

## Managing Feeding Problems in Persons with Autism using Behavioral Interventions

\*Abiodun Taofikat Adewunmi<sup>1</sup>, Rebecca Titilope Ajayi<sup>2</sup>

<sup>1</sup>Learning Disabilities Unit, Department of Special Education, University of Ibadan, Ibadan and  
<sup>2</sup>Alba Home School, Ibadan, Nigeria.

### Abstract

**Background:** This study examined the effectiveness of behavioral intervention on feeding problem in persons with autism in Ibadan, Nigeria.

**Methodology:** Pretest-posttest, control group quasi-experimental research with a 2x2 factorial matrix. Data was collected with the Feeding Behavioral Analysis Test. Ten (10) persons with non-verbal autism and evidence of poor feeding habits (selectivity by food type) attending a residential school in Ibadan participated in the study. The one-way between-subjects Analysis of Co-variance (ANCOVA) was used to determine the effectiveness of the behavioral intervention.

**Results:** Positive reinforcement was effective in reducing feeding problem in children with autism ( $F_{(1,7)} = 3.023, p < 0.05$ ), compared to the control group ( $t(8) = -5.24, p < 0.05$ ). Further analysis revealed significant main effect of the age of the participants ( $F_{(1,7)} = 5.343, p < 0.05$ ).

**Conclusions:** there is a need for teachers, counsellors, caregivers, parents, minders and clinical psychologists to adopt positive reinforcement in the management of feeding problems among persons with autism.

**Keywords:** Autism; Feeding; Feeding Problems; Behavioral Intervention.

### Introduction

Children with autism spectrum disorder exhibit some forms of restrictive and ritualistic behavior that affect their eating habits categorized as behavioral feeding disorders.<sup>[1]</sup> Feeding and eating problems have been described as pervasive problems that affect persons with autism across all ages and life span.<sup>[2]</sup> Feeding problems such as picky eating and food avoidance, restrictive food intake or pre-occupation with body shape are common among individuals with autism.<sup>[3]</sup> Empirical evidences show that atypical eating behavior such as limited food preferences and brand-specific preferences occur much more often in children with autism, when compared to children with other disorders and children in the general population.<sup>[4]</sup> These children experience

significantly more feeding problems when compared with their peers.<sup>[5]</sup> Up to 70.4% of children with autism have atypical eating behavior.<sup>[4]</sup>

Without treatment, these feeding problems persist into late childhood.<sup>[6]</sup> It can also lead to increased risk for learning and behavioral problems.<sup>[7]</sup> Treatment plans addressing feeding interventions typically target several objectives, which includes elimination of mismanaged mealtime routines, intervening with food selectivity, decreasing food

**Corresponding Author:** \*Abiodun T. Adewunmi, Ph.D. Learning Disabilities Unit, Department of Special Education, University of Ibadan, Ibadan, Nigeria  
habins.city@gmail.com.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

**How to cite this article:** Adewunmi AT., Ajayi RT. Managing Feeding Problems in Persons with Autism using Behavioral Interventions. Niger Med J 2022;63;(1): 16-21

Access this article online

Quick Response Code:



Website:

www.nigerianmedjournal.org

refusal and increasing food acceptance.<sup>[8]</sup> Food selectivity is explained as the limited consumption of foods based on texture, familiarity and taste.<sup>[9]</sup> It is also a strong aversion or liking to specific sorts of foods.<sup>[10]</sup> Also, children with autism can be fastidious about which foods they accept and which food they refuse.<sup>[11]</sup> Health care professionals treat feeding disorders by evaluating the child's diet, and speech pathologists may work with the child to strengthen functional eating muscles.

There is empirical support for behavioral interventions as an effective method- whether when used independently or in conjunction with other treatment plans, in managing feeding difficulties in young children.<sup>[12]</sup> However, there is dearth of research in early intensive behavioral intervention and other widely recognized treatment programs for managing feeding problem of children with autism.<sup>[13]</sup>

Search results in databases of Medline, PsychINFO, CINHALL and Child Development and Adolescent Studies showed that 74% of the 47 studies on autism spectrum disorders were carried out in South Africa and Nigeria, with the four themes identified in the studies excluding feeding behavior of this special population.<sup>[14]</sup> The researchers concluded the evidence base of the reviewed studies were too scanty to provide the required information to plan adequately for effective intervention strategies for children with autism spectrum disorders in Africa.<sup>[14]</sup>

Thus, we aimed at investigating the effectiveness of the use of a behavioral intervention to manage the feeding problem (selectivity by food type) of persons with autism. The study also sought to determine the effect of age on the feeding problems of these persons. The whole hypotheses tested were: (1) there is no significant main effect of behavioral intervention in reducing feeding problem (selectivity by food type) in persons with autism, and (2) there is no significant main effect of age in reducing the feeding problem in persons with autism.

## Materials and Methods

### Ethics

The procedures followed were in accordance with the Helsinki Declaration of 1975 as revised in

2000. The approval for the study was obtained from the study center where the research was conducted as permitted by the school authorities and approved by the parents of the participants. Because of the peculiarities of the participants, informed consents of the participants were obtained from their parents. Ethical approval for the study was obtained from the Oyo State Ministry of Health, with the number AD 13/479.

### Study design:

#### *Selection and Description of Participants:*

The participants for the study comprised 10 persons with autism and evidence of feeding problem (selectivity by food type) attending a residential school in Ibadan. The rationale for this sample size was based on the available number of persons with non-verbal autism in the study area and the sampling techniques used in selecting the samples for the study- the purposive sampling technique, being an acceptable technique in exploratory or field research survey.<sup>[15]</sup>

The task of identifying the participants was left to the minders, who were able to select 10 residents of the school as presenting with feeding problem of selectivity by food type after using the Feeding Behavioral Analysis Test<sup>[16]</sup> to rate the feeding behavior of the residents of the school. The test was divided into three parts namely; Personal Data / Demographic Information, Feeding behavior and Feeding level identification. The test classified feeding behavior into total refusal, type selectivity, texture selectivity and type and texture selectivity. Minders rated the feeding behavior of the residents based on the observed behavior the residents exhibited over time.

Residents who were rated as having type selectivity as a feeding behavior were qualified to participate in the study. Only 10 of such were so identified, out of the 17 residents of the school at the time of the research. The participants were males, aged between 15 and 35 years ( $M = 25.3$ ). Three of the participants (30%) had spent between 1 and 3 years in the school, 5 (50%) had spent between 4 and 6 years in the school, and 2 (20%) had spent between 7 and 9 years in the school.

*Technical information:* The researchers visited the

school where the persons with autism used as samples in the study attend, and explained the purpose of the research, which was mainly to develop behavioral intervention that will help reduce feeding problem among persons with autism, to the parents of these children and school authority, in order to obtain their given-kind consent. The minders in the school were liaised with and served as research assistants during the experiment. The procedural steps in the study were discussed with the minders and their suggestions sought on how to effectively carry out the study. The steps are as follows:

**Week one;** this week was the time used for the initial assessment (prescore); which enabled the researchers and the research assistants (minders in the home) to assess the residents' feeding problem using the Feeding Behavior Analysis Test.<sup>[16]</sup> The test was to determine the feeding behavior of the residents and only those who exhibited selectivity by food type were to be selected to participate in the study. The researchers also used the time to determine the best reinforce that can be used in the study. The preferred foods of the participants were also identified, as well as their non-preferred healthier foods. The preferred foods were noted to be yoghurt, ice cream, carbonated drinks and cakes. The non-preferred healthier foods were low-carbohydrate, moderate protein high-fat diets like potatoes, beans, vegetables and creamed milk.

**Week two:** the researchers and the research assistants divided the 10 participants into two groups of experimental group and control group through simple randomization technique by asking the participants to choose from cuts of paper containing 5 cuts of number 1 and 5 cuts of number 2. Participants who chose number 1 became the participants for the experimental group, while participants who chose number 2 were the participants for the control group. Each participant per group was numbered serially as they chose the number cuts that identified the group they belong to.

**Weeks three to six;** during these weeks, the treatment was administered which follows the reinforcement procedure: giving of preferred food and drinks following positive reinforcement, sometimes alone or in combination with social

praises such as clapping of hand and hugging, during meal-times. The researchers demonstrated to the participants that they will have access to their preferred foods or drinks after a bite of non-preferred food.

Persons in the experimental group were required to accept one bite of a non-preferred food to gain access to a bite of a preferred food item. They were then positively reinforced by being shown a gift pack that awaits them when they increase their bites of the non-preferred foods. They were then socially praised afterwards. Participants in the control group were not given any reinforcement. Subsequently, the experimenters increased the number of bites required to obtain the preferred food item. The bites of the preferred food was increased to two, three, four, five or six as each participant decided to increase the bite of the non-preferred foods to two, three, four, five or six, i.e. the more the bites of a non-preferred food is taken, the more the bites of a preferred food is allowed. However, social praise continued to be delivered after each bite.

Gradually, the bites of the preferred food was reduced as the participants increased their bites of non-preferred foods. Thereafter, the feeding behavior of each participant was then recorded, viz-a-viz their bites of preferred and non-preferred foods, using the Feeding Behavioral Analysis Test.

In the experimental group, for participants 1 and 2, a decreasing trend was observed in the number of bites accepted when the requirement was increased to four bites. Therefore, the terminal requirement was two bites for these participants. Participants 3, 4, and 5 were able to have their terminal bites at 6. The participants in the experimental group's bites are presented in Table 1.

The type of feeding problem was identified as selectivity by food type by the Feeding Behavioral Analysis Test developed by earlier researchers<sup>[16]</sup> and used in the study. The test was used as pretest and post test measures, and was designed to assess the feeding problems and feeding improvement of children with autism.

The one-way between-subjects ANCOVA was used for statistical analysis. The hypotheses were tested

at 0.05 level of significance, and there were no drop outs reported in the study.

Results: There was a significant main effect of behavioral intervention ( $F_{(1, 7)} = 9.024, p < 0.05$ ) in reducing feeding problems in persons with autism (Table 2), and there was a significant main effect of age ( $F_{(1,7)} = 5.343, p < 0.05$ ) in reducing feeding problem (selectivity by food type) in this population (Table 3).

**Table 1:** Summary of analysis of bites of participants in the experimental group

Pre-test			Post-test		
Participant	No of test	Sum of bites	Participant	No of test	Sum of bites
1	15	15	1	60	180
2	15	16	2	60	193
3	15	14	3	60	243
4	15	17	4	60	225
5	15	15	5	60	287

**Table 2:** The main effect of between-treatment in reducing feeding problems in persons with autism

Source	Type III Sum of				
	Squares	Df	Mean Square	F	Sig.
Corrected Model	2215.000	2	1024.000	9.324	.009
Intercept	1091.001	1	1009.001	6.009	.002
Pretest	210.000	1	210.000	3.023	.004
Treatment	3421.435	1	1353.989	9.024	.000
Error	4342.000	7	222.216		
Total	123010.000	10			
Corrected Total	4420.000	9			

R Squared = .865 (Adjusted R Squared = .524)

**Table 3:** Summary of the analysis of the main effect of age of the participants on their feeding problems

Source	Type III Sum of				
	Squares	Df	Mean Square	F	Sig.
Corrected Model	976.000 <sup>a</sup>	2	432.200	3.232	.034
Intercept	523.112	1	421.342	-2.221	.009
Pretest	564.875	1	564.875	5.343	.003
Age	223.110	1	120.989	4.597	.057
Error	4233.000	7	543.571		
Total	1764.000	10			
Corrected Total	4200.000	9			

a. R Squared = .211 (Adjusted R Squared = .013)

**Discussion**

The findings which indicated significant main effect of positive reinforcement (a behavioral intervention) on the feeding problem of persons with autism implies that the eating behavior of persons with autism, which is selectivity by food type could be managed effectively with the use of a behavioral intervention as evidenced by the result of this study. This means that these children could be helped to improve on their feeding habits and to feed like those children without any difficulty, if they are presented with positive reinforcement.

Therefore, this finding acquiesced earlier finding that examined the effects of having or not having access to preferred food items prior to meals during which positive reinforcement was provided for acceptance of bites of non-preferred food, wherein it was realized positive reinforcement had significant effect on management and treatment of feeding problem in children with autism.<sup>[17]</sup> This finding also agrees with the earlier discovery of significant effect of positive reinforcement on management and treatment of feeding problem in children with autism, where it was observed that gradually decreasing the amount of chocolate mixed with milk resulted in increased milk drinking.<sup>[18]</sup> It also supports findings of improved consumption of novel foods of an adolescent with autism who had chronic food selectivity problem and disruptive meal time behavior.<sup>[9]</sup> The adolescent was managed with applied paced-prompting and differential

positive reinforcement.<sup>[9]</sup>

Summary of key findings (positive reinforcement as a behavioral intervention is effective in managing feeding problems in persons with autism, and age has a significant impact on the feeding behavior of persons with Autism. *Strengths and limitations of the study*: the study is important in that it has bridged the gap between knowledge and practice, as has provided ample evidence that behavioral intervention (as expressed in the use of positive reinforcement) is effective in reducing the feeding problem (as expressed by selectivity by food type) of children with autism. It has also explained the age effect in the use of this intervention.

Nonetheless, the study was limited in several ways: the participants were from the same residential center, so the moderating effect of the environment could not be contained. Also, a small sample size was used, thereby limiting the applicability of the findings. The controversies surrounding the study includes ascertaining the efficacy of the intervention, in so much as the intervention was done by familiar minders in a familiar environment with a limited scope. Based on these observations, future researchers are advised to make use of larger samples so that better generalization can be made from the findings. Also, researches as this should be carried out on periodical or regular basis in order to always ascertain the effectiveness of this behavioral intervention (positive reinforcement). The finding on the main effect of age on feeding problems on persons with autism is novel to this study.

## References

1. Schwarz SM. Feeding disorders in children with developmental disabilities. *Infants and Young Children* 2003; **16**:317–330.
2. Vissoker RE. Latzer Y. Gal E. (2015). Eating and feeding problems and gastrointestinal dysfunction in autism spectrum disorders. *Research in Autism Spectrum Disorders* 2015; **12**:10-21.
3. Baraskewich J. von Ranson KM. McCrimmon A. McMorris CA. Feeding and eating problems in children and adolescents with autism: a scoping review. *Autism* 2021; **25**: 1505-1519.
4. Mayes SD. Zicgraf H. Atypical eating behaviors in children and adolescents with autism, ADHD, other disorders, and typical development. *Research in Autism Spectrum Disorders* 2019; **64**:76-83.
5. Sharp WG. Berry RC. McCracken C. Nuhu NN. Marvel E. Sauliner CA. Klin A. Jacquess DL. Feeding problems and nutrient intake in children with autism spectrum disorders: a meta-analysis and comprehensive review of the literature. *Journal of Autism Spectrum Disorders* 2013; **43**:2159-2173.
6. Suarez MA. Nelson NW. Curtis AB. Longitudinal follow-up of factors associated with food selectivity in children with autism spectrum disorders. *Autism* 2014; **18**: 924-932.
7. Levin DS. Volkert VM. Piazza CC. A multi-component treatment to reduce packing in children with feeding and autism spectrum disorders. *Behavior Modification* 2014; **38**: 940-963.
8. Feltmeier MI. Behavioral feeding intervention for pediatrics. *Research Papers* 2014; Paper 506.
9. Knox M. Rue HC. Wildenger L. Lamb K. Luiselli JK. Interventions for food selectivity in a specialized school setting: Teacher implemented prompting, reinforcement, and demanding feeding for an adolescent student with autism. *Education and Treatment of Children* 2012; **35**: 407-417.
10. Williams KE. Seiverling L. *Broccoli boot camp* 2018. Woodbine House.
11. vanDijk MWG. Buruma ME. Blijid-Hoogews EMA. Detecting feeding problems in young children with autism spectrum disorder. *Journal of Autism and Developmental Disorders* 2021; **51**:4115-4127.
12. Kerwin MLE. Pediatric feeding problems: a behavior analytic approach to assessment and treatment. *The Behavior Analyst Today* 2003; **4**:160-174.
13. Reichow B. Wolery M. Comprehensive synthesis of early intensive behavioural interventions for young children with Autism based on the UCLA Young Autism Project Model. *Journal of Autism and Developmental Disorders* 2009; **39**:23-41
14. Abubakar A. Ssewanyana D. Newton CR. A

- systematic review of research on autism spectrum disorders in Sub-Saharan Africa. *Behavioural Neurology* 2016; **2**:1-14.
15. Babbie ER. The practice of social research. Belmont: Wadsworth Publishing Company. 1998
  16. Ahearn WH, Castine T, Nault K, Green G. An assessment of food acceptance in children with autism or pervasive developmental disorder-not otherwise specified. *Journal of Autism and Developmental Disorders*; 2001; **31**:505–511.
  17. Levin L, Carr EG. Food selectivity and problem behavior in children with developmental disabilities analysis and intervention. *Behavior Modification*; 2001; **25**:443–470.
  18. Tiger JH, Hanley SC. Using reinforcer pairing and fading to increase the milk consumption of a preschool child. *Journal of Applied Behavior Analysis*, 2006, 39, 399-403. doi: 10.1901 /jaba.2006.6-06.