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INFLUENCE OF GLUTEN AND CASEIN ON THE BEHAVIOR OF CHILDREN WITH AUTISTIC AUTISM SPECTRUM: AN INTEGRATIVE REVIEW OF THE LITERATURE

INFLUÊNCIA DO GLÚTEN E CASEÍNA NO COMPORTAMENTO DE CRIANÇAS COM TRANSTORNO DO ESPECTRO AUTISTA: UMA REVISÃO INTEGRATIVA DA LITERATURA

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Abstract: **Introduction:** Autism spectrum disorder is a syndrome that manifests itself in childhood and lasts until the end of the individual's life. Although there is no cure, multidisciplinary treatments have shown good results, with nutrition standing out as one of the main allies. However, inadequate nutrition can cause negative effects on behavior and generate abdominal discomfort in the individual. Therefore, it is necessary to address the effect of nutrition on the behavior of autistic individuals and explain the possible mood changes and abdominal discomfort with the use of foods that are inappropriate for consumption. **Objective:** To analyze, through a literature review, the behavior of autistic individuals in the use of proteins. **Methods:** The research is based on a bibliographic review carried out in the following databases: Virtual Health Library (BVS), Google Scholar, Scielo and PubMed and LILACS. With a time frame between 2010 and 2020. February to December and 2021 the descriptors used in the searches were nutrition, autism and nutrition. **Results:** To conduct the research, 25 articles were found and 15 were used, taking into account some inclusion and exclusion criteria: published complete articles, complete articles that addressed the research topic in

Portuguese, English and Spanish, articles published in the last 10 years. And exclusion criteria: incomplete articles, articles that did not address the research topic in Portuguese, English and Spanish, and articles that did not fit the time frame. It was found that thirteen of the articles were published in foreign journals and three articles published in national journals. It was pointed out that at the time of digestion of gluten and casein, there is a change in intestinal permeability due to inflammation, and thus it crosses the blood-brain barrier, which influences changes in the central and enteric nervous system. **Conclusion:** Protein consumption triggers changes in intestinal permeability, causing modifications in the central nervous system of the autistic person. There is an influence of diet on the behavioral patterns and gastrointestinal disorders of autistic people, it is important that the autistic person's diet is exclusive and individualized.

Keywords: Autism; Nutrition; Protein.

INTRODUCTION

Autism Spectrum Disorder (ASD), popularly known as autism, is characterized by neurological developmental disorders that manifest themselves during childhood or at the birth of the child[1]. Autism is a genetic disorder, and may present several symptoms and disparate forms in each individual[2].

It is complex to identify the basis of the genes that contribute to the development of autism, it is estimated that 15 genes may be involved in the expression of the disease, since some scientists have elucidated the relationship between several genes and not just a single pair of specific alleles[3]. It is a neurobiological disorder, correlated among other findings, with complex modifications in synaptogenesis and neuronal connectivity, with high heritability, of heterogeneous etiology, which encompasses genetic, immunological and environmental causes[3].

In autistic people, symptoms can present themselves in several ways including: difficulty in interacting socially, maintaining eye contact, facial expression, gestures, expressing one's own emotions, making new friends, difficulty in communication, opting for the repetitive use of language and blockages to start and maintain a dialogue, behavioral changes, such as manias, excessive attachment to routines, repetitive actions, intense interest in specific things, difficulty in imagination and sensory sensitivity[4].

So far there is no cure for autism, but there are therapies and drug interactions to relieve hyperactivity, insomnia, depression, anxiety and aggressive behaviors[5]. In this context the family can contribute, given that the interaction with everyone makes them socially included and loved in their own way, relatives need to learn to deal with children with autism, respecting their moments, since they are loving, affectionate, attentive, intelligent people, with above-average memory

capacity[6].

Family and close people need to learn to deal with the mood swings of the autistic child, and understand when he wants to avoid physical contact. The autistic is sensitive, so the caregiver needs to adapt to his behavioral profile, desires, tastes and many things that vary from one autistic to another. This also depends a lot on the degree in which the individual is, but the support of the family is fundamental for the autistic, who need a lot of attention and patience[6].

The person who learns to deal with the autistic can develop healthy coexistence, thus avoiding daily fights, arguments and even stress for both, especially for the autistic, who can develop a feeling of anger which would lead to physical aggression[4]. Therefore, it is necessary to adapt to the autistic's way of life, and at the same time get used to limits so that he does not suffer future damage, such as not respecting the person responsible, being aggressive, or even throwing objects at people when he is not satisfied. So, adapting and inserting limits are the best strategies to live well.

Most of the time, the moment of the meal culminates in crying, agitation and aggressiveness on the part of the autistic and an emotional exhaustion on the part of the caregiver. Autistian children have dietary patterns and a different lifestyle from non-autistic children, compromising their body growth and nutritional status[7].

Autistic children have difficulty experiencing something new, so they deprive themselves and block new experiences, and may even occur with their diet, in this sense, the person responsible needs to observe what the child eats, his diet needs to be healthy, because it is known that this genetic condition alters his metabolism[8]. The autistic child has food selectivity, usually always asks or chooses the usual ones, avoiding trying new foods. This, in turn, can affect your health, by causing nutritional deficiencies, malnutrition, obesity, vitamin deficiencies and may develop some disease with poor nutrition[8].

The behavioral problems of autistic people can be aggravated by the intestinal discomfort caused by the inflammatory process. Studies show that abnormal intestinal permeability generates an increased absorption of peptides little hydrolyzed by our body, such as casein, which is a protein derived from milk, and gluten, which is derived from wheat, these, after crossing the blood-brain barrier, act as opioids that can aggravate the symptoms of autistic people by causing an overload in this system.

Studies indicate that people with autism when exposed to foods with casein or gluten suffer structural and functioning changes in the digestive system responsible for breaking down these proteins. Generating a high concentration of opioid peptides in the bloodstream, which act on the central nervous system, aggravating symptoms[4]. The immune system generates a mediated response in relation to casein and gluten proteins, which induce neural changes that consequently reflect on behavior. Therefore, people with autism who adopt a diet with casein and gluten restrictions

tend to show improvement in behavior and gastrointestinal symptoms after starting the diet[8].

Given the above, the following question is necessary: what is the effect of casein and gluten on the behavior of autistic people? The topic under study was chosen because it is a little recurrent content by the media, however, the offer of inadequate foods can generate discomfort in autistic people during the meal, and which, therefore, needs to be discussed, given that in some cases the person in charge who offers the meal to the autistic does not have correct nutritional information, and may even offer inadequate foods and cause possible mood swings and abdominal discomforts with the use of such inadequate foods for consumption in patients with the autistic spectrum. Therefore, the objective of this work is to specify the behavior of the autistic in the use of these proteins.

METHODS

This work consists of an integrative literature review, in which both the analysis and the synthesis of the data extracted from the articles were carried out in a descriptive way, making it possible to observe, count, describe and classify the data, in order to gather the knowledge produced on the subject[9]. Descriptive research usually uses survey data and defines it by speculative hypotheses that do not specify causal relationships. Descriptive research presents the characteristics of a given population or phenomenon, establishes relationships between variables and determines their nature[10].

The design used in this bibliographic review has a qualitative approach[11], qualitative research is understood by some authors as a "generic expression". Thus, it distinguishes activities or investigation that can be called specific[12]. The concept of qualitative research describes five basic characteristics that configure this type of study: natural environment, descriptive data, concern with the process, concern with the meaning and inductive analysis process.

The option for the integrative literature review was given by enabling the most recent data collection on the subject, favoring the grouping of updated information in a single text, for the understanding and presentation of perspectives created on a given phenomenon, as well as its still existing gaps[13].

In the present study, articles published between 2010 and 2020 were used, obtained through the following electronic databases: Virtual Health Library (VHL), Google Academic, Scielo, PubMed and LILACS. The following descriptors were used as a search strategy: nutrition, autism, food, casein and gluten. Articles published in Portuguese, English and Spanish are used. The exclusion criteria were articles with a different approach from the researched objective and published outside the established time frame.

The articles were read in full, analyzed, compared and summarized so that they were used to achieve the study objective of the chosen theme. This delimitation was established because studies in the health area, especially when it comes to autism, still have many gaps that need to be better elucidated.

After identifying the titles in the online databases selected for the study, an exploratory reading was carried out in the material to verify their relationship with the researched object, it was evaluated whether the articles obtained in the databases contemplated the theme addressed in the study, respecting the established inclusion criteria. Aiming to develop the research, taking into account the most relevant studies that address the subject.

RESULTS

After analyzing the works, taking into account the inclusion and exclusion criteria mentioned above, 15 articles were included in this review. The articles are presented in the following table.

Table 1 - Selected articles after applying the inclusion and exclusion criteria.

TITLE	AUTHORS	OBJETIVES	METHODOLOGY	CONCLUSION
Gluten and casein restriction in patients with autism spectrum disorder	PIMENTEL et al. (2019)	To assess the presence of behavioral changes and gastrointestinal symptoms resulting from gluten and casein restriction in individuals with ASD.	This is an intervention study. Eight people aged 2-25 were evaluated For a period of 11 weeks. It was carried out in the second half of 2017, in Varginha - Minas Gerais	At the end of the dietary intervention, positive responses were obtained in relation to autistic individuals, with improvements occurring in the following aspects: Behavior; Stereotypy; Aggressiveness; Hyperactivity; Anxiety; Gastrointestinal changes.
Autistic syndromes and diet: a follow-up study	KNIVSBERG et al. (2016)	Assess cognitive level, autistic traits, language, motor coordination.	A randomized, controlled, double-blind clinical trial was conducted. Fifteen individuals were evaluated over a period of 1 year. In Norway	At the end of the dietary intervention, a reduction in agitation behavior, improvement in the use of social, cognitive, and communicative skills, and normalization of urine patterns were recorded.
Efficacy of a gluten-free, casein-free diet for children diagnosed with	PENNESI et al. (2013)	Evaluating a gluten-free and/or casein-free (GFCF) dietary intervention for	A cross-sectional study was conducted. 387 parents and guardians were interviewed. Over a	At the end of the dietary intervention, positive responses were obtained in children whose parents

autism spectrum disorder: Based on parent report		children with autism spectrum disorders (ASD) suggests that some children may respond positively to implementation of the dietary intervention.	period of 1 year, in Pennsylvania	reported the presence of gastrointestinal symptoms, diagnoses of food allergy, and improvements in physiological symptoms and social behaviors.
Nutritional profile of children with autism spectrum disorder	CAETANO et al. (2018)	To assess the nutritional status and food consumption of children with autism spectrum disorder (ASD).	This is a quantitative, descriptive, exploratory and cross-sectional study. 26 individuals were evaluated Over a period of 4 months. It was carried out from March to June 2017 In Limoeiro do Norte, Ceará, Brazil	Participants showed improvements in stereotypical behaviors, communication and social interaction.
The effects of a gluten-free and casein-free diet in children with autism: a case report	LIN HSU (2010)	Carry out a case report of a child with autism, with growth and development delay.	A case study was conducted. In which a child was evaluated over a period of 11 months. The investigation was conducted in August 2009. In Guishan District, Taoyuan City, Taiwan.	The author obtained positive responses at the end of the dietary intervention, it was observed that children improved interpersonal relationships, including eye contact and verbal communication. The dietary intervention provided a decrease in the frequency of postprandial vomiting and led to a significant increase in body weight and body height.
Gluten-free and casein-free diets in autism therapy	LANGE et al. (2015)	Discuss the role of gluten-free and casein-free diets in the treatment of autism.	A cross-sectional study was conducted. 80% of parents of children with autism were interviewed. In the United Kingdom	29% of parents who used the gluten-free and casein-free diet reported significant improvements in core dimensions of autism spectrum disorder.
Influence of a combined gluten-free and casein-free diet on behavioral disturbances in children and adolescents diagnosed with autism spectrum disorder: a 12-month follow-up clinical trial	DOMENECH et al. (2020)	To determine the influence of a GFCF diet on behavioral disorders in children and adolescents diagnosed with ASD and the possible association with urinary beta-casomorphin	A controlled clinical study was conducted. Thirty-seven individuals were evaluated over a 12-month period. It was carried out in November 2018 in Granada, Spain.	At the end of the dietary intervention, it was concluded that short-term diets did not induce significant changes in behavioral symptoms and significant changes in urinary beta-casomorphin concentrations.

		concentrations.		
Nutritional impact of a gluten-casein-free diet in children with autism spectrum disorder	BAUSET et al. (2016)	To compare children with autism spectrum disorder (ASD) on a gluten-free, casein-free (GFCF) diet and a regular diet.	A controlled clinical trial was conducted. A total of 105 children were evaluated over a period of 3 months. The study was conducted on October 1, 2015, in Valencia, Spain.	At the end of the dietary intervention, it was observed that the group that had a regular diet had an adequate body mass index and total energy, greater intake of fiber, vegetables and greens, and the group that had a gluten and casein-free diet obtained positive results, with better quality of fat intake, but needed supplementation with vitamin D.
The ScanBrit randomized, controlled, single-blind study of a gluten-free and casein-free dietary intervention for children with autism spectrum disorders	WHITELEY et al (2010)	Obtain information on the use of gluten-free and casein-free diets for children with autism spectrum disorders (ASD).	A randomized clinical trial was conducted. 72 children were evaluated over a period of 24 months. The research was conducted on February 13, 2008, in Denmark.	After the dietary intervention there was a significant improvement and overcoming of the predefined statistical limits.
A pilot study to evaluate nutritional influences on gastrointestinal symptoms and behavior patterns in children with Autism Spectrum Disorder	HARRIS et al. (2012)	To evaluate the relationship between a GFCF diet (gluten-free/casein-free diet) and gastrointestinal symptoms and behavior patterns in children with ASD.	A cross-sectional project was carried out. Thirteen children were evaluated over a period of 4 months. The research was conducted in July 2012, in the United States.	At the end of the dietary intervention, parents of all children on the diet reported improvement in GI symptoms and behavior patterns.
Data mining from the ScanBrit study of a gluten-free and casein-free dietary intervention for children with autism spectrum disorders: behavioral and psychometric measures of dietary response	PEDERSEN et al. (2013)	Determine potential factors pertinent to response to dietary intervention.	A randomized clinical trial was conducted. A total of 72 children were evaluated over a 12-month period. The study was conducted in Denmark in August 2012.	Participants with signs of inattention and hyperactivity behaviors had significant positive changes and a positive response after the dietary intervention.
Autism and dietary therapy:	HERBERT et al. (2013)	To evaluate the case of a child	A case report and literature review were	After starting the diet, the child had positive

case report and literature review		with autism and epilepsy using a gluten-free and casein-free diet.	performed. One child was evaluated over a 14-month period. The study was conducted in February 2012 in the United States.	results, free of seizures. The electroencephalogram showed only occasional spike wave activity, improvement of cognitive and behavioral characteristics.
Improvement of autism symptoms and nutritional assessment after implementing a gluten-free and casein-free diet in a group of children with autism who attend a foundation	AUDISIO et al. (2013)	To understand the changes in behavior regarding eye contact, social interaction, hyperactivity and gastrointestinal problems according to the perception of parents of children with autism after incorporating a gluten-free and casein-free diet (GLCD).	A mixed, exploratory-descriptive, cross-sectional study was conducted. 30 children were evaluated over a period of 4 months. The research was conducted in March 2012, in Buenos Aires.	Individuals showed improvement in moderate to severe changes in any of the gastrointestinal symptoms, hyperactivity, social interaction, and eye contact. Those receiving a dietitian intervention were more likely to improve in all four symptoms compared with those who did not receive follow-up.
Attitudes of parents and child health professionals towards dietary interventions for children with autism spectrum disorders	WINBURN et al. (2014)	To investigate parents' and professionals' experience of dietary interventions and attitudes towards a proposed trial to evaluate the gluten-free casein-free diet (GFCFD).	A cross-sectional study was conducted. A total of 258 parents, 244 health professionals and 258 children were evaluated over a period of 6 months. The study was conducted in January 2014 in the United Kingdom.	After the diet, individuals showed improvements in concentration, attention, communication, social interaction, and repetitive behaviors.
Gluten-free and casein-free diet applied in the treatment of children with autism spectrum disorder - literature review	SILVA et al. (2019)	To evaluate the application of a gluten-free and casein-free diet in the literature in the treatment of children with ASD.	A bibliographic review was carried out in August 2019, using the following databases: PubMed and Periódicos Capes, in Fortaleza, Ceará.	It was realized that there is a need for studies that better elucidate the effectiveness of the gluten-free and casein-free diet.

Source: Research data, prepared by the authors, 2021.

When a search was carried out in PubMed, SciELO, LILACS, scientific and health journals, using the following keywords: nutrition, autism, food, 25 articles were found, of this total the inclusion and exclusion criteria were verified and ten studies were discarded because they were not within the standards of the established criteria, that said, 15 articles were selected to integrate this review.

The selected studies were classified according to their publication category, in the

classification of the studies, as to the context in which they were carried out, most individuals with autism were subjected to a series of tests and the data evaluated with the help of statistical analysis, using specialized software. The objective of these analyses was to evaluate behavioral changes before, during and after the implementation of specialized diets. After the initial procedures, the diets were followed individually in the home environment of each participant. In addition, a significant part of the selected studies used questionnaires as a criterion and evaluation method.

DISCUSSION

Autism is a disorder where there are not many certainties, so several aspects need to be better clarified. In this sense, the withdrawal of gluten and casein is an important starting point to generate greater clarification on this topic. Therefore, it is natural that it is the most studied objective, because there are positive reports when there is monitoring and attention with the diet of autistic children. There are several scientifically based works in the literature on autism and nutrition. The possibility of removing gluten and casein in the diet of people with autism emerged from the intestine-brain axis relationship, this axis is defined by a bidirectional communication system between the intestine and the brain. Thus, the involvement of the central nervous system (CNS), enteric nervous system (SNE), immune system and endocrine system was observed. Any change in this axis can cause dysfunction in the systems involved, being able to generate inflammatory bowel diseases, some gastrointestinal dysfunctions, accentuate neural symptoms, among others[2].

Gastrointestinal dysfunctions become a challenging situation in the care of the autistic patient, knowing that their interpretation is impaired by the communicative difficulty related to the disorder, and can be precipitated or aggravated by episodes of escape to the routine of the same, such as cases of constipation that occurred because of changes or frustrations in their physiological habits[13].

Several studies address the relationship of gluten and casein as harmful substances for autistic people who often have some gastrointestinal discomforts, and aggravate the behavioral symptoms of autistic people, since evidence indicates a relationship between microbiota, intestine and brain. One of the theories is "intestinal dysbiosis" that proposes an alteration of the intestinal microbiota[14].

Research concludes that proteins, gluten and casein may be related to the worsening of ASD symptoms. Gluten composed of two groups of proteins, gliadin and glutamine, belong to the groups of prolamines and glutamines. The presence of these substances in gluten makes it resistant to digestion by gastric peptidases and intestinal epithelium, leading to a high concentration of resistant peptides, which contributes to the stimulation of inflammatory responses and consequently, causing changes in intestinal permeability and alteration of the intestinal microbiota of the autistic[15].

In the study, it was observed that at the end of the dietary intervention positive responses

were obtained in relation to autistic people, with behavioral improvements. Even if it is a short-term study, with only 11 weeks, it is possible to notice the obtaining of favorable results, demonstrating improvements in the characteristic symptoms of ASD carriers[16].

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In a quantitative, exploratory and cross-sectional research aimed at evaluating the nutritional status and food consumption of children with autism spectrum disorder (ASD)[19], improvements in stereotyped behaviors, communication and social interaction were observed. The study time was short, lasting only four months, and there was also a lack of more detailed specification of the method used for the evaluations, which in turn made it difficult to obtain more accurate results. But the results obtained show that there was an improvement in symptoms with the use of the diet.

A male child with autism was investigated in the aspect of growth and developmental delay, he was diagnosed with CHARGE syndrome[20]. This research consists of a case study, achieving positive results, because at the end, the boy was able to play and share toys with his brother and other children, behavior noted as closer to that of a non-autistic child. Demonstrating benefits of the dietary intervention used.

In a cross-sectional study, the role of gluten-free and casein-free diets in the treatment of autism was discussed[21]. The results of this study suggest additional effects of a gluten and casein diet on comorbid autism problems, such as gastrointestinal symptoms, concentration and attention.

From a controlled clinical study it was possible to address the influence of a gluten-free and casein-free diet on behavioral disorders in children and adolescents diagnosed with ASD and the possible association with urinary concentrations of beta-casomorphin[22]. In the results, diets for short periods of time do not induce significant changes in behavioral symptoms and urinary concentrations of beta-casomorphin. There is a need for prolonged follow-up to achieve better results.

In a comparison between children with autism spectrum disorder (ASD), with a gluten-free casein-free diet (GFCF) and in a regular diet, through a controlled clinical trial, positive results were obtained, in the face of the withdrawal of gluten and casein, with improvement in the quality of fat intake, despite requiring supplementation with vitamin D[23]. This essay addresses as a positive point possible improvements and the observation of dietary interventions in relation to some nutritional deficiency for individuals and supplementation needs.

Information on the use of gluten-free and casein diets for children with autism spectrum disorders (ASD) was obtained through a randomized clinical trial over 12 months[24]. At this point, there was a significant improvement. For 12 months he sanctioned the retribution of group B participants to active dietary treatment. The study demonstrates positive effects of gluten and casein withdrawal in individuals with autism.

The relationship between normal diet and gluten-free and casein-free diet (FBCF) and gastrointestinal symptoms and behavior patterns in children with ASD, are addressed in a cross-sectional study, in which the authors obtained as results the response of the parents of all children who took the restrictive diet, who reported improvement in gastrointestinal symptoms and behavior patterns. With the results of the questionnaires, they observed significant improvement in relation to the symptoms and patterns of autistic children, obtained positively from a dietary intervention[25].

The potential factors relevant to the response to dietary intervention, involving a randomized clinical trial, indicated several factors as potentially relevant to a positive response to dietary intervention in terms of symptom presentation. This study had the significant participation of family members who collaborated and had positive responses regarding dietary interventions[26].

In the case of a child with autism and epilepsy with the use of a gluten-free and casein-free diet, in a case report and literature review, they showed favorable results, proving that the child was essentially free of seizures. The electroencephalogram showed only occasional peak wave activity. This study demonstrates positive results from the dietary intervention used, bringing improvements even to seizures[27].

With the knowledge of behavior modification in relation to visual contact, social interaction, hyperactivity and gastrointestinal problems according to the perception of parents of children with autism, after the incorporation of a gluten-free and casein diet (DLGC), in a mixed, exploratory-descriptive and cross-sectional study[28], the authors noted that 26 individuals participating in the research presented improvements, with more expressive results for those who received nutritionist intervention, who were more likely to improve the four symptoms compared to those who did not have follow-up.

The investigation of the experience of parents and professionals of dietary interventions and attitudes was demonstrated in a cross-sectional trial proposed to evaluate the gluten-free casein-

free diet[29], in which 76 children who followed the diet obtained improvement in the parameters: concentration, attention, communication, social interaction, repetitive behaviors, anxiety and aggressiveness. The published literature review work reinforces the importance of a greater number of studies that address this essential and emerging theme[30].

From the analysis of the studies selected to compose this review, it can be seen a positive relationship with the use of dietary intervention regarding the withdrawal of gluten and casein in diets in individuals with autism, it is important to emphasize autistics have specificities, with different levels, so each dietary intervention should be done by a specialized nutritionist, with full attention directed to each individual, analyzing the differences, nutritional deficiencies and their limitations. Recent studies dealing with dietary intervention (the withdrawal of gluten and casein in diets) in patients with autism are recent.

The research used in this review brought explanations about the behavior of the autistic in the use of protein, reported the relationship of food with autistic behavior and specified their mood swings and their abdominal discomfort when using foods that are not suitable for consumption by autistic children. However, the arguments presented on dietary intervention, regarding the withdrawal of gluten and casein for individuals with autism, address improvement for the central nervous system and enteric system, but further research and experiments are still needed so that they can cover all levels and types of autism [18,22,25,26,27,28].

CONCLUSION

For autistic people, inadequate nutrition can cause changes in their central and enteric nervous system. That is why it is important to maintain a gluten-free and casein-free diet in order to provide improvements in the interaction of the individual with family and friends, as well as improvements in concentration and attention; improve communication and eye contact, help maintain control of crises of anger, anxiety and panic reactions when exposed to unknown places and reduction in abdominal discomforts.

Autism corresponds to a complex situation, which requires effective multidisciplinary approaches, in this sense, nutrition plays a primary role in improving the quality of life and well-being of patients. Several studies indicate that the consumption of some proteins triggers changes in intestinal permeability, causing changes in the central nervous system of the autistic. There is a need for nutritional intervention, suggesting the removal of gluten and casein in the diet of autistic people, with a positive effect on the behavior of these patients, leading to improvements in the central and enteric nervous systems. Communication, eye contact, ease of expressing something, increasing your friendship cycle, abdominal discomforts can improve with the correct

nutritional conduct.

However, it is important to note that each autistic has their own psychological and behavioral characteristics, in view of the different levels of autism, therefore, each case must be evaluated in an individualized way, so their diet will be elaborated from their needs and nutritional deficiencies, making it necessary to monitor qualified professionals.

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