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SPEECH-LANGUAGE THERAPY INTERVENTION FOR CHILDREN WITH AUTISM SPECTRUM DISORDER: INSIGHT'S FROM BEHAVIOUR

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Abstract: Autism spectrum disorder is a neurodevelopmental disorder that affects socio-communicative and behavioral abilities. In the language aspect, there is a greater impairment at the pragmatic level and in non-verbal aspects. The objective of this study was to characterize the severity of autism spectrum disorder in girls, pre and post speech language therapy, and describe the process of speech language intervention using educational software program, picture exchange communication system allied to the principles of behavioral analysis applied to language. The Autism treatment evaluation checklist with the parents was applied. Then, a therapeutic programs session of 50 minutes was developed, one per week and then the questionnaire was reapplied.

Keywords: Autistic Disorder, Speech-Language, therapy, intervention, children, behavior.

INTRODUCTION

Autism Spectrum Disorder (ASD) is a disorder of neurological development, characterized by a set of behavioral conditions with impairments in two main domains: socio-communicative and behavioral ones (fixed or repetitive behaviors), with the onset of symptoms occurring from birth or early childhood. [1]

This definition is based on the new classification described in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), [2] which standardizes the diagnosis and aims to increase the specificity of the diagnosis of ASD. The clinical condition can present very different levels of severity, making individuals with the same diagnosis present very different clinical manifestations, so the term "spectrum." In this new classification, classic autism, Asperger's disorder, childhood disintegrative disorder and the developmental disorder of development without other specification are included in the ASD.

Language alterations, although not an exclusive diagnostic criterion for autism, play a central role in the characterization of ASD, since there are usually delays and deviations in the development of autism, observing a greater impairment at the pragmatic level and in non-verbal aspects. It is possible to notice still in the first months of life the absence of ocular contact, reduced number of gestures and facial expressions, babbling and response to sounds. [3]

Furthermore, the precursors of spoken language, such as the ability to imitate behaviors, play with objects and shared attention (triadic attention), are impaired in children with autism. Echolalia (immediate or late), inappropriate use of pronouns, immature grammatical structure, and rigidity of meanings are also observed. [4]

Individuals with ASD may experience limited social experiences, maintaining relationships only with close people, such as family members. In order to change this mode of individual and social functioning, speech, language and hearing sciences therapy work is fundamental, since the socio-cognitive functioning of autistic is closely associated with the communicative profile and, therefore, the more effective the communication, more the subjects can act socially and develop. [5]

In addition, first-line treatments for children with autism should include psychosocial treatments and educational interventions, with the goal of maximizing language acquisition, improving social and communicative skills, and ending maladaptive behaviors. Currently, however, there are no drug treatments approved by the Food and Drug

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Administration (FDA) for autism. Despite limited empirical support, psychopharmacological treatment appears to be common in clinical practice and targets specific symptoms that accompany nuclear symptoms and which severely impair the functioning of the individual. This commonly does not allow for educational and behavioral interventions (aggression, self-destructive behavior, compulsive rituals, low frustration tolerance with explosive attacks, hyperactivity, etc.). [6]

Autism Spectrum Disorders (ASDs) are currently considered all-encompassing development disorders that involve the areas of social interaction, language, and cognition. The etiology of autism varies, and, prior to 3 years of age, children in this spectrum already show symptoms, such as abnormal development in the areas of verbal and/or nonverbal communication, social interaction, and behavioral alterations that include limited repertoire of interests and activities, and difficulties with shared attention, among others. For these reasons, these children can be diagnosed early. [7, 8]

When it comes to therapeutic interventions, the existing ASD treatments tend to concentrate on improving the most affected areas, such as language, social interaction, involvement in several types of activities, and even some difficulties that may be associated with the disorder, such as anxiety and short attention span. [9]

Objectives:

The main purpose of this study was to verify possible changes in the functional communication profile and in the social cognitive performance of the children with autism based on two short periods of intervention, considering the functional communication profile and social cognitive performance data collected after 12 months period of individual intervention as the baseline To assess any in the Functional Communication Profile (FCP) and in the Social Cognitive Performance (SCP) of children with ASD.

(1) To assess any possible changes in the Functional Communication Profile (FCP) of children with ASD.

(2) To assess the social cognitive performance of children with ASD.

Hypothesis:

(1) There would be significant difference between the baseline and the moments of interventions for the functional communication profile.

(2) There would be significant difference between the baseline and the moments of intervention for the social cognitive performance variable.

METHODS

The study was conducted with 60 children with Autism Spectrum Disorder diagnoses, randomly allocated into two groups, who received the same short-term intervention types (06 months with the mother and 12 months with the support of an educational software program).

Sample: The participants of this study were 60 children aged between 02 and 12 years, with autism spectrum disorder psychiatric diagnosis, who had been assisted of ASHA hearing Centre in Rewa (M.P.) for speech-language investigation of autism spectrum disorder for at least 06 months and for 12 months of the most. In the course of the therapeutic process, it was possible to observe an increase. Functional communication and social cognitive performance independently an increase in the number of vocalizations with communication intention or functional speech, longer time of visual contact and social smile, reduction of inappropriate behaviors with a significant improvement in autism treatment evaluation checklist score.

Participants:

The participants of this study were 60 children aged between 2 and 12 years, with ASD psychiatric diagnoses, who had been assisted at ASHA Hearing Speech Therapy for Speech-Language Investigation of ASDs (LIF-DEA) for at least six months, and for 1 year at the most.

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The following aspects were established as inclusion criteria:

(i) The children's diagnoses had to be included in the autism spectrum;

(ii) They had to attend at least 80% of the anticipated therapy sessions;

(iii) The mother had to indicate the possibility of participating in the therapy sessions at the scheduled times.

The participants were randomly allocated in two groups:

(i) Group 1 (G1): this group underwent the intervention cycles in the following order: 6 weeks of therapy with the mother's or primary caregiver's presence, and 6 weeks of therapy with an educational software program. Ten children composed this group.

(ii) Group 2 (G2): this group underwent the intervention cycles in the following order: 6 weeks of therapy with an educational software program, and 6 weeks of therapy with the mother's or primary caregiver's presence. Eleven children were part of this group.

PROCEDURES

The first cycle of modified therapy for both groups was initiated after a six-month period of individual speech-therapy assistance. The routine assessments, which include the FCP and the SCP, carried out after the period of individual speech-therapy assistance, were computed and served as the baseline against which the results of the modified therapy cycles were analyzed.

All participants were filmed after the first and the second cycles. The recording took place while the patients spontaneously interacted with the speech-language pathologists for 15 minutes, at the beginning and at the end of each modified therapy cycle, so that the data were transcribed and later analyzed in relation to the following tests:

(i) Functional Communication Profile, as proposed by Fernandes[10, 11, 12]: this is a model of assessment of communication functions. The interaction is analyzed based on communicative acts, communicative means, and communication functions. We considered the following variables: number of communicative acts produced per minute, percentage of interactive acts, and percentage of communicative space used.

(ii) Social Cognitive Performance, as proposed by Molini and Fernandes[13]: this is a procedure to verify aspects of gestural and vocal communication intention, use of the mediating object, gestural and vocal imitation, combinatorial play, and symbolic play. For this study, we used the same recorded situation to analyze the FCP. [14]

The educational software program selected for this study was *Baby Speak* – Desenvolvendo a Linguagem Oral, which has eight different activities with the purpose of using visual and auditory stimuli to develop oral language through play.

RESULTS

The statistical analysis was conducted with Student's *t*-test with the purpose of verifying the significance of the differences observed in the FCP and the SCP results between both intervention moments and the baseline period.

Upon comparison of the three moments of data collection of each FCP variable used, it was possible to observe a statistically significant difference of 10% only in relation to the variable “percentage of communicative space used” in G1; this difference was negative, which demonstrates that the participants' performance dropped after the third moment of intervention (that is, following the intervention with the educational software program) when compared to the baseline (0.0621) and the first cycle of intervention (0.0704). The results of this quantitative analysis are displayed in Table 1.

Table 1: Significant differences between the baseline and the moments of intervention for the Functional Communication Profile variable “communicative space used” in Group 1

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	Baseline and first moment	Baseline and second moment
FCP – communicative space used	0.0704	0.0621

Caption: FCP = Functional Communication Profile.

The analysis concerning the SCP variables in the three moments of collection yielded a statistically significant difference of 5% only in relation to the variable "use of the mediating object" in G1 when the baseline performance was compared to the third moment, that is, intervention with the aid of the educational software program. These data demonstrate that the participants' performance dropped when the first moment of analysis was compared to the last. The results of this quantitative analysis are displayed in Table 2.

Table 2: Significant differences between the baseline and the moments of intervention for the Social Cognitive Performance variable "use of the mediating object" in Group 1

	Baseline and first moment	Baseline and second moment
SCP – use of the mediating object	0.1501	0.0210

Caption: SCP = Social Cognitive Performance.

After each cycle of modified short-term intervention, we collected qualitative data that were submitted to the percentage of patients who presented positive and negative points for behaviors and abilities in each group. In this analysis, a positive performance was defined as the patient's good acceptance of the therapeutic intervention; increased interaction with the speech-language pathologist; appearance of positive behaviors, such as the patients' increased interest in therapeutic activities and shared games; use of verbal communication and eye contact; and positive adhesion shown by the mother or primary caregiver, which enabled them to comprehend their children's situation and help them to deal with daily issues. Negative performance, in turn, was defined as the patient's non acceptance or extreme difficulty to accept the intervention; the patients' negative behaviors, such as whining or temper tantrums; decreased interaction with the speech-language pathologist; and non-adhesion to the therapeutic intervention shown by the mother or primary caregiver.

The analysis of these data indicated that G1 presented similar performance in both short-term intervention cycles, given that, in both moments, the patients presented more indicative factors of positive than negative performance, even if the percentage of positive performance was higher for the cycle with the presence of the mother/legal guardian (90%) when compared to the cycle carried out with the use of the educational software program (75%). These data are presented in Table 3.

Table 3: Qualitative analysis percentage found for Group 1

Group 1	Positive	Negative
Mother/legal guardian	90%	10%
Educational software	75%	25%

In regards to Group 2, we observed better performances in the cycle with the presence of the mother/legal guardian, as 52% of the participants showed positive performances against only 35% in the cycle conducted with the educational software program. These data are presented in Table 4.

Table 4: Qualitative analysis percentage found for Group 2

Group 2	Positive	Negative
Educational software program	35%	65%
Mother/legal guardian	52%	48%

DISCUSSION

The participants of this study were divided in groups but submitted to the same modified short-term interventions. Statistically significant differences were observed only in G1 in relation to the variables "percentage of communicative space used" and "use of the mediating object". Concerning the first variable mentioned above, we observed a decrease in the proportion of occupation of the communicative space, which suggests that the participants began to interact less

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with their speech-language pathologists after the intervention with the use of the educational software program. This fact is against the literature consulted[15], considering that a recent research study demonstrated that the use of a certain computer program targeting the training of social skills in children with ASDs led to an increase in their facial recognition ability and recognition of emotions and social interaction, not only in a context of controlled activity, but also in their daily routine[16]. The data obtained in this study lead us to believe that the sole use of an educational software program, in a controlled environment with direct human tutoring, aiming at helping and interacting with the patient at all times, is not enough to prompt the evolution of an individual's social skills. This brings forth the possibility of inciting a more expansive evolution of these skills in programs with a duration of at least six months[17]. In this case, in addition to direct human monitoring to help and interact with the patient, professionals would also select scientifically verified software programs with the clear objective of improving social skills.

The second aforementioned variable, use of the mediating object, did not demonstrate any reduction in the participants' performance; it only indicated that they opted for not using the mediating object while interacting with the speech-language pathologist (in the first moment, seven individuals used the mediating object, but, in the third moment, this number was reduced to only two). Considering that the analysis was conducted in a spontaneous situation, in many cases the individuals did not have the opportunity to use mediating objects, as the object of their interest was within their reach. In studies carried out by the author of the SCP test, she reports this characteristic[18, 19], demonstrating that, in cases of analyses performed in spontaneous contexts, certain social cognitive aspects might not be observed, not because the patients are unable to display them, but because of the lack of activities necessary to assess such aspects. Although we counted on a wide gamma of data that were submitted to statistical analysis in this study, few variables showed significant differences. This finding puts into question the fact that the experimental model of collecting data in 12 weeks (6 weeks for each short-term intervention model) may be a complicating factor, considering that other authors suggest that the shortest therapeutic intervention period necessary to identify any progress has a minimum duration of six months.

The qualitative analysis was carried out because we considered it important to take into account the speech-language pathologists' perspective. As it is reported in the literature [20], this type of analysis elucidates important elements for reflection, such as the fact that the children experienced positive and negative points that influenced their performance during the sessions.

CONCLUSION

Considering the necessity of identifying more efficient and economically viable procedures for speech-language intervention with ASD children, the main purpose of this study was to verify possible changes in the FCP and in the SCP of children with ASD based on three different therapeutic situations. The results of the quantitative analysis indicated that statistically significant differences of 10% and 5% were observed only in G1 in relation to the FCP variable “percentage of communicative space used” and the SCP variable “use of the mediating object”, respectively. As an unanticipated result, we can mention the data from the qualitative analysis, which demonstrated that the individuals' performances were positive in both short-term intervention cycles in G1. We highlight that in both groups the cycle with the presence of the mother/legal guardian yielded the best performances. Another aspect to be considered is the need for an individualized analysis in which the impact of each model can be assessed in relation to each child in his/her specific stage of development. The wide individual variations observed in the autism spectrum frequently generate results in which the performances of the study groups require thorough analyses. Thus, statistically significant results are even more relevant in regards to therapeutic interventions in this population.

Therefore, although other authors indicate the advantages of using technological resources in the process of intervention, the family's participation must be carefully considered. The results presented here suggest the necessity of new studies with adequate intervention duration; we propose increasing the duration of each cycle to six months.

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