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Re-habilitative interventions and Different Treatment Models for autism spectrum disorder: A review

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Abstract

Autism Spectrum Disorder includes a group of developmental disorders characterized by a delay and deviation in the development of communication, socialization, cognitive skills, and the presence of restricted interests as well as repetitive behaviors. Past literature presents numerous classifications of intervention methods but the most recent classification identifies two types of intervention models: comprehensive treatment models and focused interventions. The former consists of a set of focused interventions organized around a common conceptual framework, while the latter includes cognitive-behavioral techniques specific to target symptoms. Based on the efficacy studies carried out so far, all national and international guidelines concerning the enabling/rehabilitative aspects of Autism Spectrum Disorder propose, first and foremost, the use of cognitive-behavioral techniques. These techniques have proven effective both in learning/increasing new skills and in managing anxiety symptoms. The greatest scientific evidence supports interventions based on cognitive-behavioral techniques, but further research is needed to find the ideal model that will represent a more widely accepted guideline in the future.

Keywords: Autism Spectrum Disorder; Rehabilitation; Comprehensive Treatment Models; Focused interventions.

1. Introduction

Autism Spectrum Disorder (ASD) is a complex neurodevelopmental condition that impacts areas of child development as behavior, social communication ability, language, executive function skills and personal abilities [1]. Clinical presentation depends on symptom severity, cognitive and language abilities and co-occurrence of medical or psychiatric conditions [2]. Recently, in the USA, it has been estimated a prevalence of 1 in 36 children and of 1 in 45 adults [3].

Often the symptoms of autism can be mild or subthreshold and overlap with other psychopathological disorders [4]. In addition to core symptoms, people with ASD often have numerous medical and psychiatric comorbidities that worsen the quality of life of patients and their caregivers [5,6]. Although the etiopathogenesis of autism has not yet been clarified, the data in the literature agree that the causes of autism are multifactorial [7].

Currently, there are no authorized drugs for the treatment of the symptomatic features of ASD, but drugs are used for comorbid psychopathological aspects [8,9]. New instrumental therapies such as deep brain stimulation are demonstrating efficacy in the treatment of pathological conditions associated with ASD [10]. However, the effectiveness and tolerability of drug treatments are often questionable [11] and many times drugs are overdosed and burdened with numerous side effects [12]. For these reasons, it appears necessary to focus the interest of clinicians on rehabilitation interventions with the greatest possible efficacy based on evidence [13]. On the other hand, there is a general lack of good scientific validation of the effectiveness of the various intervention methods [14].

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Howlin [15] categorized the outcome of the ASD programs as good, fair and poor, depending on the independence achieved by the children after the intervention. Numerous studies agree that a higher IQ and better language skills at the time of diagnosis are correlated with a better prognosis in communication and social competence [16,17].

The first researchers to demonstrate that children with autism could learn new behaviors through behavioral techniques were Ferster and De Meyer in 1961 [18]. In 1969, Lovaas and Simmons demonstrated how severe behavior problems in autism and mental retardation could be modified and controlled [19]. In 1987, Lovaas published a paper introducing a new treatment approach called The Lovaas Method of Applied Behavior Analysis [20], subsequently known as Discrete Trial Training (DTT). Over the years, modifications have been made to Lovaas' model, both in terms of setting, environment and procedures, with numerous evidence in addressing the core impairments of ASD [21,22].

As regards psychotherapeutic aspects, it seems fundamental to mention cognitive-behavioral therapy. Cognitive-behavioral psychotherapy is useful in teaching how to examine thoughts and feelings, recognize when negative thoughts and emotions increase in intensity and then use strategies to change how we respond. Past literature has shown that cognitive behavioral therapy can produce increased independence and daily living skills in children with ASD [23,24], proving effectiveness in the treatment of ASD [25]. Family members can also be included in cognitive behavioral intervention approaches as they can be valuable in supporting learning, generalization, and maintenance of skills by helping their children practice at home and reinforcing skills they see the child use in all environments [26].

2. Methods

A literature search was conducted on major databases to find useful studies for the aim of this paper.

3. Discussion

In an attempt to classify enabling and rehabilitation interventions and models, several criteria could be taken into consideration [27]. Below, we will propose a summary as understandable as possible.

Based on the setting where the intervention is delivered, we would have a) center-based programs, b) home-based programs and c) school-based programs. According to the target age, we would have a) early intervention programs, b) school-age programs and c) adult-age programs.

Based on the National Research Council [28], from a theoretical point of view, the main intervention models can be distinguished into two types of approaches: evolutionary approaches (or interactive) and behavioral approaches. The latter can be divided into traditional and neo-behavioral approaches. The basis of the evolutionary approaches is a theory of development of the autistic child who has deviated from the normal developmental path and must therefore be redirected by intervention. Traditional behavioral approaches aim to teach the child skills through a precise definition of the goals to be achieved and a progressively more complex structuring of the various tasks.

In 2004 Roberts [29] proposed three main classes of intervention models a) biologically based interventions, b) psychodynamic interventions and c) educational interventions. Biologically based interventions take into account pharmacological treatments and medical interventions. Some examples are represented by Melatonin, Naltrexone, Secretin, Antifungal agents, Intravenous immunoglobulin, Chelation, Hyperbaric oxygen and Dietary interventions.

Psychodynamic therapies are based on the assumption that the cause of the symptoms would be found in the way parents had raised their child [30], but today are seldom used.

Educational interventions in ASD are well-documented [31,32] and can be described as behavioral, developmental, therapy-based or combined. Behavioral interventions are considered an "established" treatment for ASD children, with evidence of significant improvements for the core symptoms of ASD, mainly in the first 12 months of treatment. The Applied Behavioral Analysis (ABA) based on Lovaas' method and the DTT are the main models. Over the years, modifications have been made to the original ABA model with more naturalistic settings and new methods like Pivotal Response Training (PRT), the Natural Language Teaching Paradigm [33] or Incidental Teaching [34], Positive Behavioral Support [35], Functional Assessment [36] and Functional Communication Training [37].

Developmental interventions (or normalized interventions) focus on teaching essential skills that were not learned at the expected age and on the ability to form positive relationships with other people. The Early Start Denver Model

(ESDM) [38], the Developmental Individual Difference Relationship-based approach (DIR/Floor Time) [39], the Early Behavior Intervention (EIBI) [40] and the Responsive Teaching [41] represent some examples.

Therapy-based interventions include Communication interventions and Sensory-Motor interventions.

Combined interventions include more than one interventional model but are mainly based on a specific approach and are represented by the Social Communication, Emotional Regulation, Transactional Support (SCERTS) program [42], the ESDM, the Learning Experiences-An Alternative Program for Preschoolers and Parents (LEAP) [43] and the Treatment and Education of Autistic and related Communication-handicapped CHildren (TEACCH) [44]. The latter method is a "whole life" approach and focuses on structuring the environment to facilitate skill development and independence and is currently considered an "established" model for children with ASD [45].

Odom et al. [46] and Wong et al. [47] have classified behavioral evidence-based interventions into two groups: comprehensive treatment models (CTMs) and focused interventions.

CTMs consist of a set of focused interventions organized around a common conceptual framework and designed to achieve a broad learning or developmental impact on the core features of autism (see Table 1).

There are approximately 30 models of global rehabilitation interventions [46], but only some are characterized by scientific evidence. Examples of well-established CTMs include EIBI, ESDM, DIR, PRT, and TEACCH.

Focused interventions are practices designed to address a single skill or goal [48]. They represent the operational bases of intervention of educational programs and global interventions. In 2015 Wong et al. [47] identified 27 types of focused interventions (Antecedent-based intervention; cognitive behavioral intervention; differential reinforcement; discrete trial training; exercise; extinction; functional behavior assessment; functional communication training; modeling; naturalistic interventions; parent-implemented interventions; peer-mediated instruction and intervention; Picture Exchange Communication SystemTM; pivotal response training; prompting; reinforcement; response interruption and redirection; scripting; self-management; social narratives; structured play groups; social skills training; task analysis; technology-aided instruction and intervention; time delay; video modeling; visual supports).

Considering all the rehabilitative interventions and methods exposed, the authors want to underline the importance of taking into consideration not only the aspects to improve, but also the potentialities and talents of each person with autism [49].

Table 1 Characteristics of Comprehensive Models and Focused Interventions

	Comprehensive treatment models	**Focused Interventions**
Operations	the procedures are described in a manual	represented by specific techniques
Intensity	a considerable number of hours per week	a less significant number of hours per week
Timing	occur in one or more years	shorter, but depends on achieving the goal
Focus	breadth of focus on outcomes (multiple outcomes such as communication, behavior, targeted social competence	well-defined focus (communication, behavior, targeted social competence, etc.)

4. Conclusion

In this paper the authors have tried to summarize and outline, making as clear as possible, the rehabilitation intervention methods and intervention models present in the literature. Some internal characteristics of the models and the various differences between the numerous classifications have been exposed. Since the 1980s there have been major changes in rehabilitation interventions, and new intervention models have been proposed. The greatest scientific evidence supports interventions based on cognitive-behavioral techniques, but the ideal model still seems to be found.

Compliance with ethical standards

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Disclosure of conflict of interest

No conflict of interest to be disclosed.

References

[1] American Psychiatric Association. Diagnostic and statistical manual of mental disorders, 5th Edition. Arlington: APA Publishing, 2013.

[2] Waizbard-Bartov E, Fein D, Lord C, Amaral DG. Autism severity and its relationship to disability. Autism Res. 2023 Apr;16(4):685-696. doi: 10.1002/aur.2898.

[3] Maenner MJ, Warren Z, Williams AR, et al. Prevalence and Characteristics of Autism Spectrum Disorder Among Children Aged 8 Years — Autism and Developmental Disabilities Monitoring Network, 11 Sites, United States, 2020. MMWR Surveill Summ 2023;72(No. SS-2):1–14. DOI:.org/10.15585/mmwr.ss7202a1

[4] D'Agostino L, Ranalli C, Ciamarra C, Gentile A, Marini S. Subthreshold Autism Spectrum Disorder. International Journal of Clinical Studies and Medical Case Reports (IJCSMCS), 2024, 36(2). DOI:10.46998/IJCMCR.2023.36.000884.

[5] Lord C, Elsabbagh M, Baird G, Veenstra-Vanderweele J. Autism spectrum disorder. Lancet. 2018 Aug 11;392(10146):508-520. doi: 10.1016/S0140-6736(18)31129-2.

[6] D'Agostino L, De Lena R, Molinero M, Giacomodonato M, Sebasta S, Agense S, Ciamarra C, Marini S. Autism Spectrum Disorder and Hikikomori. Glob J Intellect Dev Disabil. 2024; 13(4): 555868. DOI:10.19080/GJIDD.2024.13.555868

[7] Marini S, D'Agostino L, Mentana M, Ciamarra C, Gentile A. Modulation of Excitatory and Inhibitory Systems in Autism Spectrum Disorder: The Role of Cannabinoids. International Journal of Clinical Studies & Medical Case Reports (IJCMCR) 2023: 30(1): 005. DOI: 10.46998/IJCMCR.2023.30.000730

[8] Murray, M.L., Hsia, Y., Glaser, K., Simonoff, E., Murphy, D.G., Asherson, P.J., Eklund, H. and Wong, I.C. (2014), "Pharmacological treatments prescribed to people with autism spectrum disorder (ASD) in primary health care", Psychopharmacology (Berl), Vol. 231 No. 6, pp. 1011-1021.

[9] Marini S, D'Agostino L, Ciamarra C, De Berardis D, Gentile A. Gabapentin treatment for challenging behaviors in autism spectrum disorder and coexisting intellectual disability: a case report. Advances in mental health and intellectual disabilities, 05 Sep 2024, Vol. 18, Issue 3, pages 101 – 109.

[10] Marini S, D'Agostino L, Ciamarra C, Gentile A. Deep brain stimulation for autism spectrum disorder. World J Psychiatry. 2023 May 19;13(5):174-181. doi: 10.5498/wjp.v13.i5.174.

[11] Sharma, A. and Shaw, S.R. (2012), "Efficacy of risperidone in managing maladaptive behaviors for children with autistic spectrum disorder: a meta-analysis", Journal of Pediatric Health Care, Vol. 26 No. 4, pp. 291-299.

[12] Branford, D., Gerrard, D., Saleem, N., Shaw, C. and Webster, A. (2019), "Stopping over-medication of people with intellectual disability, autism or both (STOMP) in England part 1 – history and background of STOMP", Advances in Mental Health and Intellectual Disabilities, Vol. 13 No. 1, pp. 31-40.

[13] Marini S, D'Ambrogio T, Esposito M, Sergi MR, Sorge G. Rehabilitation in Autism. Pilot Project on the Health Centre-Based Primary Care Model within the National Health Plan Implementation Projects. 2018, 8 (2).

[14] Seida JK, Ospina MB, Karkhaneh M, Hartling L, Smith V, Clark B. Systematic reviews of psychosocial interventions for autism: an umbrella review. Dev Med Child Neurol. 2009 Feb;51(2):95-104. doi: 10.1111/j.1469-8749.2008.03211.x.

[15] Howlin P. (2005) The effectiveness of interventions for children with autism. J Neural Transm Suppl.;(69):101-19.

[16] Szatmari P, Bryson SE, Boyle MH, Streiner DL, Duku E. Predictors of outcome among high functioning children with autism and Asperger syndrome. J Child Psychol Psychiatry. 2003 May;44(4):520-8. doi: 10.1111/1469-7610.00141.

[17] Mysore A, Kaku SM. Predictors of Outcome in Autism Spectrum Disorders: A Perspective for Clinicians and Therapists. Indian Journal of Psychological Medicine. 2023;0(0). doi:10.1177/02537176231210063

[18] Ferster CB, Demyer MK. The development of performances in autistic children in an automatically controlled environment. J Chronic Dis. 1961 Apr;13:312-45. doi: 10.1016/0021-9681(61)90059-5.

[19] Lovaas OI, Simmons JQ. Manipulation of self-destruction in three retarded children. J Appl Behav Anal. 1969 Fall;2(3):143-57. doi: 10.1901/jaba.1969.2-143.

[20] Lovaas OI. Behavioral treatment and normal educational and intellectual functioning in young autistic children. J Consult Clin Psychol. 1987;55(1):3.

[21] Slocum TA, Detrich R, Wilczynski SM, Spencer TD, Lewis T, Wolfe K. The evidence-based practice of applied behavior analysis. The Behavior Analyst. 2014;37(1):41–56.

[22] Leaf JB, Leaf R, McEachin J, Taubman M, Ala'i-Rosales S, Ross RK, et al. Applied behavior analysis is a science and, therefore, progressive. Journal of autism and developmental disorders. 2016;46(2):720–31.

[23] Drahota A, Wood JJ, Sze KM, Van Dyke M. Effects of cognitive behavioral therapy on daily living skills in children with high-functioning autism and concurrent anxiety disorders. J Autism Dev Disord. 2011 Mar;41(3):257-65. doi: 10.1007/s10803-010-1037-4.

[24] Marini S, D'Ambrogio T, Battista P, Sorge G. Cognitive-behavioral therapy in high-functioning autism spectrum disorder adults: A longitudinal observational study, European Neuropsychopharmacology, 2019, 29, Supplement 1. doi.org/10.1016/j.euroneuro.2018.11.258.

[25] Weston L, Hodgekins J, Langdon PE. Effectiveness of cognitive behavioural therapy with people who have autistic spectrum disorders: A systematic review and meta-analysis. Clin Psychol Rev. 2016 Nov;49:41-54. doi: 10.1016/j.cpr.2016.08.001.

[26] Mussey, J., Dawkins, T., & AFIRM Team. (2017). Cognitive behavioral intervention. Chapel Hill, NC: National Professional Development Center on Autism Spectrum Disorders, FPG Child Development Center, University of North Carolina. Retrieved from http://afirm fpg unc edu/cogniItive behavioral intervention

[27] Ros G, Milla Romero MG, Abad L, & Mulas F. (2011). Intervention Models in Children with Autism Spectrum Disorders. InTech. doi: 10.5772/18512

[28] National Research Council. 2001. Educating Children with Autism. Washington, DC: The National Academies Press. doi.org/10.17226/10017.

[29] Roberts JM. (2004) A review of the research to identify the most effective models of best practice in the management of children with autism spectrum disorders. Sydney: Centre for Developmental Disability Studies. Sydney University. Department of Ageing, Disability and Home Care.

[30] Bettelheim B. (1967). The empty fortress: Infantile autism and the birth of the self. New York Free Press.

[31] Howlin, P, Magiati, I & Charman, T. (2009) Systematic review of early intensive behavioral interventions for children with autism. Am J Intellect Dev Disabil; 114:23.

[32] Ospina MB, Krebs Seida J, Clark B, Karkhaneh M, Hartling L, Tjosvold L, Vandermeer B, Smith V. Behavioural and developmental interventions for autism spectrum disorder: a clinical systematic review. PLoS One. 2008;3(11):e3755. doi: 10.1371/journal.pone.0003755.

[33] Koegel, L. K., Koegel, R. L., & Carter, C. M. (1998). Pivotal responses and the natural teaching paradigm. Seminars in Speech and Language, 19(4), 355-372.

[34] Hart, B., & Risley, T. (1975). Incidental teaching of language in the preschool. Journal of Applied Behavior Analysis, 8, 411-420.

[35] Horner, R., O'Neill, R., & Flannery, K. (1993). Building effective behavior support plans from functional assessment information. In M. Snell (Ed.), Instruction of persons with severe handicaps (4th ed., pp. 184-214). Columbus: OH: Merrill.

[36] O'Neill, R. et al. (1997). Functional assessment and program development for problem behavior: A practical handbook. Pacific Grove: CA: Brooks/Cole.

[37] Durand VM (1993). Functional communication training for challenging behaviors. Clin Commun Disord.;3(2):59-70

[38] Dawson G, Rogers S, Munson J, Smith M, Winter J, Greenson J, et al. Randomized, controlled trial of an intervention for toddlers with autism: the Early Start Denver Model. Pediatrics. 2010;125(1):e17-23.

[39] Greenspan, S. I. (1998). A developmental approach to problems in relating and communicating in autistic spectrum disorders and related syndromes. SPOTLIGHT on Topics in Developmental Disabilities, 1(4), 1-6.

[40] Reichow B, Barton EE, Boyd BA, Hume K. Early intensive behavioral intervention (EIBI) for young children with autism spectrum disorders (ASD). The Cochrane database of systematic reviews. 2012;10:Cd009260.

[41] Myers, SM, Johnson, CP. (2007) Management of children with autism spectrum disorders. Pediatrics; 120:1162.

[42] Wetherby, A. W., & Prizant, B. M. (2000). Autism Spectrum Disorders: A Transactional Developmental Perspective (1st ed. Vol. 9). Baltimore: Paul H Brookes.

[43] Strain, P. S., & Hoyson, M. (2000). The need for longitudinal intensive social skill intervention, leap follow-up outcomes for children with autism. Topics In Early Childhood Special Education, 20(2), 116-122.

[44] Mesibov GB, Shea V. The TEACCH program in the era of evidence-based practice. J Autism Dev Disord. 2010;40(5):570–9.

[45] Panerai, S, Ferrante, L, Zingale, M. (2002) Benefits of the Treatment and Education of Autistic and Communication Handicapped Children (TEACCH) programme as compared with a non-specific approach. J Intellect Disabil Res; 46:318.

[46] Odom, S. L., Boyd, B., Hall, L., & Hume, K. (2010). Evaluation of comprehensive treatment models for individuals with autism spectrum disorders. Journal of Autism and Developmental Disorders, 40, 425–436. doi:10.1007/s10803-009-0825-1.

[47] Wong C, Odom SL, Hume KA, Cox AW, Fettig A, Kucharczyk S, Brock ME, Plavnick JB, Fleury VP, Schultz TR. Evidence-Based Practices for Children, Youth, and Young Adults with Autism Spectrum Disorder: A Comprehensive Review. J Autism Dev Disord. 2015 Jul;45(7):1951-66. doi: 10.1007/s10803-014-2351-z.

[48] Odom, S. L., Collet-Klingenberg, L., Rogers, S., & Hatton, D. (2010). Evidence-based practices for children and youth with autism spectrum disorders. Preventing School Failure, 54, 275–282. doi:10.1080/10459881003785506.

[49] Marini S, Ciamarra C, De Lena R, Giacomodonato M, Molinero M, Sebasta F, Agnese S, Mastrodonato F, D'Agostino L. Invisible Talents and Overcomeable Limits in Autism Spectrum Disorder. International Journal of Clinical Studies and Medical Case Reports (IJCSMCS), 2024, 39(1). DOI: 10.46998/IJCMCR.2024.39.000953