CONTRIBUTIONS OF PSYCHOLOGY IN THE EARLY TREATMENT OF AUTISM: AN ANALYSIS OF THE DENVER MODEL

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Yone Monteiro Ferreira[1], Lucas Silva Gomes[2], Lizandra Lima Santos[3], Heden Robson Monteiro Souza[4], Alex Bruno Lobato Rodrigues[5], Cleidjane Gomes Faustino[6], Jennepher da Cruz Viana[7] and Edmilson dos Santos Morais[8]

ABSTRACT

Autism Spectrum Disorder (ASD) is a condition characterized by significant changes in social, communicative, and behavioral development, requiring specialized and early therapeutic interventions. Among the approaches that have stood out in the scientific literature, the Early Start Denver Model (ESDM) emerges as an evidence-based proposal, integrating principles of child development, applied behavior analysis, and naturalistic practices. Psychology plays a central role in this context, by understanding the specific needs of child development and articulating intervention strategies that enhance the cognitive, social and communicative skills of children with ASD. This study aimed to analyze the efficacy of ESDM in the development of children with ASD, especially those who are without a confirmed diagnosis or awaiting specialized treatment. To this end, a descriptive research was carried out, with a qualitative approach, through a bibliographic review in national and international databases, such as PePSIC, SciELO and PubMed, as well as institutional repositories and government data. The methodological choice is justified by the need to gather and synthesize the existing evidence on the effects of ESDM in different

[1]Bachelor of Science in Psychology
Macapaense Institute of the Best Higher Education
E-mail: psiyoneferreira@gmail.com
[2]Bachelor of Science in Psychology
Macapaense Institute of the Best Higher Education
E-mail: lucaspsigomes@gmail.com
[3]Dr. in Pharmaceutical Innovation
Federal University of Amapá
E-mail: lizandralsantos@unifap.br
[4]Bachelor of Science in Pharmacy
Macapaense Institute of the Best Higher Education
Email: heden.souza.01@outlook.com
[5]Dr. in Biodiversity and Biotechnology
Federal University of Amapá
E-mail: alex.rodrigues@unifap.br
[6]Dr. in Pharmaceutical Innovation
Federal University of Amapá
E-mail: cgfenfermagem@gmail.com
[7]Bachelor of Arts in English
Federal Institute of Amapá
Email: jennepherviana@gmail.com
[8]Master of Science in Pharmaceutical Sciences
Federal University of Amapá
E-mail: morais28mcp@gmail.com

contexts, expanding the understanding of the model's applicability in different realities. The results showed that early intervention with ESDM promotes significant benefits for the overall development of children with ASD, even when applied in low-intensity contexts, such as school and family environments. Among the gains observed are the improvement of expressive and receptive language, advances in cognition, adaptive behavior and social interaction, as well as the reduction in the severity of symptoms characteristic of the autism spectrum. Such findings corroborate the importance of public policies that favor early diagnosis and the offer of specialized treatments, reinforcing the role of Psychology in the design of therapeutic practices that respect the specificities of child development. It is concluded that ESDM is an effective tool in the context of early intervention, being fundamental to minimize the impacts of ASD and promote the quality of life of children and their families. It is also recommended that additional studies be carried out in Brazil, in order to strengthen the national empirical base and expand access to evidence-based practices in the field of Developmental Psychology.

Keywords: Neurodevelopment. Behavioral therapies. Autism. Child Development.

INTRODUCTION

Autism Spectrum Disorder (ASD) represents a significant challenge in the field of health and education, especially with regard to early diagnosis and intervention. ASD is characterized by persistent deficits in social communication, as well as restricted and repetitive patterns of behavior, interests, or activities, usually manifesting in the first years of life (DSM-5, 2014). Given the complexity and diversity of the manifestations of the disorder, early intervention becomes a fundamental strategy to enhance the child's development and minimize the impact of symptoms throughout their trajectory (RODRIGUES; FILE; ROSSI, 2021).

In recent decades, the advancement of studies on child development and neurodevelopmental disorders has made it possible to improve more effective and humanized therapeutic models. In this context, the Early Start Denver Model (ESDM) stands out, which consists of an intensive, naturalistic, evidence-based intervention protocol aimed at young children diagnosed with ASD or who show early signs of the disorder (DAWSON; ROGERS, 2014). ESDM was conceived from the convergence of several theoretical and methodological models, such as the original Denver Model, the Interpersonal Development Model in Autism, the Social Motivation Hypothesis and Induced Response Training (PRT), all with an emphasis on the development of social, cognitive and communicative skills (DAWSON; ROGERS; VISMARA, 2015).

Early intervention is supported by the concept of neuroplasticity, which refers to the ability of the central nervous system to modify its structures and functions in response to environmental stimuli. The earlier treatment begins, the greater the possibility of positively altering the developmental paths of children with ASD, promoting significant advances in language, cognition and socialization (RODRIGUES; FILE; ROSSI, 2021). International studies indicate that the use of ESDM, even at low intensity, can reduce the severity of ASD symptoms and favor substantial gains in several areas of development (DEVESCOVI et al., 2016; FULLER et al., 2020).

However, the late diagnosis of ASD is still a worrying reality, especially in developing countries, such as Brazil, where barriers to access to specialized services and the lack of adequate training of health and education professionals make it difficult to identify the disorder early (RIBEIRO et al., 2017). This situation contributes to many children remaining for long periods without adequate intervention, compromising their global development and restricting their social participation (SILVA; ARAÚJO; DORNELAS, 2020).

In view of this scenario, the main objective of this study is to evaluate how the use of the Denver Model of Early Intervention can promote significant gains in the development of

children who are without treatment or waiting for the diagnosis of ASD. Specifically, it seeks to: (a) address fundamental concepts about ASD; (b) present ESDM as a proposal for effective early intervention; (c) analyze the losses resulting from late intervention; and (d) identify the potential benefits provided by ESDM on child development.

To achieve these objectives, a descriptive research was carried out, with a bibliographic design and a qualitative approach, based on national and international scientific publications, as well as official documents. The choice of this method is justified by the need to gather and critically analyze the knowledge already produced on the subject, enabling a deep understanding of the effects of early intervention in the context of ASD (GIL, 2017).

The relevance of this study lies in the possibility of contributing to the dissemination of qualified information about the Denver Model and its applicability, in addition to sensitizing professionals, family members and public managers about the importance of early intervention as a fundamental strategy for promoting the development and quality of life of children with ASD. Considering that evidence-based practices are essential to ensure the effectiveness of interventions, it is hoped that this research can support future actions in the fields of health, education and social assistance.

Thus, by exploring the theoretical, methodological and empirical foundations of the Denver Model, it is intended to highlight its contribution to the advancement of early intervention practices, reinforcing the need for public policies that ensure early diagnosis, access to specialized treatments and comprehensive support for families of children with ASD.

METHODOLOGY

With regard to the objectives, this research was classified as descriptive, as it aimed to describe the characteristics of a population (children with ASD from 12 months) and a phenomenon (treatment with ESDM) to establish a relationship between both variables. It was a qualitative research with a bibliographic design, since it was produced based on material already prepared, mainly books, magazines and articles published on scientific platforms (GIL, 2017).

UNIVERSE AND SAMPLING

The research universe consisted of studies available on the scientific platforms *PePSIC, SciELO* or *PubMed,* in the national and international repositories of public and private universities, as well as in government data, books, newspapers and scientific journals;

INCLUSION AND EXCLUSION CRITERIA

- Scientific articles, books, university publications, and government data were used as sources of research;
- The research sources were published in one of the scientific platforms *SciELO, PepSIC* and *PubMed* or in the national and international repositories of public and private universities, as well as in government data, books, newspapers and scientific journals;
- The research sources presented one of the following keywords: autism spectrum disorder; TEA; autism; autistic; Denver Model; Denver; ESDM; diagnosis; early treatment; child development; early childhood; autistic child;
- The books researched were within the proposed theme;
- The works were within the publication period from 1980 to 2021, as the pioneering Denver model was developed in 1980 (DAWSON; ROGERS, 2014);
- Government data were found on the official *websites* of national and/or international public institutions;
- All bibliographic sources that did not meet the previously established criteria were excluded.

DATA COLLECTION, ANALYSIS AND INTERPRETATION

After accessing the research sources based on the keywords, the material was selected through the inclusion and exclusion criteria based on exploratory reading, which, according to Gil (2017), is carried out through the examination of the cover page, bibliography indexes and footnotes. Also part of this type of reading was the study of the introduction, the preface and the summaries of the publications.

Subsequently, selective reading was carried out, that is, the choice of the material that interested the study, focusing on texts that met the objectives of the research and that contributed to the solution of the problem. The analysis of the researched content was done through analytical reading, whose purpose was to order and summarize the information

contained in the sources so that they could obtain answers to the projected problem (GIL, 2017).

The analytical reading unfolded in four phases: a) first, the complete reading of the work or the selected text was done to have a view of the whole; b) then, a careful reading was carried out to identify the main discussions of the text; c) subsequently, the hierarchization of the contents was made, and; d) the synthesis of ideas was carried out, whose objective was to present what is most important, briefly, in the research sources, eliminating what was secondary.

The information was collected through documentation forms which, according to Gil (2017), are cards for notes of the most important elements obtained from the analysis of the researched material and which constitute the raw material of the work. After collection, the data were thoroughly studied for the understanding and selection of the most important aspects for the research. The works were separated into four groups for interpretation: Autism Spectrum Disorder; Denver Model of Early Intervention; the consequences of late intervention for the development of children with ASD and; the benefits that ESDM offers to the child with ASD. This procedure was done by the authors of the research based on interpretative reading, according to Gil (2017).

RESULTS AND DISCUSSIONS

Since the creation of ESDM by Dr. Sally Rogers and her collaborators in the 1980s, several studies have been conducted that investigated the benefits of the model. At first, it was possible to verify the effectiveness of the model's interaction in the first two studies carried out. Dawson and Rogers (2014) explain that some of this research has been published.

One of these articles is the study by Rogers *et al.* (1986 *apud* DAWSON; ROGERS, 2014) applied to a small group of preschool-age children with ASD. In this study, the intention was to stimulate the acceleration of development in these children, which could be proven later. In 1989, already working with a larger group of children, the study by Rogers and Lewis (1989 *apud* DAWSON; ROGERS, 2014) identified that, in addition to the promptness in development, there were gains in the symbolic game and in social communication.

These first studies pointed to indications of the efficacy of ESDM and were relevant and pertinent at that time. However, they cannot be considered today, since the current study models are more rigorous and reliable. Thus, it is necessary to seek more recent research that can prove the effectiveness of the model. To this end, Chart 1 (below) was

prepared with data from new studies produced by several researchers in different regions, contexts, and realities:

Table 1 - Data from new studies produced by several researchers

AUTHOR	GOAL	METHOD AND PARTICIPANTS	MAIN FINDINGS
Devescovi, Monasta, Mancini, Bin, Vallante, Carrozzi, Colombi, 2016.	To assess the effectiveness of an early intervention inspired by ESDM in a small group of children. The intervention was administered at low intensity by the Italian Public Health System.	The study was carried out with 21 children who presented risk characteristics for ASD, aged between 20-36 months. They received 3 hours per week of individual intervention inspired by the ESDM.	Early initiation of ESDM-inspired treatment, even at low intensity, helped to reduce the severity of symptoms and improve language and cognition development.
Fuller Oliver Vejnoska Rogers 2020 - Dates	To examine the developmental effects of ESDM in children with autism.	A meta-analysis with 12 studies that reported interventions carried out with 640 children with ASD.	The results found in the application of ESDM in children with ASD were promising, especially in the aspects of language and cognition.
Tateno Kumagai Monden Nanba Yano Shiraishi 2021 - Dates	To investigate the effectiveness of an ESDM intervention in children with ASD in a community in Japan.	The study was conducted on 27 Children with ASD, who received ESDM intervention in 75-minute sessions for 1 year. Scales of measures were used to evaluate the results.	The results were positive and indicated that the ESDM intervention could reduce the severity of clinical features of ASD, with gains mainly in language, social interaction and communication.
Geoffray, Denis, Mengarelli, Peter, Gallifet, Beaujeard, Grosmaitre, Malo, Grisi, Georgieff, Magnificat, Touzet, 2019	Develop an ESDM program for children from 18 to 30 months of age, which is compatible with the French reality.	Prospective observational study with 19 children with ASD. The trial was conducted in 2 early intervention units of 2 different hospitals in Lyon, France, using ESDM. The improvement in the cognitive level of children who received 12 hours of weekly consultations with a therapist was evaluated.	A significant improvement in verbal and nonverbal cognitive skills, receptive language, and adaptive behavior was observed in nonverbal children and those with low cognitive status.
Sinai-Gavrilov Gev Mor-Snir Vivanti Golan 2020 - Dates	To evaluate the integration of ESDM into community preschool programs for children with ASD in Israel.	The study included 51 children from 08 schools, aged between 33 and 57 months. 26 children attended 04 ESDM-based preschools and 25 attended 04 schools with multidisciplinary developmental intervention environments.	Children in the ESDM treatment based on preschool obtained better results when compared to the group that received multidisciplinary treatment, especially in receptive language, expressive language and cognition. Children with milder symptoms achieved higher gains.

Holzinger, Laister, Vivanti, Barbaresi, Fellinger, 2019.	To investigate the feasibility and efficacy of early intervention in autism with ESDM implemented with low intensity in a community service in Europe	The subjects were 13 boys aged 34-54 months, a mean age of 43.3 months. All were diagnosed with ASD, receiving ESDM intervention for 4.6 hours per week over 12 months.	The intervention was carried out with high fidelity to the ESDM by a newly trained multidisciplinary team and was well accepted by the parents. The ESDM was considered compatible with the routines of the family and the preschool without major adaptations. There was an improvement in receptive language and a reduction in the basic symptoms of ASD. During the study, no improvement was observed in the control group.

Source: Survey data, 2025.

Devescovi *et al* (2016) conducted a study that evaluated the effectiveness of an early intervention inspired by ESDM in a small group of children. This intervention was administered at low intensity by the Italian Public Health System. The study was carried out with 21 children who had risk characteristics for autism spectrum disorder. Aged 20-36 months, these children received, by trained therapists, 3 hours per week of individual intervention inspired by the ESDM. Parents and teachers played an important role in the implementation of treatment ecology. The median duration of treatment was 15 months.

In this study, cognitive and communication skills, as well as the severity of autism symptoms, were assessed using standardized measures before the intervention and after the intervention. The results were measured by a series of non-parametric Wilcoxon tests (Wilcoxon Rank Sum *Test*) for paired data and pointed to statistically significant improvements in the domains of language and cognition. It was possible to conclude that starting early treatment inspired by the Denver model, even if at low intensity, helped to reduce the severity of ASD symptoms and the development of children's language and cognition.

Fuller *et al* (2020), when studying the effects of the Denver Model in a meta-analysis carried out with 12 studies, which reported interventions in 640 autistic children, found, from the size of the general, moderate and significant effect, that ESDM showed promise as an effective treatment for young children with ASD, bringing improvement in some areas affected by autism, especially in language and cognition. The study pointed out that some domains involving autism symptomatology, such as social communication, adaptive behaviors, and repetitive behaviors, did not show great results when using ESDM and may require additional treatment efforts.

Tateno *et al* (2021), in a study carried out in a small community in Japan, stated that ESDM presented itself as an effective intervention program for children on the autism spectrum, corroborating several other randomized control trials that have already proven the effectiveness of the method. The work investigated the clinical feasibility of the ESDM intervention in young children with ASD. They received the interventions once a week, lasting 75 minutes, for a period of at least 12 weeks. The scales used to measure the results were: Kyoto Scale of Psychological Development (K test), *Aberrant Behavior Checklist* - Japanese version (ABC-J) and *Clinical Global Impression-Severity* scale (CGI-S).

The results of this study proposed that ESDM intervention can reduce the severity of ASD symptoms, such as impairments in social interaction and communication, as well as maladaptive behavior. It has been suggested that ESDM may be the default model for children with ASD in Japan.

Geoffray *et al* (2019), responding to the need to create an intervention model compatible with the French reality, implemented an ESDM program according to the local context, in which children usually enter preschool from 30 months of age. The therapy was applied for 10 months by a multidisciplinary team, which had extensive support from parents and other partners.

This prospective observational study was conducted in 19 children with ASD, evaluating the improvement in cognitive level after the use of 12 hours per week of therapy with ESDM. The results showed significant improvements in verbal and nonverbal cognitive skills on the Mullen Scale of Early Learning. The biggest gain was in the receptive language development quotient with an average improvement of 19.6 points. Promising results were found in daily adaptive behavior, with a slight improvement in communication on the Vineland Adaptive Behavior Scale. It was concluded that the method is effective, even in children with low cognitive and verbal levels.

Sinai-Gavrilov *et al* (2020), recognizing the efficacy of early intervention already proven by several studies, sought to develop a model that was not so costly as to limit implementation in their community. The author studied the integration of ESDM into community preschool programs for children with autism in Israel. In total, 8 community preschools adhered to the therapeutic models. Four of these schools implemented ESDM and the other four applied a multidisciplinary model used in schools for children with ASD.

A total of 51 children between 33 and 37 months of age participated in this study, 26 in schools with the ESDM model and 25 in schools with the multidisciplinary model. Both groups were similar in age, development, and socioeconomic status. The results showed

greater gains in blinded measures of general cognitive development, receptive and expressive language skills, adaptive communication, and social skills in the group of children who received ESDM treatment when compared to the other group of children, showing that the use of the model in preschools in Israel was successful.

Holzinger *et al* (2019) investigated the feasibility and effectiveness of implementing low-intensity ESDM in a community service in Europe. The study included 13 boys aged 34-54 months, with a mean age of 43.3 months. All participants, at a regional autism center in Austria, had a diagnosis of ASD. 07 boys received ESDM intervention for 4.6 hours per week for 12 months and 06 received community-standard interventions.

The feasibility of the intervention was assessed by parent and teacher questionnaires, ESDM fidelity measures, and feedback from therapists. In addition, the children's development was assessed before and after the intervention using standardized instruments (Mullen Scales of Early Learning (MSEL), Vineland Adaptive Behavior Scales – Second Edition, Communicative Development Inventory, Pervasive Developmental Disorder Behavior Inventory (PDDBI), Parental Sense of Competence Scale).

The results were positive. The ESDM intervention applied by a newly trained group had a high fidelity index (80%). Parents showed great acceptance in relation to ESDM. The intervention was considered compatible with family and school routines because there was no need for major adaptations in the routine. In the DSES group, there was a trend toward improvement in receptive language and a reduction in basic ASD symptoms. In the control group, there was no improvement.

CONCLUSION

The present research highlighted the fundamental importance of early intervention in the treatment of children with Autism Spectrum Disorder (ASD), highlighting the Denver Model (ESDM) as an effective tool to promote the global development of these children. From the analysis of several national and international studies, it was found that the application of ESDM, even at low intensity, can result in significant improvements in language, cognition, social interaction and adaptive behavior, in addition to reducing the severity of the symptoms characteristic of ASD.

It was found that childhood neural plasticity offers a window of opportunity that, when well used through early interventions such as ESDM, enhances development and minimizes the difficulties associated with autism. Thus, the need for diagnosis and the initiation of interventions to take place as early as possible is reinforced, avoiding losses

resulting from late intervention, which can significantly compromise the child's potential and quality of life.

Finally, the social relevance of this study is highlighted, as it contributes to the advancement of knowledge about evidence-based therapeutic practices, encouraging the adoption of the Denver Model as an effective strategy in the clinical, educational and family context. It is also recommended that new research be carried out to expand the understanding of the applicability of ESDM in different socioeconomic and cultural realities, especially in Brazil, where there is still a lack of studies and difficulties in accessing specialized treatments for children with ASD.

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