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Hypersensitivity in children with Autism Spectrum Disorder (ASD)

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ABSTRACT
Hypersensitivity is a common trait in many children with Autism Spectrum Disorder (ASD), making them more sensitive to sensory stimuli from the environment, such as sounds, textures, tastes and odors, balance, and posture. These reactions can have a substantial impact on both the quality of life and social interactions of these children. Therefore, speech therapy, in collaboration with the multidisciplinary team, plays a fundamental role in the evaluation, diagnosis and intervention, aiming to help these children deal with their exacerbated sensitivities. The therapeutic approach seeks to create personalized strategies for each child, considering the wide variation in the intensity of hypersensitivities within ASD. For this reason, the main objective of this article is to address hypersensitivity in children with Autism Spectrum Disorder (ASD). It is critical to recognize and understand the specific areas in which each child is most sensitive, as this sensitivity can vary widely from one child to another. Addressing hypersensitivity in a personalized way is essential to improve the quality of life of these children by reducing their discomfort, anxiety, and challenging behaviors. That said, the development of this study was based on a bibliographic research, which used as sources scientific articles available on renowned platforms, such as Google Scholar, as well as journals indexed in Scielo.

Keywords: Hypersensitivity, TEA, Children

1 INTRODUCTION

Autism Spectrum Disorder (ASD) is a notorious neurodevelopmental syndrome, characterized by the presence of limitations in the spheres of communication and social interaction, along with the manifestation of patterns of behavior, interests, and activities that tend to be restricted and repetitive. (American Psychiatric Association, 2013).

In this context, it is common for many children diagnosed with Autism Spectrum Disorder (ASD) to demonstrate noticeable sensory alterations, often of a disturbing nature. Sensitivities in some senses can generate anxiety and induce aggressive or self-harming behaviors. (AMERICAN PSYCHIATRIC ASSOCIATION, 2014; CRYING; LIM, 2010; CHUANG; KUO, 2016; POSE; VISCONTI, 2018).

Additionally, within these conditions, it is common to observe an unusual interest in sensory aspects of the environment and the presence of hypersensitivities or hyposensitivities to sensory stimuli that are perceived through the senses of the human body (LEITE et al, 2018). In addition to the

traditional senses, such as sight, hearing, smell, touch, and taste, it is important to remember that all individuals have additional senses, such as the vestibular and proprioceptive system. However, in patients with autism spectrum disorder (ASD), these senses may be subject to hyper- or hyposensitivities, meaning they may be more heightened or reduced in their perception (GUIDANCE MANUAL, 2019).

According to the words of Costa (2016), it is essential to emphasize that the treatment of children with Autism Spectrum Disorder (ASD) is inherently multidisciplinary. This implies that no professional, regardless of their competence, can assume the responsibility for the treatment of this complex disorder alone. Multidisciplinary approaches may vary, being selected according to the specific needs of each case and may include professionals such as speech therapists, occupational therapists, psychologists and physiotherapists.

That said, the present article seeks to address hypersensitivity in children with ASD, as it is extremely important to direct attention to this group, since it plays a central role in improving the quality of life of these children.

The choice of this theme is justified by the fact that, by addressing and treating this sensitivity, it becomes possible to promote social inclusion, facilitate communication, reduce challenging behaviors, and stimulate global development. In addition, this approach not only benefits the child with ASD but also contributes significantly to the well-being of the family by creating a more harmonious environment. This holistic approach allows children to reach their full potential and live a fuller, more satisfying life.

As for the methodology of this study, it is of a bibliographic nature made through the collection of data on hypersensitivity in children with autism spectrum disorder (ASD) and, for this, it was used publications of scientific articles available on platforms such as Google Scholar, journals indexed in Scielo.

The research focused on the area of language, with the aim of exploring hypersensitivity in children with Autism Spectrum Disorder (ASD).

The structure of the text is organized as follows: in the first section, a concise summary of Autism Spectrum Disorder was presented, addressing its concept, characteristics, types, ICD-11 classification, and the relevance of the multidisciplinary team in the diagnosis and evaluation process.

In the second section, the main types of hypersensitivity in children with ASD are addressed, which encompass the sensory and perceptual areas (sound, visual, gustatory, olfactory and tactile, balance and posture, and body awareness). There is also a brief explanation of the "hug machine", an innovation conceived by Temple Grandin, who was diagnosed with autism as a child. The said machine was made to reduce anxiety, tension, and repetitive motions in people who have hypersensitivity.

In the third section, interventions for children with ASD were discussed, highlighting the relevance of the role of the speech therapist, sensory integration therapy, hippotherapy, psychomotricity and the collaboration of the multidisciplinary team.

2 MATERIALS AND METHOD

This study adopts a qualitative approach and fits into the genre of literature review. This is due to the fact that the work follows research techniques that involve the critical analysis of previously published literature in various formats, including books, journals, and documents available in both printed and electronic formats on the internet (Thomas, Nelson, & Silverman, 2012).

Regarding the bibliographic research, Prodanov (2013, p.54) explains that:

> Bibliographic research: when elaborated from material already published, consisting mainly of: books, magazines, publications in periodicals and scientific articles, newspapers, bulletins, monographs, dissertations, theses, cartographic material, internet, with the objective of putting the researcher in direct contact with all material already written on the subject of the research. In relation to the data collected on the internet, we must pay attention to the reliability and fidelity of the sources consulted electronically. In bibliographic research, it is important for the researcher to verify the veracity of the data obtained, observing the possible inconsistencies or contradictions that the works may present (PRODANOV, 2013, p.54).

To achieve the objectives proposed in this study, a comprehensive literature search was conducted. Scientific articles available on widely recognized platforms, such as Google Scholar, as well as journals indexed by Scielo, were used as primary sources of research. This rigorous literature search provided a solid basis for reviewing the literature and gathering relevant information related to our study

The following keywords were used in the research field of these platforms: autism spectrum disorder, hypersensitivity, sensory, childhood autism, ASD intervention. In addition, a filter was applied to the results so that the time lapse was in the period from 2012 to 2022, and files in the languages of Portuguese and English. Due to the scarcity of articles addressing the different types of hypersensitivity in children with Autism Spectrum Disorder (ASD), this study incorporated research dating from 1999 and 2000 to enrich and improve its approach, aiming at a more comprehensive and consistent understanding of this topic

To obtain the results of this study, a search was initiated on the Google Scholar and Scielo platforms, resulting in the identification of 30 articles. Then, we conducted a thorough analysis of the literature of the articles, aiming to select those that were aligned with the thematic proposal of this work. As a result of this screening process, we identified a total of 16 articles that were considered relevant and therefore used as the basis for our research.

3 AUTISM SPECTRUM DISORDER

3.1 CONCEPT, CHARACTERISTICS, EVALUATION AND DIAGNOSIS

Autism Spectrum Disorder (hereinafter ASD), also known as Autism, is characterized by the DSM-5 (Diagnostic and Statistical Manual of Mental Disorders, 2014) as a neurodevelopmental disorder that mostly manifests in the first years of life. The word "Autism" has its origin in the Greek language, meaning "one's own" or "one's own" (BARBOSA; ZECHARIAH; MAN; NOGUEIRA, 2013).

One of the first indications of this disorder is related to language, including "people with prosody problems, changes in the voice, and also sensorimotor changes in the orofacial area (orofacial), which can result in dietary challenges and changes (hypersensitivity) in hearing, such as hyperacusis" (SBFa, 2019). These language challenges are a fundamental component of this disorder, which is characterized by the presence of challenges in communication, social interaction, and the manifestation of restricted and repetitive behaviors and interests (CAMPISI et al., 2018). It is important to note that the nature and intensity of these symptoms vary considerably between individuals (RAHMAN; SUBASHINI, 2021).

As research indicates, more than 40% of patients diagnosed with Autism Spectrum Disorder (ASD) also have sensory alterations known as Sensory Processing Disorder (SPD) (SOUZA, NUNES, 2019). These combined influences can result in limiting social participation and restricting the interaction of these individuals (POSAR and VISCONTI, 2018). In addition to the five traditional senses – sight, hearing, smell, touch, and taste – it is relevant to highlight additional sensory systems, including the vestibular and proprioceptive systems. These systems may present hyper- or hyposensitivities, which implies an intensification or reduction in sensory perception (GUIDANCE MANUAL, 2019).

According to the International Classification of Diseases – 11th edition (ICD-11), which was released in 2022, autism is categorized and classified:

Table 1: Classification of Autism

ICD 11	AUTISM CLASSIFICATION
6A02	Autism Spectrum Disorder (ASD)
6A02.0	Autism Spectrum Disorder without intellectual disability (ID) and with mild or absent functional language impairment
6A02.1	Autism Spectrum Disorder with intellectual disability (ID) and with mild or absent functional language impairment
6A02.2	Autism Spectrum Disorder without intellectual disability (ID) and with impaired functional language
6A02.3	Autism Spectrum Disorder with intellectual disability (ID) and with impaired functional language
6A02.5	Autism Spectrum Disorder with intellectual disability (ID) and absence of functional language
6A02. Y	Other specified Autism Spectrum Disorder
6A02. Z	Autism Spectrum Disorder, unspecified

Font: CID 11 (2022).

Autism Spectrum Disorder (ASD) is categorized into three levels, based on social communication difficulties and restrictive, repetitive patterns. At Level 1, individuals are still able to communicate, although they have communication gaps and a reduced interest. They face challenges in modifying their habits, and organization and planning pose obstacles to their independence. At Level 2, communication, both verbal and nonverbal, is limited to simple sentences, and interest in specific subjects is reduced. In addition, their verbal communication can be peculiar, and they manifest inflexibility of behavior, repetitive behaviors evident to the people around them. Changing the focus or actions is a challenging task, depending on the context. At Level 3, there is a significant limitation in social communication, with few attempts to initiate interactions. Their social approaches can be unusual and direct, and they face extreme difficulty in coping with changes in behavior or routine. Changing focus or actions can cause great distress (DMS-V, 2014).

Autism spectrum disorder begins before the age of 3 and can persist throughout life, although the intensity of symptoms may decrease over time. In some cases, symptoms of this disorder can be observed in children during the first 12 months of life (MONTEIRO et al., 2020). In other situations, symptoms may not appear until 24 months of age or even later (RIBEIRO et al., 2017).

As indicated in studies, a significant percentage, ranging from 45% to 96%, of people with Autism Spectrum Disorder (ASD) face some form of Sensory Processing Disorder (HOWE; STAGG, 2016; METZ et al., 2019). As a result, many individuals with ASD find it difficult to adapt to their surroundings, which can negatively impact their participation in social contexts.

In recent years, there has been a considerable increase in the prevalence of Autism Spectrum Disorder (ASD), with current estimates pointing out that one in every 160 people is diagnosed with ASD (LI et al., 2022). This increase in the prevalence of ASD can be attributed to several factors, as highlighted by Hyman et al. (2020), including the expansion of diagnostic criteria throughout the revisions of the Diagnostic and Statistical Manual of Mental Disorders (DSM). It is notable that boys are more likely than girls to be diagnosed with autism (RAHMAN; SUBASHINI, 2021), and reliable statistics indicate that ASD is more common in boys, with a ratio of almost 5 affected boys for every girl (INSTITUTO BUKO KAESEMODEL, 2020).

The diagnosis of Autism Spectrum Disorder (ASD) is a complex process that requires the collaboration of a multidisciplinary team, composed of specialists such as neurologists, psychologists, speech therapists, occupational therapists and physiotherapists. Therefore, this process is of utmost importance in the evaluation and follow-up of individuals with ASD (Brasil, 2015).

The multidisciplinary assessment aims to analyze the symptoms presented by children, aiming at a deeper understanding of their individual behavior.

In this evaluation process, several stages are conducted, including neuropsychological evaluation, anamnesis, speech therapy, social cognition analysis, physical examination, and

neurological examination. After each evaluation, the multidisciplinary team meets to discuss relevant aspects, resulting in the formulation of a diagnosis. This diagnosis, which also takes into account the DSM-5 criteria (APA, 2014), is complemented by a comprehensive report, encompassing all this information and including specific guidelines and guidance. These details are then shared in a meeting with the assessed individual's family, ensuring effective communication and mutual understanding (feedback).

4 TYPES OF HYPERSENSITIVITIES

Sensory hypersensitivity is a complex and prominent feature that is usually present in Autism Spectrum Disorder (ASD). Children with ASD often demonstrate intense and challenging responses to a variety of sensory stimuli, which include, but are not limited to, lights, sounds, textures, and odors. These reactions can have a substantial impact on both the quality of life and social interactions of these children.

The vestibular system, located in the inner ear, plays a crucial role in providing information about our body's location in space, its speed, direction, and movement in relation to the force of gravity. It is essential for maintaining balance and posture. In individuals on the autism spectrum, hypersensitivity manifests itself in the form of difficulties when performing activities that involve movement, stopping rapidly, or activities in which the head is not in an upright position (Dawson & Watling, 2000).

The body awareness system, also known as proprioception, is located in the muscles and joints, forming a perception system that provides information about the body's position, its shape, and how the body parts are moving and articulating with each other. In individuals with autism, hypersensitivity may manifest as difficulty performing fine motor activities and whole-body movements when directing one's gaze to something (Dawson & Watling, 2000).

Auditory hypersensitivity is identified as an atypical perception of sound, with the potential to influence various everyday situations, including social interactions and leisure time (AAZH et al., 2016)

According to Sanchez et al., (1999), auditory hypersensitivity can manifest itself in three distinct ways:

1) Hyperacusis (derived from "hyper" = excess and "akousis" = hearing) - observed in individuals with normal hearing, characterized by an abnormal sensitivity to sounds of low or moderate intensity, regardless of their frequency. This condition is attributed to changes in the central processing of sounds, resulting in uncomfortable sensations;

2) Phonophobia – an aversion to certain sounds due to their meaning or association, with tolerance for pleasant sounds, even at high intensities. This occurs even in the absence of auditory abnormalities, and is related to increased connections between the auditory and limbic systems;

3) Recruitment - associated with peripheral sensorineural hearing loss, occurring due to a decrease in the sensory elements of the inner ear (GOMES E. et al., 2014)

The auditory system, located in the inner ear, is responsible for capturing and processing sounds from the environment. In individuals with autism, auditory hypersensitivity manifests itself primarily through increased volume of noises, resulting in an inability to deal with specific sounds and a decrease in the hearing threshold, making them more sensitive to hearing. Auditory processing impairment can have direct repercussions on their ability to communicate and can affect their balance (Dawson & Watling, 2000).

On the other hand, the visual system located in the ocular retina and activated in response to light, this component regulates our visual perception of objects, people, colors, contrast, and spatial boundaries. In individuals facing the challenges of the autism spectrum, hypersensitivity can manifest in a variety of ways, including a distorted view of objects and intense light sources, the fragmentation of images, and the tendency to focus on small details (Dawson & Watling, 2000).

According to author Dawson & Watling (2000), the taste system is responsible for processing information through chemical receptors located on the tongue, identifying a variety of flavors, including sweet, sour, bitter, salty, and umami. In the case of an individual with Autism Spectrum Disorder (ASD), hypersensitivity related to this system manifests itself as discomfort with the intensity of certain flavors and specific textures of food

As for the olfactory system, it is responsible for processing information through chemical receptors located in the nose, allowing the perception of the aromas of substances. In individuals with Autism Spectrum Disorder (ASD), hypersensitivity in this system can manifest itself through an intensification of smells, leading to the rejection of products with distinct scents, such as perfumes and shampoos (Dawson & Watling, 2000).

Lastly, the tactile system refers to the sensation of touch, including different levels of pressure, pain perception, and temperature sensitivity, and is located in the skin, which is the largest organ in the body. In the case of individuals facing challenges on the autism spectrum, hypersensitivity in this system can manifest itself through an aversion to touch, making it painful and uncomfortable. This can result in difficulties in performing simple activities, such as brushing teeth or washing hair, as well as specific preferences for certain types of clothing and textures (Dawson & Watling, 2000).

With that, in 1965, Temple conceived, designed, and elaborated a device with the purpose of relieving anxiety and stress in hypersensitive individuals, in particular, those with autism. According

to the creator, the hug machine aimed to replicate the tactile sensation of a hug, restricting space and applying pressure to the body, in order to provide a feeling of comfort and serenity (SCHMIDT, 2012).

In this context, it is relevant to highlight Temple Grandin's pioneering initiative in conceiving the hugging machine as a measure to mitigate the challenges arising from these sensory alterations, with the intention of benefiting not only herself, but also other people. Currently, the device continues to be used in several therapeutic programs in the United States, which report positive results (SCHMIDT, 2012).

5 INTERVENTION

5.1 MULTIDISCIPLINARY THERAPY

The multidisciplinary team is crucial for a comprehensive and effective intervention in children with hypersensitivities in ASD, providing a diverse set of therapeutic tools and expertise to promote the child's development and well-being.

5.2 SPEECH-LANGUAGE PATHOLOGIST

The work performed by a speech-language pathologist has a remarkable impact on social, family and school interactions, contributing significantly to the improvement of the quality of life of children with autism (GONÇALVES; CASTRO, 2013). Autism Spectrum Disorder (ASD) encompasses several ways in which sensory processing impairments negatively impact the lives of people with ASD and their families. This is reflected in the areas of communication, social activities, and daily routines (POSAR; VISCONTI, 2018).

5.3 OCCUPATIONAL THERAPIST

The Occupational Therapist (OT) is crucial in the management of sensory dysfunctions associated with autism spectrum disorder (ASD) (SANTIAGO; BARBOSA; SOUZA, 2020). Whereas, Sensory Integration Therapy (IT) is an approach widely employed by occupational therapists and speech pathologists, although it is also practiced by other professionals. According to Trigo (2018), TIS aims at the integration of all sensory systems, such as vision, hearing, taste, smell, touch, balance, and body awareness, with a special focus on the vestibular and tactile systems.

With this, TIS aims to provide meaningful sensory experiences, challenging the child in an appropriate way, promoting their autonomy, and allowing them to participate in the choice of activities. In addition, it seeks to adapt to the child's level of individual interest, creating therapeutic environments that are engaging and stimulating (CARDOSO; BLANCO, 2019).

According to Ayres' research, sensory integration is a fundamental factor to promote a greater capacity for concentration and organization, increase self-confidence, self-esteem and self-control,

improve the capacity for reasoning and abstract thinking, as well as facilitate academic learning and the development of the skills necessary for communication and social interaction (MONTEIRO et al., 2021).

5.4 PHYSIOTHERAPIST

According to Oliveira (2018), physical therapy treatment, when started early, can result in amplified benefits for the child, considering the brain's ability to adapt and promoting more effective development and improving the understanding of the body schema.

Among the therapeutic options available, hippotherapy stands out as a valuable approach for this population. As indicated by Souza e Silva (2015), hippotherapy has been shown to contribute to the development of people with Autism Spectrum Disorder (ASD). This is due to the kinetic-therapeutic nature of the horse, which has positive impacts on perceptual and cognitive aspects. According to Duart et al (2015), the horse's performance is relevant due to the stimuli generated by its movements, which favor the development of the child's balance, posture, and motor coordination. In addition, this interaction with the horse promotes the reduction of aggression and agitation, helping to stimulate skills such as reasoning, language, hearing, sight, laterality, touch and understanding of temporal space.

In addition, according to Teixeira et al. (2016), hippotherapy is a set of rehabilitation techniques aimed at overcoming motor, behavioral, sensory, and cognitive challenges. These techniques are applied through a recreational and sporting activity that uses the horse as the main resource, establishing a comprehensive therapeutic approach for people with ASD.

5.5 PSYCHOPEDAGOGUE/ PSYCHOTHERAPIST

Psychomotor interventions are adapted to the individual needs of each child, considering their particularities and providing a safe and welcoming environment (HOLDEFER; VILELA, 2022). In addition, psychomotricity contributes to sensory integration, helping children with autism to improve the processing of sensory stimuli from the environment (CORDEIRO; SILVA, 2018).

The psychomotor approach plays an essential role in the intervention with children with autism, since it offers an environment rich in sensory, motor and emotional stimuli (SILVA; SOUZA, 2018).

Psychomotricity is an effective therapeutic strategy, providing valuable opportunities for the integral development of children with autism, supporting them in their learning process and contributing to improving their quality of life (SILVA et al., 2020).

6 FINAL THOUGHTS

The present study revealed that hypersensitivity in children with Autism Spectrum Disorder (ASD) is a significant aspect that can profoundly impact their lives. Understanding the different forms of hypersensitivity, which can range from sensitivity to sensory stimuli to exaggerated responses to everyday stimuli, is essential to provide a more adapted and welcoming environment for these children.

In the context of autism, it is critical to recognize the uniqueness of each child, as their sensory responses vary widely. In this sense, multidisciplinary therapeutic approaches play a crucial role in the support and development of children with Autism Spectrum Disorder (ASD). The cooperation of a multidisciplinary team consisting of professionals such as occupational therapists, speech therapists, physiotherapists, and psychologists is essential to develop personalized treatment plans. As Sensory Integration therapies, Speech Therapy, Hippotherapy and Psychomotricity have the purpose of improving the sensory processing, communication skills, motor skills and general well-being of these children. When integrated into a multidisciplinary treatment plan, these collaborative therapies contribute significantly to improving the quality of life and unlocking the developmental potential of these children with ASD. Interdisciplinarity is key to the success of these approaches.

This study had limitations due to the lack of recent articles comprehensively addressing hypersensitivities in children with Autism Spectrum Disorder (ASD), resulting in a scarcity of up-to-date sources for analysis and discussion.

Finally, it is recommended that future research address in greater depth the role of the multidisciplinary team in the intervention with children with Autism Spectrum Disorder (ASD), aiming at a broader understanding and an improvement in the quality of care.

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