ANÁLISE DO COMPORTAMENTO APLICADA EM CASOS DE AUTISMO: CONCEITOS, FERRAMENTAS DE AVALIAÇÃO E DIAGNÓSTICO

BEHAVIOR ANALYSIS APPLIED TO CASES OF AUTISM: CONCEPTS, ASSESSMENT AND DIAGNOSTIC TOOLS

ANÁLISIS DE CONDUCTA APLICADO A CASOS DE AUTISMO: CONCEPTOS, EVALUACIÓN Y HERRAMIENTAS DE DIAGNÓSTICO

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RESUMO

O estudo analisa a definição, os conceitos e as ferramentas da Análise do Comportamento Aplicada (ABA) no diagnóstico e tratamento de casos de Transtorno do Espectro Autista (TEA), com ênfase em práticas baseadas em evidências. Utilizando uma metodologia bibliográfica qualitativa, revisou-se a literatura nacional e internacional para identificar instrumentos eficazes, explorar suas aplicações e avaliar os impactos na qualidade de vida dos pacientes. Instrumentos como o ADI-R, ADOS e CARS demonstraram elevada precisão diagnóstica e contribuição significativa para a detecção precoce do TEA, enquanto a ABA se destacou pela capacidade de modificar comportamentos e promover a funcionalidade e integração social. Os resultados indicam que a aplicação de protocolos validados e intervenções sistemáticas pode suprir lacunas no diagnóstico e no tratamento, especialmente no contexto brasileiro. Conclui- se que o avanço na capacitação profissional e na validação local de ferramentas é essencial para garantir intervenções mais precisas e inclusivas, reforçando a importância da abordagem interdisciplinar e personalizada no atendimento a indivíduos com TEA.

Palavras-chave: Transtorno do Espectro Autista. Análise do Comportamento Aplicada. Diagnóstico. Tratamento. Qualidade de vida.

ABSTRACT

This study analyzes the definition, concepts, and tools of Applied Behavior Analysis (ABA) in the diagnosis and treatment of Autism Spectrum Disorder (ASD), with an emphasis on evidence-based practices. Using a qualitative bibliographic methodology, both national and international literature were reviewed to identify effective instruments, explore their applications, and assess their impact on patients' quality of life. Tools such as the ADI-R, ADOS, and CARS demonstrated high diagnostic accuracy and significant contributions to the early detection of ASD, while ABA stood out for its ability to modify behavior and promote functionality and social integration. The results indicate that the application of validated protocols and systematic interventions can address gaps in diagnosis and treatment, especially within the Brazilian context. It is concluded that advancements in professional training and local validation of tools are essential to ensure more accurate and inclusive interventions, reinforcing the importance of an interdisciplinary and personalized approach in supporting individuals with ASD.

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Keywords: Autism Spectrum Disorder. Applied Behavior Analysis. Diagnosis. Treatment. Quality of Life.

RESUMEN

Este estudio analiza la definición, conceptos y herramientas del Análisis Conductual Aplicado (ABA) en el diagnóstico y tratamiento del Trastorno del Espectro Autista (TEA), con énfasis en las prácticas basadas en la evidencia. Utilizando una metodología bibliográfica cualitativa, se revisó la literatura nacional e internacional para identificar instrumentos eficaces, explorar sus aplicaciones y evaluar su impacto en la calidad de vida de los pacientes. Herramientas como el ADI-R, el ADOS y el CARS demostraron una alta precisión diagnóstica y contribuciones significativas a la detección precoz del TEA, mientras que el ABA destacó por su capacidad para modificar el comportamiento y promover la funcionalidad y la integración social. Los resultados indican que la aplicación de protocolos validados e intervenciones sistemáticas puede abordar las lagunas en el diagnóstico y el tratamiento, especialmente en el contexto brasileño. Se concluye que los avances en la formación profesional y la validación local de herramientas son esenciales para garantizar intervenciones más precisas e inclusivas, reforzando la importancia de un enfoque interdisciplinario y personalizado en el apoyo a las personas con TEA.

Palabras clave: Trastorno del Espectro Autista. Análisis aplicado de la conducta. Diagnóstico. Tratamiento. Calidad de vida.

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INTRODUCTION

Autism Spectrum Disorder (ASD) is a group of neurodevelopmental conditions characterized by deficits in social interaction, communication, and restricted and repetitive behavior patterns. According to the DSM-5 (2014) and ICD-11 (2022), these manifestations can vary in intensity and functional impact, which makes a detailed and accurate diagnostic approach essential to identify the disorder and plan appropriate interventions. According to Oliveira, Martins and Fachin (2024), the growing prevalence of ASD in several countries, including Brazil, highlights the need for evidence-based practices to improve the quality of life of affected people and their families.

In this context, Applied Behavior Analysis (ABA) emerges as a science based on radical behaviorism, proposed by B.F. Skinner, which aims to understand, modify, and generalize socially relevant behaviors (Alves; Ganen; Corrêa, 2024). ABA uses experimental and systematic methodologies to assess and intervene in human behavior, presenting effective results in educational, clinical, and therapeutic contexts, especially for individuals with ASD (Sousa et al., 2020).

The theme of this study is the analysis of the screening and diagnostic tools used in the identification of ASD. The central problem investigated is: which behavioral and diagnostic assessment instruments are most effective in the Brazilian context for ABA-based interventions?

As a hypothesis, it is considered that the adoption of validated tools, such as the ADI-R, ADOS and CARS, combined with systematic ABA interventions, can promote significant advances in the early detection and treatment of ASD, improving the functionality and social integration of diagnosed individuals.

The general objective of this work is to analyze the definition, concepts and tools of Applied Behavior Analysis in the diagnosis and treatment of ASD cases. Specifically, it seeks to identify effective instruments, explore their applications, and evaluate the impacts of evidence-based practices on patients' quality of life.

This study is relevant because it contributes to the expansion of scientific knowledge about behavioral interventions in ASD, helping professionals and families to cope with the difficulties associated with the disorder. In addition, it aims to fill gaps in diagnosis and treatment, especially in developing countries, such as Brazil.

The methodology adopted consists of a bibliographic research with a qualitative approach, with a literature review based on national and international studies on ABA and ASD. In this way, it is expected to consolidate information that can support clinical practice and foster academic debate on the subject.

EVOLUTION OF THE CONCEPT AND DIAGNOSIS OF AUTISM SPECTRUM DISORDER

ASD is a condition that presents complex and interdisciplinary challenges in its understanding and diagnosis. The term "autism" was initially used in 1906 by Plouller, but it was in 1911 that Eugene Bleuler associated it with the loss of contact with reality due to impairments in interpersonal communication. However, the studies of Leo Kanner, in 1943, were decisive for the consolidation of the modern concept of autism, when he described cases with unique characteristics, such as inability to establish affective bonds, repetitive behaviors and echolalia, calling the condition "autistic affective contact disorder" (Alves; Ganen; Corrêa, 2024).

Kanner contributed significantly by proposing that autism could have biological origins, considering hypotheses related to biochemical, genetic or neuropsychological dysfunctions. This approach represented an advance in the understanding of the disorder, moving away from purely environmental or psychological explanations prevalent at the time (Chag et al., 2023).

Over the decades, the diagnostic criteria for autism have undergone important changes, reflected in the main diagnostic manuals, such as the DSM and the ICD. Initially, autism was associated with other conditions, such as childhood schizophrenia, but it was systematized for the first time in the ICD-6. It was only in 1977, with the work of Robert Spitzer, that there was a clearer separation between autism and other psychopathologies, consolidating it as a distinct disorder. With the publication of the ICD-10 in 1993, autism was classified as an invasive developmental disorder, characterized by abnormalities in social interaction, communication, and restricted interests (Alves; Ganen; Corrêa, 2024).

The DSM-5, published in 2014, brought significant changes to the diagnosis of ASD. This manual unified previously separate subdiagnoses, such as Asperger's syndrome, under the single category of autism spectrum disorder. This shift reflects the adoption of the concept of "spectrum," which recognizes a wide variation in symptoms and severities. According to the DSM-5, the diagnosis of ASD requires persistent deficits in social communication, repetitive patterns of behavior, and impairment in daily functioning, with manifestations from early childhood.

An important innovation in the DSM-5 was the inclusion of sensory hyper- or hypo-reactivity as a diagnostic criterion, broadening the understanding of the peculiar sensory experiences that many people with ASD have. This multidimensional approach was also incorporated into the ICD-11, launched in 2022, which unified autism spectrum disorders

into a single diagnostic code, promoting greater alignment between international classifications.

These changes in diagnostic criteria reflect advances in research on ASD and the need for continuous adaptations to encompass the multiple dimensions of this condition. The work of Leo Kanner and other pioneering researchers laid the foundation for modern child psychiatry, enabling the development of more effective strategies for diagnosis and intervention. As a result, ASD has come to be understood not as a static pathology, but as a spectrum that requires personalized and interdisciplinary approaches (Chag et al., 2023).

DIAGNOSIS DIFFERENTIAL And ANALYSIS FROMBEHAVIOR IN THE CONTEXT OF AUTISM SPECTRUM DISORDER

The diagnosis of Autism Spectrum Disorder (ASD) has become more challenging due to the expansion of diagnostic criteria, as described in the DSM-5 (2014), and the overlap of symptoms with other disorders. Montenegro, Celeri and Caselli (2018) highlight that, although the typical form of ASD is easily recognized by experienced professionals, it is essential to pay attention to other genetic, neurological and sensory dysfunctions that may have similar characteristics, avoiding diagnostic disagreements.

Among the disorders that should be ruled out in the differential diagnosis are Rett Syndrome, characterized by a regression in motor and cognitive development after an initial period of normal development; selective mutism and separation anxiety, which can include communication problems and anxiety similar to those found in ASD; language disorders and social communication disorder (pragmatics), which present difficulties in social interaction without the restrictive and repetitive patterns typical of ASD; intellectual disability without ASD, in which the difficulty lies in global development without the specific characteristics of the autistic spectrum; stereotyped movement disorder, which shares repetitive behaviors but without significant social impairment; Attention-Deficit/Hyperactivity Disorder (ADHD), which can include attention problems and hyperactivity; and schizophrenia, which in adolescents can include social withdrawal and communication difficulties, but with distinct psychotic characteristics. Conducting a thorough differential diagnosis is essential to ensure the accuracy of the diagnosis and the choice of the most appropriate interventions (Chag et al., 2023).

Behavior Analysis is an interdisciplinary field that combines a philosophical basis in Radical Behaviorism with scientific methods of study and application. According to Sella and Ribeiro (2018), it can be understood as a field of study, encompassing the theoretical and practical areas; as a discipline, based on Radical Behaviorism and Experimental

Behavior Analysis (EAB); and as a practice, involving the provision of services in applied contexts, such as Applied Behavior Analysis (ABA).

Baer, Wolf and Risley (1968), mentioned by Sella and Ribeiro (2018), outlined seven fundamental dimensions of ABA, which should be considered in the development of interventions. These dimensions include application, focusing on socially relevant behaviors; the emphasis on behavior, focusing on what the individual does and the behavior of those who conduct the intervention; the analysis, which seeks to prove that changes in behavior result from the intervention; the technological description, which must be detailed and clear to be replicable; the conceptual foundation, which uses precise and theoretical language; effectiveness, which requires significant and measurable results; and generalization, which seeks to ensure that the results persist over time and in different contexts and behaviors.

In the context of ASD, ABA stands out for its basis in experimental and systematic methods of behavior measurement, being recognized as an evidence-based practice (Carvalho Filho, 2019). Wolf, Lovaas and Green are important figures in this field, contributing to the systematization and dissemination of ABA and to the fight for the rights of people with ASD (Sella; Ribeiro, 2018). Thus, the application of ABA in the context of ASD represents a scientific and structured approach, promoting interventions that are effective, replicable, and adjustable to the individual needs of each client, reinforcing the importance of accurate diagnosis and evidence-based interventions.

DIAGNOSTIC INSTRUMENTS AND METHODS IN AUTISM SPECTRUM DISORDER

The identification of suspicious episodes of this disorder can be based on behavioral observation according to the criteria of the categorization systems or by the application of validated and reliable tools, which allow the professional to develop a detailed profile of the child's developmental characteristics (Jenabi *et al*., 2022).

In the international literature, two instruments are widely recognized as the gold standard for diagnosis: the Autism Diagnostic Interview-Revised (ADI-R) and the *Autism Diagnostic Observation Schedule-Generic* (ADOS), both still in the initial validation process in Brazil (Chag *et al.,* 2023).

The ADI-R, or Diagnostic Interview for Autism-Revised, is a semi-structured interview applied to parents or guardians, consisting of 93 items divided into six sections: general information about the patient and his or her family; early development and developmental milestones; triad of disabilities according to DSM-IV criteria; and general

behavior problems. The application, performed by trained and experienced specialists, is estimated to last 1.5 to 2.5 hours (Jenabi *et al*., 2022).

According to Namur (2019), ADOS is a standardized protocol for observing social behavior in natural communicative contexts, organized into four modules that serve children with different levels of language development. During the assessment, children interact through standardized activities that simulate social situations, communication and play, whose behaviors are recorded and scored. Modules 3 and 4 are especially indicated for the verbal evaluation of children with high functioning and suspected ASD, including cases of Asperger's syndrome.

The current ADOS, formerly known as Generic ADOS, represents an update of the two previous instruments: the original ADOS and the pre-linguistic ADOS (intended for children with little or no speech). This instrument has been expanded to cover a wider range of ages and developmental levels, surpassing its previous versions (Chag *et al.,* 2023). Its application takes about 30 to 45 minutes and has high sensitivity (90% to 97%) and specificity (87% to 93%). However, some concerns have arisen about the possibility that ADOS may over-identify very young children with Global Developmental Disorder (GDD) or older children with severe intellectual disabilities. Specialized training is essential for researchers and highly recommended for health professionals (Namur, 2019).

The Childhood Autism Assessment Scale (CARS) is a 15-item tool that helps in the diagnosis and differentiation between autism and other developmental disorders. Its main function is to assess the level of impairment of children with autism. CARS is fast and suitable for children aged 2 and up. Created over 15 years, this scale is based on the diagnostic criteria of Kanner (1943), Creak (1961), Rutter (1978), Ritvo & Freeman (1978) and the DSM-III (Silva; Pansera, 2023).

The second revised edition of CARS2 expanded the clinical reach of the instrument, making it more sensitive to individuals with more developed verbal skills and more subtle social and behavioral deficits. While maintaining the simplicity and clarity of the original version, CARS2 now includes new forms and features that help integrate diagnostic information, assess functional skills, provide feedback to parents, and plan more targeted interventions (Jurek *et al.,* 2021).

The *Autism Behavior Checklist* (ABC), created by Krug *et al.* (1980), is a list of 57 anomalous behaviors that help in the screening of children with suspected ASD. In Brazil, it was translated, adapted and pre-validated under the name *Inventory of Autistic Behaviors (ICA)* by Marteleto and Pedromônico (2005). This instrument was developed to help identify children with signs of autism and is commonly used for differential diagnosis,

referring children to appropriate treatments. The ABC is part of one of the five subtests that make up the ASIEP-2 and is often used in the early diagnosis of autism (Pontes, 2022).

The Social Communication Questionnaire (SCQ), formerly known as the *Autism Screening Questionnaire* (ASQ), was developed by Rutter and Lord and consists of a series of 40 questions answered by the primary caregiver of children aged 4 and up. Derived from the revised version of the *Autism Diagnostic Interview* (ADI) (Jenabi *et al*., 2022), the SCQ is a tool focused on the assessment of children at high risk of developmental problems, providing a diagnosis based on the analysis of behaviors organized into three areas of functioning: mutual social interaction, language, and communication, as well as repetitive and stereotyped patterns of behavior (Karlov *et al*., 2024).

The Revised Psychoeducational Profile (PEP-R), created by Schopler *et al.* (1990, *apud* Frizzo; Freire, 2020), is a tool used to measure the developmental age of children with autism or communication disorders. The PEP-R arose from the need to identify irregular learning patterns, to develop a psychoeducational plan based on the principles of the Treatment and Education of Autistic Children and Communication Disabilities (TEACCH) model. The PEP-R is composed of two scales: the first, focused on development, was based on empirical norms that reflect the performance of typically developing American children, while the second, related to behavior, was inspired by Schopler's CARS and Creak's criteria (Canal; Silva, 2022). TEACCH began as a university research project and, due to the practical results, has become an intervention model adopted in several countries and cultures. In the 1960s, when TEACCH emerged in the United States, the behaviorist paradigm dominated. Its theoretical principles, also applied in psycholinguistics, aim to compensate for the communication deficits typical of the disorder, using visual resources, such as pictograms and photographs, to facilitate understanding. The constant updating of behavioral descriptions, the use of structured and behavior-enhancing programs reflect the influences of the behaviorist model, seeking to improve control over peculiar and discrepant responses in individuals with autism (Jesus *et al.,* 2023).

The Image Exchange Communication System (PECS) was developed in 1985 by Andrew S. Bondy and Lori Frost as an alternative and complementary communication system for individuals with ASD and related developmental disorders. Initially applied in the "Delaware Autistic Program", PECS gained worldwide recognition due to its focus on communication initiation. This system does not require complex or expensive materials, and

is designed to be easily implemented by educators, families, and caregivers in various situations (Silva; Pansera, 2023).

PECS begins with teaching a person how to deliver an image of a desired item to a communication partner, who accepts it as a request. In subsequent steps, the system teaches how to distinguish images and combine them into sentences. Subsequently, individuals learn to answer questions and make comments. The PECS teaching protocol is based on the book *Verbal Behavior* by B.F. Skinner, to teach functional verbal operants in a systematic way, using cues and reinforcement strategies to promote independent communication. No verbal cues are used, ensuring an immediate initiation and avoiding dependence on them (Luz; Branco, 2021).

The Padovan Neurofunctional Reorganization was created by Beatriz Padovan, pedagogue and speech therapist, who based her method on the discoveries of Rudolf Steiner (founder of Waldorf education) and Temple Fay (creator of the nervous system rehabilitation approach known as Neurological Reorganization), who described the phases of human neuropsychomotor development (Menezes *et al*., 2019). This method proposes that neurological reorganization is a physiological state completed in the human being through the continuous development of the nervous system, that is, through individual neural development. The Padovan Method is a low-cost therapeutic approach that aims to recapitulate the stages of neural development, in order to activate or rehabilitate the nervous system, allowing the individual to reach their full genetic potential (Pereira *et al*., 2022).

The Son Rise Program, created by the *Autism Treatment Center of America*, in Massachusetts, USA, is an effective educational methodology for children with autism, with excellent performance in several countries. In the early 1970s, Barry and Samahria Kaufman, founders of the program, were diagnosed with severe autism for their son Raun, who also had an IQ of less than 30, being told by experts that he would have no chance of recovery. The Son Rise Program Development Model aims to engage parents in a strategic way to support individuals with developmental delays, assisting them in the acquisition and improvement of new skills (Taveira; Clemente, 2021).

The Floortime method seeks to help children with autism become more attentive, active, flexible, able to deal with frustrations, perform procedures and communicate both through the body and verbalization. When the child is already familiar with PECS and sign language, Floortime can be used during teaching activities. However, if the child is new to these methods, Floortime should not be the initial approach, as its focus is not on teaching, but on exploring the child's spontaneity, initiative, and verbalization. The main objective is

to make the child enjoy learning, transforming Floortime into a fun, joyful and playful experience, taking advantage of everyday opportunities to solve problems and adapt to changes (Dinis, 2023).

The Montessori method refers to the theory, practices, and teaching materials developed by Maria Montessori, an Italian doctor and educator. For Montessori, the most important aspect of the method is not the material or the practices themselves, but the possibility they offer to liberate the true nature of the individual, allowing him to achieve his autonomy through interaction with the environment. This process involves learning in a playful way, allowing the child's development to be observed and understood. Montessori highlighted that development occurs according to evolution plans, emphasizing concepts such as self-education, cosmic education, education as science, prepared environment, prepared adult, and balanced child (Gonçalves, 2021).

The *Modified Checklist for Autism in Toddlers* (M-CHAT), according to Dereu (2021), is a screening scale that can be used during pediatric consultations to identify signs of autism in young children. Screening tools are useful for evaluating individuals who appear to be well, but who may have a condition or risk factor for disease, as opposed to those without obvious symptoms. M-CHAT is simple to administer, does not require a doctor to be present, and only takes a few minutes to complete. It is based on parents' observations about the child's behavior, is low-cost, does not require prior scheduling and does not cause discomfort to the patient.

M-CHAT is an expanded version of CHAT, consisting of 23 yes/no questions, answered by parents of children aged 18 to 24 months who are literate and accompany their child to the pediatric consultation. The first nine CHAT questions were retained, while the additional 14 questions were created from a list of typical symptoms of children with autism (Dereu, 2021).

The *Autistic Traits Scale* (ATA), developed by Ballabriga *et al.* (1994), was created from an analysis of the most relevant aspects of autism syndrome, based on several instruments and the clinical experience of the authors. Its construction is mainly based on the DSM III-R criteria for diagnosis. The scale was designed to meet a series of criteria, although, as reported by Dinis (2023), its scope is quite broad and nonspecific, including characteristics that can be attributed to a wider range of conditions.

The ATA is a simple-to-use tool, designed for professionals who deal directly with the autistic population. Although it is not a diagnostic interview, the scale is a standardized test that allows the child's behavioral profile to be drawn based on different diagnostic aspects. It is an observational evaluation that makes it possible to follow the longitudinal evolution of autistic symptoms, being useful

for the formulation of a reliable diagnosis. Its application is carried out through detailed clinical information about the child, and can be used from the age of two. Although it includes many specific elements, the application time is relatively short, around 20 to 25 minutes. In the Brazilian context, the average application time was approximately 20 to 30 minutes (Gonçalves, 2021).

CONCLUSION

The present study achieved its objectives by analyzing the definition, concepts and tools of Applied Behavior Analysis (ABA) in the diagnosis and treatment of cases of Autism Spectrum Disorder (ASD). It was possible to identify that the adoption of validated instruments, such as the ADI-R, ADOS and CARS, together with systematic interventions based on ABA, has a significant impact on the early detection and treatment of ASD. This combination promotes improvements in the functionality and social integration of the individuals diagnosed, corroborating the initial hypothesis.

The review highlighted the relevance of evidence-based practices, which not only increase diagnostic accuracy, but also contribute to the development of personalized interventions, adjusted to the individual needs of patients. Among the instruments analyzed, the high sensitivity and specificity of the ADOS and the versatility of the CARS proved to be crucial for the elaboration of detailed diagnoses. In addition, ABA, with its fundamental dimensions described by Baer, Wolf and Risley (1968), has been shown to be an effective approach for behavior modification and the promotion of functional skills in individuals with ASD.

The impact of these practices on the quality of life of patients and their families reinforces the need for dissemination and implementation of validated protocols in the Brazilian context. This study also highlighted the importance of continuous training for professionals in the area, in order to ensure the correct use of these tools and methodologies.

Finally, it is highlighted that advances in research and local validation of diagnostic instruments, combined with the application of practices based on behavioral science, is essential to reduce existing gaps in the diagnosis and treatment of ASD in Brazil, promoting greater inclusion and autonomy for those affected.

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