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EFFICACY OF ORAL MOTOR INTERVENTION ON EATING BEHAVIOUR OF AUTISTIC CHILDREN: A RANDOMIZED CONTROLLED TRIAL

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ABSTRACT

Background

Eating is an important aspect in childhood it is related to growth and development process, 25% of all children experience eating problems during the early years of life, but this number may rise to as high as 80% in children with developmental difficulties. "Selective" or "picky eating," is defined as eating a limited variety of food and refusal to eat or taste new foods. This is a frequent problem in children with autism spectrum disorders.

Many autistic children will have eating behavioural problem in their early years. This may lead to having problems in learning of the skills essential for daily activities and also limited researchers or available to manage oral motor and behaviour issue related to eating behaviour among autistic children. Hence an attempt has been made in this study to fine the solution for eating behaviours of autistic children.

Objectives

- To evaluate the level of autism by using Childhood Autism Rating Scale (CARS).
- To assess the abnormal eating behaviour of autistic children by using Brief Autism Mealtime Behaviour Inventory (BAMBI).
- To evaluate effectiveness of oral motor intervention in reducing abnormal eating behaviour of autistic children.

Study design

The study was done with quasi experimental design consisting of 15 participants in Experimental group and 15 participants in Control group. The sample included boys and girls who were diagnosed as mild to moderate level of autism with age group between 3-6 years. Convenient sampling technique was adopted. Independent variable is oral motor intervention, eating behaviour of autism is a dependent variable.

Method

The pre data were collected in both group at entry level with CARS and BAMBI scale. Post data were collected after the treatment with BAMBI scale. During the intervention phase the student engaged in oral motor intervention during the mealtime for 40 minutes timed by therapist.

The control group receive only OT management and the experimental group receive OT management with oral motor intervention. The therapy was given for 3-month duration comprising 36 sessions, 12 sessions are given to each one month in total 3-month period.

Results

Paired 't' test has been calculated for the experimental group (BAMBI). The mean of pre-test was 88.33 and the post test was 54.93. The calculated 't' value was 50.0286 with level of significance 0.05. It indicates there is a highly significant difference between pre and post-test values.

Conclusion

From this study, it is concluded that there is a significant improvement in eating behaviour of the children with autism through oral-motor intervention.

Keywords: Autism, Eating behaviour, Occupational Therapy, Oral motor intervention

INTRODUCTION

Eating is an important aspect in childhood because it is related to growth and development process. Besides, eating also reflects parent's attentions in rearing their children.

Picky eating and food avoidance is a common problem in autistic youth [1], while such difficulties yet to be understood well to manage [2]. There are wide spread views that sensory issue is a significant factor involved [3]. About 25% of all children experience eating problems during the early years of life, but this number may rise to as high as 80% in children with developmental difficulties. "Selective" or "picky eating," is defined as eating a limited variety of food and refusal to eat or taste new foods. This is a frequent problem in children with autism spectrum disorders.

Furthermore, difficulties in social interaction and communication that are the characteristic of children with autism may lead them to have problems in learning behaviour needed for daily activity such as eating behaviour. Restricted, repetitive behaviour, sameness, distress over trivial

change and interest in following routines or ritual may contribute in the idiosyncratic eating behaviour.

Many autistic children will have eating behavioural problem in their early years. This may lead to having problems in learning of the skills essential for daily activities and also limited researches are available to manage oral motor and behaviour issue related to eating behaviour among autistic children. Hence an attempt has been made in this study to fine the solution for eating behaviours of autistic children.

Picky eating is prominent in children with ASD and cause for significant parental stress; however, we have yet to determine efficacious interventions likely due to our lack of knowledge related to the underlying factors of eating behaviour [4]. Few authors proposed three Picky Eating categories: transient PE in early childhood (23.3%), persistent PE into late childhood (3.7%) and PE absent (73.0%) [5]. However, this 'outgrow as grow' theory is disputed by the findings that despite improvement over time, 63% did not reach an age-adequate food intake after a long follow-up period averaging 6 years 3 months [6].

The gap in the understanding of the nature and course of picky eating is not a concluded one. The nature of the picky eating is further complicated by the findings regarding the presence of emotional over-eating and under-eating behaviours. Autistic children are both more emotional over-eating and more emotional under-eating behaviours than their typical developing peers [7].

Majority of the interventions in previous studies were single-component interventions, with the sensory approach being the type that was most frequently utilised, followed by the nutrition approach and parenting approach. Given the evidence that picky eating is influenced by various factors, a multi-component intervention can provide a substantial impact on future programmes [8, 9].

The current study also necessitated as many occupational therapists have been focusing on coaching and education techniques to correct the picky eating [10]. Therefore, this study is intended to find effectiveness of oral motor intervention in eating behaviour of autistic children.

AIM:

The aim of the study is to find out the effectiveness of Oral motor intervention in reducing abnormal eating behaviour in children with autism.

OBJECTIVES:

To evaluate the level of autism by using Childhood Autism Rating Scale (CARS). To assess the abnormal eating behaviour of autistic children by using Brief Autism Mealtime Behaviour Inventory (BAMBI). To evaluate effectiveness of oral motor

intervention in reducing abnormal eating behaviour of autistic children.

METHODOLOGY:

Research design

The study was done with quasi experimental design consisting of 15 participants in Experimental group and 15 participants in Control group. Informed consent was obtained from the parents of autistic children and Ethical clearance obtained from Institutional Ethical Committee (IEC 2023/OT/56 dated 20.02.2023).The selection criteria of the samples included boys and girls who were diagnosed as mild to moderate level of autism with age group between 3-6 years. Children with visual and hearing impairments and ASD children with other associated medical conditions were excluded. Convenient sampling technique was adopted. The pre data were collected in both group at entry level with Childhood Autism Rating Scale and Brief Autism Mealtime Behaviour Inventory (BAMBI) [11] scale. Post data were collected after the treatment with BAMBI scale. Independent variable is Occupational Therapy oral motor intervention, while Dependent variable was eating behaviour of autism. The study was conducted at Occupational Therapy foundation, Erode. The study duration was one year including 3 months of intervention. During the intervention phase the student engaged in oral motor intervention during the mealtime for 40 minutes timed by therapist.

The control group receive only OT management and the experimental group receive OT management with oral motor intervention. The therapy was given for 3-month duration comprising 36 sessions, 12 sessions are given to each one month in total 3-month period.

Materials used:

The eatables and other objects namely Pori, Sundal, Potato chips, Ragi chips, Ragi murukku, Ragi vita, Apple, Banana, Millets (biscuits, murukku, chips), Eating vegetable [12], Apron, Gloves, Lunch towel, Brush (finger brush, vibrating brush).

Training sessions

Each session consisted of 40 minutes and it was planned in such a way that weekly there were 3 sessions and for the total duration of 3 months there were 36 sessions (12 sessions per month X 3 months).

Oral motor intervention

Preparation:

Therapist worked way from more distal and less personal body areas. For example, we can start by lightly squeezing their hands rhythmically, and then squeeze arms, then shoulders, then cheeks. It needs to be done a bit of this every time therapist started working around the mouth.

Playful approach was adopted to increase comfort. Before therapist putting hands on or around the child's mouth, let them bite

down on a washcloth and play "tug-of 'war" with it, where we try to pull it out of their teeth.

Stage 1:

Therapist massaged around the mouth area. Rubbed firmly 3-4 times with pads of thumbs and fingers from cheeks towards lips, then from nose and chin towards lips.

Stage 2:

Gum massage was given using index finger and thumb, starting in a pincer position. Started above the front teeth. Slide index finger back along the upper gums on that side quickly, firmly, but carefully.

Then moved index right down to the bottom gums and slide back to the front.

Later used the thumb to do the same thing along the upper and then lower gums on the other side. If confident about not getting bitten, pressed the pad of thumb against the palate, right behind the front teeth, and push up firmly but gently 3 times **[13, 14]**.

Stage 3:

There are two methods. First method consisted of using index and middle fingers at opposite sides of bottom teeth (one finger outside of back teeth on one side, the other outside back teeth on the opposite side), hook fingers right over the very back teeth and briefly and firmly tug downward and slightly forward 2-3 times. Second method consisted of just hooking index finger over the front bottom teeth and tug forward 3 times.

After the intervention scores were statistically analysed with "t" test and results were discussed.

DATA ANALYSIS AND RESULTS:

Table 1 shows that comparison between the control group pre test and experimental group pre test score mean values 87.20;88.33and "t" values 0.5621 and "p" values 0.0001which is greater than acceptance levels of significance of 0.05 so it is considered to be not statistically significant.

Table 2 shows that comparison between the control group (BAMBI) pre-test and post test score mean values 87.20; 87.00 and "t" value1.8708 and "p" value 0.0824 which is more than acceptance level of significance of 0.05. So, it is not statistically significant.

Table 3 shows that comparison between the experimental group (BAMBI) pre-test and post test score mean values 88.33;54.93 and "t" values 50.0286 and "p" values 0.0001 which is less than acceptance level of significance of 0.05. So, it is extremely statistically significant. It shows that experimental group has significant improvement.

Table 4 shows that comparison between the control group post test and experimental group post test score mean values87.00;54.93 and "t" values 14.9905 and "p" values 0.0001which is less than acceptance levels of significance of 0.05 so

it is extremely statistically significant. It shows that experimental group has more improvement comparatively control group.

Table 1: Comparison Of Eating Behaviourin Pre Test of Both Control and Experimental Group

S. No.	BAMBI	Mean	M.D	S.D	"t"value	'p'value
1	Pre test (control group)	87.20		5.48		
2	Pre test (experimental group)	88.33	1.13	5.56	0.5621	P>0.05

Graph I: Comparison of Eating Behaviour in Pre Test of Both Control and Experimental Group
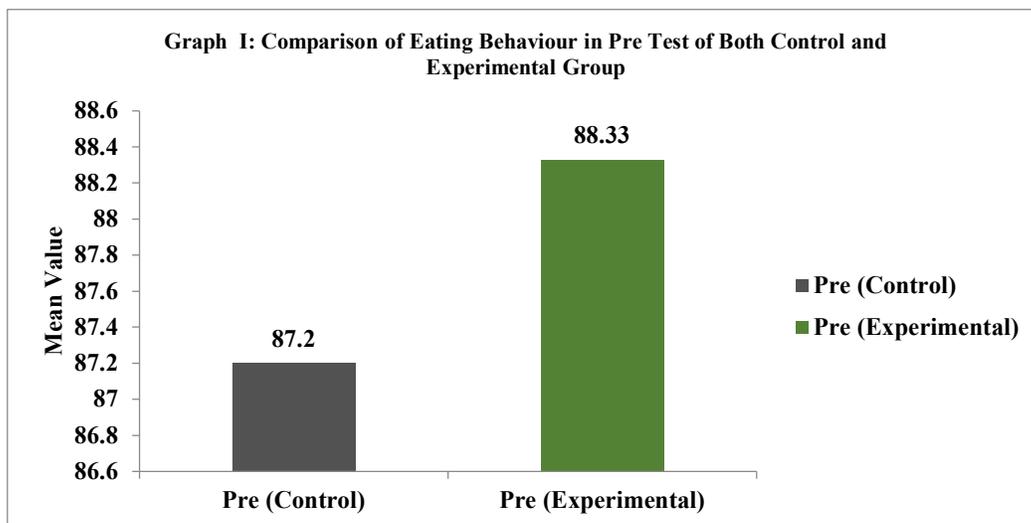
Table 2: Comparison of Eating Behaviour Between Pre and Post Test In Control Group

S. No.	BAMBI	Mean	M.D	S.D	"t"value	'p'value
1	Pre test	87.20		5.48		
2	Post test	87.00	0.2	5.66	1.8708	P>0.05

Graph II: Comparison of Eating Behaviour Between Pre and Post Test in Control Group
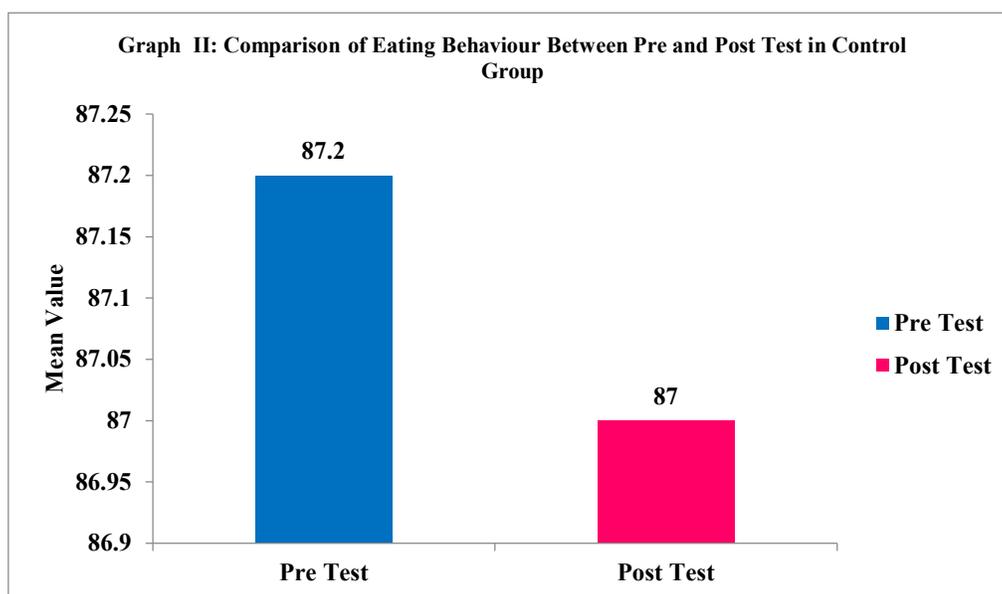
Table 3: Comparison of Eating Behaviour Between Pre and Post Test in Experimental Group

S. No.	BAMBI	Mean	M.D	S.D	"t"value	'p'value
1	Pre test	88.33	33.4	5.56	50.0286	P<0.05
2	Post test	54.93		6.05		

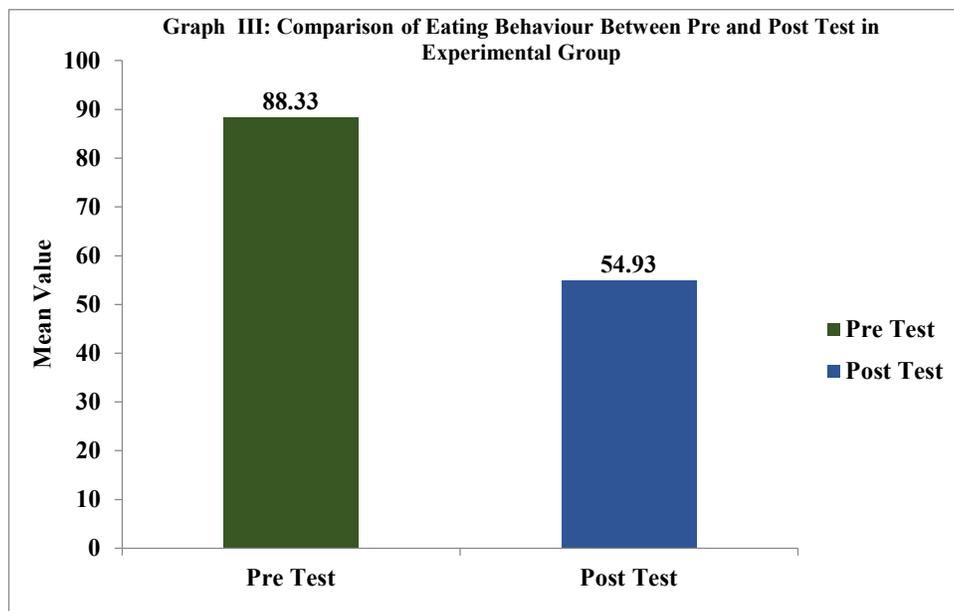Graph III: Comparison of Eating Behaviour Between Pre and Post Test in Experimental Group

Table 4: Comparison of Eating Behaviour in Post Test of Both Control and Experimental Group

S. No.	BAMBI	Mean	M.D	S.D	"t"value	'p'value
1	Post test (control group)	87.00	32.07	5.66	14.9905	P<0.05
2	Post test (experimental group)	54.93		6.05		

Graph - IV Comparison Of Eating Behaviour In Post Test Of Both Control And Experimental Group
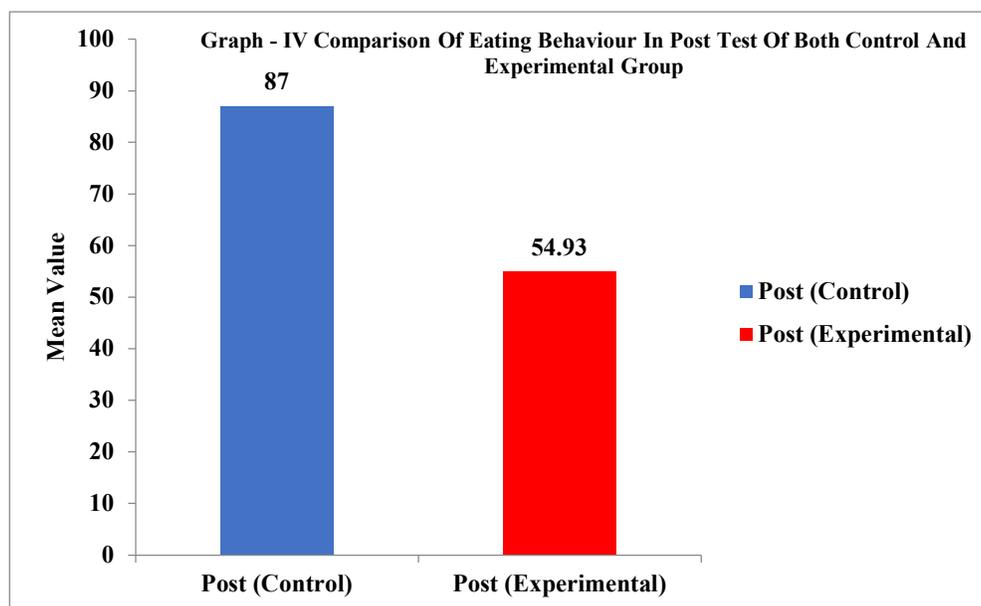
DISCUSSION

The purpose of this study was to find out the effect in improving eating behaviour in autism children. The aim of the study was to improve the eating behaviour of autism children.

In this study Wilbarger's oral-motor intervention was given along with conventional Occupational Therapy. The oral-motor intervention was given to improve the eating behaviour in autistic children. The experimental group received oral motor intervention during their snacks time and lunch time, 12 sessions in a month for the period of 3 months. Total 36 sessions were conducted within 3-month duration. The pre-test is taken by BAMBI. The CARS is the screening tool, which was used to screen and fine the level of autistic children.BAMBI was used to evaluate the eating behaviour in autistic children. After the evaluation experimental group engaged in oral motor intervention during the mealtime for 40 minutes timed. After the 36-sessionpost-test have been conducted and value suggests that there is a significant improvement in eating behaviour in autistic children in the age group of 3-6 years respectively.

Unpaired 't' test has been calculated for the both experimental and control group (BAMBI).The mean of pretest was found to be 87.20(control} and 88.33(experimental} respectively. The calculated't' value was obtained to be 0.5621 with level of significance 0.05 and the table 't' value is found to be 2.05.Hence the table's 't' value is greater than calculated 't' value shows that unanimity of the group that is no significant difference between both groups.

These findings were supported by Maulinahandayani *et al* (2012) **[15]** they conducted a study about the eating behaviour of autistic children. The study examines the eating behaviour of 39 Japanese and 13 Indonesian parents of autistic children and 197 Japanese, 144 Indonesian typically developing children was evaluated by using BAMBI completed by parents of 3-6 years children. This study provided information that autism children have problem in eating behaviour.

Paired 't' test has been calculated for the control group (BAMBI). The mean of pretest was found to be 87.20 and the post test was 87.00. The calculated't' value was obtained to be 1.8708 with level of significance 0.05 and the table 't' value is found to be 2.15. Hence the table 't' value is greater than calculated 't' value. So, there is no significant difference between pre and post-test values.

Paired't' test has been calculated for the experimental group (BAMBI). The mean of pre-test was found to be 88.33 and the post test was 54.93. The calculated't' value was obtained to be 50.0286 with level of significance 0.05 and the table 't' value is

found to be 2.15. Hence the table 't' value is less than calculated 't' value. So, there is a highly significant difference between pre and post-test values.

These findings were supported by Rinita B. Laud *et al* (2009) **[16]** conducted study about the "treatment outcomes for sever feeding problems in children with autism spectrum disorder". Study done with age group of 3 years with autism there were 46 children (40 male and 6 female). Children are evaluated by CEBI. Children received behaviour therapy 3 hours a day and oral motor therapy 1 Hours a day. Results showed that average caregiver satisfaction ranked between very satisfied and extremely satisfied.

Unpaired 't' test has been calculated for the both experimental and control group (BAMBI). The mean of post-test was found to be 87.00(control} and 54.93(experimental} respectively. The calculated 't' value was obtained to be 14.9905 with level of significance 0.05 and the table 't' value is found to be 2.05. Hence the table's 't' value is less than calculated 't' value.So, there is a highly significant difference between both group means.

These findings were supported by Kozlowski, A. M (2011) **[17]** was conducted study to compare the combining stimulus fading, escape extinction, differential reinforcement for treating food and liquid refusal in children with autism. The various studies presented have shown that food and liquid refusal and inappropriate mealtime behaviours are a concerning and common problem among children who have the diagnoses of autism spectrum disorder. She concluded that these techniques seem the most effective when used in combination with each other.

Present study has demonstrated that patient in the experimental group who receives oral motor intervention shows more statistically significant than the control group, Therefore the present study rejecting null hypothesis and accepting the alternative hypothesis. Result supports a tentative conclusion that oral motor intervention is a factor reducing abnormal eating behaviour in children with autism.

CONCLUSION

The result of this study indicates that children who underwent oral-motor intervention along with conventional occupational therapy intervention show more improvement than who had conventional occupational therapy intervention only.

REFERENCES:

[1] Baraskewich J., Von Ranson, K.M., McCrimmon, A., and McMorris, C.A (2021): Feeding and eating problems in children and adolescents with autism: A scoping review. Autism, 25(6), 1505-1519.

[2] Adams, S. N (2022): Feeding and Swallowing Issues in Autism Spectrum Disorders. Neuropsychiatric Disease and Treatment, 18, 2311 – 2321. https://doi.org/10.2147/NDT.S3325 23.

[3] Petitpierre, G, Luisier, Anne-Claude, and Bensafi, M (2021): Eating behaviour in autism: senses as a window towards food acceptance, Current Opinion in Food Science, Vol.41, 210-216.

[4] R. Renuchitra, P. Nagalakshmi. "Effect of Behavioral and Oral Motor Training in Eating Behavior of Mentally Retarded Children", International Journal of Science and Research, Volume 7 Issue 5, May 2018.

[5] Bourne L., Bryant-Waugh, R., Mandy W., and Solmi F (2023): Investigating the prevalence and risk factors of picky eating in a birth cohort study, Eating Behaviours, Vol 50: 101780. https://doi.org/10.1016/j.eatbeh.202 3.101780.

[6] Dumont E., Jansen, A., Duker, P. C., Seys, D. M., Broers, N. J., and Mulkens, S (2022): Feeding / Eating Problems in Children Who Refrained From Treatment in the Past: Who Did (Not) Recover?,

Frontier Paediatrics, Vol. 10, May 2022. https://doi.org/10.3389/fped.2022.8 60785.

[7] Wallace, G.L., Richard, E., Wolff, A., Nadeau, M., and Zucker, N (2021): Increased emotional eating behaviours in children with autism: Sex difference and links with dietary variety, Autism, 25 (3), 603 – 612. https://doi.org/10.1177/1362361320 942087

[8] Kamarudin M S., Shahril M R., Haron H., Kadar M., Safii N S., Hamzaid N H (2023): Interventions for Picky Eaters among Typically Developed Children – A Scoping Review. Nutrients, 3:15(1): 242. https://doi.org/10.3390/nu15010242

[9] T.Jegadeesan, P.Nagalakshmi, R.Renuchitra., "Study of sensory processing Dysfunctions in Typically developing Children and Children with attention Deficit and Hyperactivity Disorder".,Indian Journal Of Public Health Research And Development.2020. Volume 11, Number 8. Page 167-173.

[10] Chilman L B., Meredith P J., Kennedy-Behr A., Campbell G., Frakking T., Swanpoel L., and Verdonck M (2023): Picky eating

in children: Current clinical trends, practices, and observations within the Australian health-care context, Australian Occupational Therapy Journal, Vol 70 (4), 471-486. https://doi.org/10.1111/1440-1630.12869.

[11] Bekir Fatih Meral, Ahmet Fidan. A Study On Turkish Adaptation, Validity And Reliability Of The Brief Autism Mealtime Behavior Inventory (BAMBI). Procedia - Social and Behavioral Sciences 116 (2014) 403 – 408.

[12] Ahearn, W. H.: Using simultaneous presentation to increase vegetable consumption in a mildly selective child with autism. Journal of Applied Behavior Analysis, 36(3): 361-5, 2003, *[5a]]* http://www.ncbi.nlm.nih.gov/pubmed/14596577.

[13] Clark, G. F.; Avery-Smith, W.; Wold, L. S.; Anthony, P.; and Holm, S. E.: Specialized knowledge and skills in feeding, eating, and swallowing for occupational therapy practice. American Journal of Occupational Therapy, 61(6): 686-700, 2007. *[5b]* http://www.ncbi.nlm.nih.gov/pubmed/18217635.

[14] Clawson, E. P.; Palinski, K. S.; and Elliott, C. A.: Outcome of intensive oral motor and behavioural interventions for feeding difficulties in three children with Goldenhar Syndrome. Pediatric Rehabilitation, 9(1): 65-75, 2006.

[15] Maulina Handayani, Elisabeth Siti Herini, Satoshi Takada. Eating Behavior of Autistic Children. Nurse Media Journal of Nursing, *2, 1, 2012, 281-294*.

[16] Laud, R. B.; Girolami, P. A.; Boscoe, J. H.; and Gulotta, C. S.: Treatment outcomes for severe feeding problems in children with autism spectrum disorder. Behavior Modification, 33(5): 520-36, 2009.

[17] Kozlowski, A. M.; Matson, J. L.; Fodstad, J. C.; and Moree, B. N.: Feeding therapy in a child with autistic disorder: Sequential food presentation. Clinical Case Studies, 2011. 10(3): 236-246.