finger strength or muscle tone essentially:
  - a. Never force a child to do an exercise.

- b. Make exercises fun. Be a model for children and they will gladly follow in your footsteps.
- c. Emphasize the process and not the end result.
- d. Integrate exercises in your daily planning.
- e. Nothing is more important than having fun!

### **Policy Recommendations**

1. All children should have access to early childhood programs with strong literacy components that include clear adaptations for children with ASD.
2. Early literacy curricula and teaching practices should be evidence-based, integrated with all domains of learning, and understandable to staff members.
3. Early literacy standards should be established that articulate with K-12 programs and reflect consistency and continuity with overall program goals.
4. Early literacy assessment should use multiple methods and use the information to improve both teaching and the total preschool program.
5. Standards for early childhood professionals should require staff to meet early literacy instructional standards.
6. Parent involvement programs should have a strong early literacy component that guides parents and caregivers in providing early literacy experiences at home.
7. Support for English Language Learners should be specified and provided in both the home language and English where feasible.

### **Future Directions**

Additional research could extend the scope and the scale of the current study in several ways.

1. Pre reading and writing intervention programme study could be utilized to verify the effectiveness of the intervention and thereby determine whether it has policy implications.
2. Extension of the current study would be a follow-up study to explore the long-term effects of the intervention. A main feature of the current study is the finding that the children with ASD maintained their gains in cognitive ability one month after the intervention was completed.
3. Research direction includes an examination of different measures of quality. An extension of the current study might incorporate measures such as topics of Effects of a Classroom-Based Pre-Literacy Intervention, Multi-Approach Intervention, and Reading Intervention Programme. These would provide additional useful data for determining the impacts of academic intervention.

### **Limitation of the Study**

The sample size was a small group from only Navi Mumbai area which is not generalizable urban and rural

areas. This study was limited by a number of factors, including a small sample size and the absence of a control group. The absence of a control group leaves unanswered the question of whether positive results are due to test attenuation or spontaneous improvement versus to group participation. Smaller sample size affected the overall power and statistical significance attained on the dependent variables. As such, some findings appear to be specific to the intervention. For example, higher dosage levels of treatment led to larger effect sizes and a greater number of significant improvements on the dependent variables. Effect sizes were comparable to previous studies that utilized a control group (Provencal, 2003; Tse et al., 2007).

Another limitation might have to study focused on only pre reading and writing skills.

The participants of the present study were selected from only one NMMC 'etc' center for PWD, in vashi. If the investigator might have selected few more inclusive schools for the study. This may help the investigator to obtained still good outcomes from a group of parents.

Another limitation of the study was the use of only parent report measures to test for quantitative evidence of generalized improvement. Teachers may have had different perceptions regarding changes in subjects' social and related behaviors.

### **Implications**

Several implications can be drawn from the data presented in the current study.

1. Therapeutic intervention to help a child with writing readiness difficulties is important to: Improve ability in, and persistence with, fine motor tasks for academic performance.
2. The findings of this study highlight the need for professional development for educators to support efforts to integrate children with ASD into inclusive settings.
3. Pre-reading and writing skills are essential for a student with ASD to be able to develop the ability to hold and move a pencil fluently and effectively and therefore produce legible writing.

### **Educational Applications**

1. Use Task Analysis –very specific, tasks in sequential order.
2. Always keep your language simple and concrete.
3. Repeat instructions and checking understanding. Using short sentences to ensure clarity of instructions.
4. Provide a very clear structure and a set daily routine including time for play.
5. Teaching what “finished” means and helping the student to identify when something has finished and something different has started.
6. Addressing the children with ASD individually at all times.

7. Use various means of presentation – visual, physical guidance, peer modeling, etc.
8. Seeking to link work to the child's particular interests.
9. Involve students in daily reading and writing experiences.
10. Teach reading and writing through authentic literary experiences.

## References

1. [asha.org/PRPSpecificTopic.aspx?folderid=8589935303&section=Roles\\_and\\_Responsibilities](http://asha.org/PRPSpecificTopic.aspx?folderid=8589935303&section=Roles_and_Responsibilities)
2. Boulware B, Crow ML. Using the concept attainment strategy to enhance reading comprehension. *Reading Teacher*. 2008;6:491–95.
3. heller@gsu.edu, <https://doi.org/10.1177/001440299906500207>
4. <https://www.skillsyouneed.com/general/life-skills.html>
5. Irene E Drmic , Mariam Aljunied , Judy Reaven (2017) Feasibility, Acceptability and Preliminary Treatment Outcomes in a School-Based CBT Intervention Program for Adolescents With ASD and Anxiety in Singapore. *J Autism Dev Disord* 2017;47(12):3909-29.
6. Lauren Parsons Reinie Cordier, Natalie Munro, Annette Joosten, Renee Speyer (2017) A systematic review of pragmatic language interventions for children with autism spectrum disorder. Published: April 20, 2017. <https://doi.org/10.1371/journal.pone.0172242>
7. <https://doi.org/10.1371/journal.pone.0172242>
8. [omicsonline.org/open-access/multiapproach-intervention-in-enhancing-adaptive-behavior-of-asd-awithinsubject-experimental-design-2375-4494-1000344.php?aid=88533&view=mobile](https://www.omicsonline.org/open-access/multiapproach-intervention-in-enhancing-adaptive-behavior-of-asd-awithinsubject-experimental-design-2375-4494-1000344.php?aid=88533&view=mobile)
9. [readingeggs.com.au/articles/2012/08/15/reading-and-autism/ps://childdevelopment.com.au/areas-of-concern/writing/writing-readiness-pre-writing-skills/](https://www.readingeggs.com.au/articles/2012/08/15/reading-and-autism/ps://childdevelopment.com.au/areas-of-concern/writing/writing-readiness-pre-writing-skills/)
10. [researchgate.net/publication/258445707\\_Reading\\_Comprehension\\_Interventions\\_for\\_Students\\_with\\_Autism\\_Spectrum\\_Disorders\\_A\\_Synthesis\\_of\\_Research](https://www.researchgate.net/publication/258445707_Reading_Comprehension_Interventions_for_Students_with_Autism_Spectrum_Disorders_A_Synthesis_of_Research) [accessed May 18 2018].
11. Ronadora E. Deala. Multi-Approach Intervention in Enhancing Adaptive Behavior of ASD: A within-subject Experimental Design. *Child Adolesc Behav* 2017;5:344. doi:10.4172/2375-4494.1000344. <https://www.omicsonline.org/open-access/multiapproach-intervention-in-enhancing-adaptive-behavior-of-asd-awithinsubject-experimental-design-2375-4494-1000344.php?aid=88533>
12. Therese McNamee, Sandra Patton. Teachers' perspectives on handwriting and collaborative intervention for children with Autistic Spectrum Disorder. *Irish J Occupational Therapy* 2018;46(1).