Autism Spectrum Disorder: Educational Approaches, Diet and Sleep in Early Childhood

Who for?

Parents

Special Education Teacher

Preschool Teacher

Child Psychologist

Pediatrician

Nurse

1.Autism

Leo Kanner was the first to introduce the concept of autism, and he observed repetitive movements, obsessive behaviors, echolalia, etc. in children. It is known that he considers the characteristics within the concept of autism. Kanner stated that children insist on continuing similar behaviors and cannot communicate with other people. Autism is defined as a complex developmental disorder that is usually seen in early childhood and continues to be seen throughout life, with delays in communication and interaction areas, and with limited areas of interest. It is a disorder in which there are difficulties in making eye contact, disorders in interaction and communication, and differences in the appearance of symptoms from person to person, especially from infancy.

When dealing with autism, it is similarly explained as a neuro-psychiatric disorder in which there are limitations in social communication and interaction, repetitive behavior patterns, and abnormal interest and activity. Children with autism differ from children with normal development due to problems related to attention (difficulty in directing their attention to a certain stimulus or over-focusing on a stimulus, etc.). Making a diagnosis of autism; It covers the medical evaluation process for children, taking into account the DSM-5 diagnostic criteria. The diagnosis of autism is made by child psychiatrists and neurologists, and while making the diagnosis, observations to be made in a clinical setting and family interviews are taken into account along with the diagnostic criteria in DSM5.

In DSM-5, the diagnostic criteria for autism spectrum disorder are listed as follows:

- Persistent disability in social communication and social interaction, present or in the past in different ways,
- Inability to social-emotional responsiveness
- Inability to use nonverbal communicative behaviors for social interaction
- Difficulty developing, maintaining, and understanding relationships
- Limited, repetitive behaviors, interests, or activities now or in the past
- Stereotyped or repetitive motor movements, object use, or speech
- Insistence on sameness, strict adherence to routine, or ritualized verbal and nonverbal behaviors Limited fixated interests that are abnormal in subject or intensity
- Sensory over- or under-sensitivity or an over-attention to the sensory dimension of the environment
- Symptoms should be seen in the early developmental stages.
- Symptoms are clinically evident in social, occupational, or other parts of life should cause limitations.
- These disorders are not better explained by intellectual developmental impairment or general developmental delay.
- Mental retardation and autism spectrum disorder often coexist; In order for autism spectrum disorder and mental retardation to be co-diagnosed, social communication must be below what is expected from the general developmental level.

It is stated that in children with autism, different progression can be observed before the age of 2, but the diagnosis is made at the age of 3 years and later. Developmental disorders that can be seen in children with autism are listed as delayed speech, inability to make eye contact, inability to respond to smiles, lack of imitation skills, inability to use body language, and repetitive behaviors such as nodding and clapping. In children diagnosed with autism spectrum disorder in early childhood; It is seen that the symptoms begin to be seen in the first years of life, between the ages of six months and one year, they have less eye contact than their peers, social smiles are less, not looking when their name is mentioned, repetitive behaviors, deterioration in language skills and non-verbal communication.

At the age of two or three, it is stated that there is a delay in expressive language development, less social responses and behavioral problems. In the pre-school period, it is stated that especially the problems related to language skills become more visible and their social skills are also affected due to the problem they are experiencing. It can be seen that children with autism can become uncomfortable and aggressive when their routines or routines in daily life are changed.

They can develop self-harming behavior; It can be observed that they can engage in high-intensity damaging actions such as biting their lips excessively, biting their fingers or hands, and hitting their head repeatedly, as well as mild ones such as pulling their hair, hitting their head. It is also seen that they do not react to their name, act as if other people are not around, they can laugh or cry suddenly without stimulus, and they develop an obsession with a subject and constantly talk about it. It is stated that the diagnosis of autism has increased rapidly, especially in the last ten years.

1.1.Epidemiology of Autism

According to the data of the Autism and Developmental Disorders Monitoring Network (ADDM); While the prevalence of autism was 1 out of every 150 people in 2000, it was seen in 1 out of 110 people in 2006, 1 out of every 69 people in 2012, 1 out of every 59 people in 2014, and 1 out of every 54 people in 2016. Autism Spectrum Disorder is more common in boys compare to girls but when it is seen in girls it is more severe than boys.

When the causes of autism are investigated, it is generally genetic, familial and preferential in application. In the design of autism, impairments in social interaction and contact are due to the reason that occurs in more than one gene. The fact that the sibling is not diagnosed with autism, experiencing problems after birth, and the normal development of the child from 8 months to 2 years of age are suggested as indicators that autism may be caused by environmental factors.

However, although not scientifically proven, familial factors such as having children at an advanced age, low sociocultural and economic level of the family, smoking and alcohol addiction are also thought to be risk factors for autism. No relationship was found between the behavior of the parents, the race or economic level of the parents, and autism. There are comorbid diagnoses in people with autism and these diagnoses. It is stated that ADHD can be observed as psychotic disorders, tics, sleep disorders, and eating disorders. It also appears to be accompanied by other medical conditions in addition to the diagnosis of autism. These conditions may appear as physical diseases that are diagnosed such as epilepsy or chronic disorders, or that are difficult to attribute to a specific cause such as abdominal pain, cramps, and headaches. People with autism have limited or no communication, in other words, their expressive language is not developed, they cannot talk about their pain or medical disorders verbally; It makes it difficult for people who work with and examine people with autism to understand the events.

It is thought that there is no cure for autism and that it is a life-long disorder, but it should not be ignored that early diagnosis, education and drug therapy are beneficial. Drug use is common especially in people with autism who have self-harming behavior and have anger attacks. Since autism is a lifelong developmental disorder, both children and their families are affected significantly.

The fact that their children are diagnosed with autism by parents can cause them to feel many emotions. In the face of this situation, parents' realizing that their child has a diagnosis and seeing that their children have problems in establishing relationships, being withdrawn or displaying inappropriate behaviors and raising them can lead to the development of depression as well as being a source of stress for parents. It is known that families of children

with autism have a high level of stress and experience more communication problems within the family than other families.

Stress factors felt by families can be listed as follows:

• They do not have enough information after their children being diagnosed with autism and they do not know what to do

• Their children's development progresses differently and they experience communicative and behavioral problems

• Family members do not receive a response from the child in their approach to their children

• Behaviors that may put their families in trouble when their children are in the community.

• They need to be in contact with more than one different specialist

• They need to decide which interventions are most beneficial and appropriate for their child.

It is known that having a child with autism negatively affects the social life of parents, reduces their ability to establish social relationships, and the frequency of meeting with their friends decreases because they spend most of their time on the care and education of their children. More than half of the parents of a child with autism reported that their relationships with other people decreased and they felt lonely. It is mentioned in many studies that families have financial difficulties after the diagnosis of autism. Families with a child with autism can receive care and psychological support from the people around them, but they often cannot receive adequate support in terms of education and economic needs. The stress experienced in families with a child diagnosed with autism can cause communication problems and develop unrealistic expectations.

The level of mothers to accept the diagnosis of autism is quite low, and when they ignore the situation, their depression and anger levels are just as high. In addition, mothers who can develop different perspectives on the diagnosis of autism have higher well-being. When we look at the coping methods of mothers of children with autism towards the difficulties they experience; belief, problem-focused approach, for example: setting more realistic goals) and positive reinterpretation (for example: looking from a more positive perspective). It is very important for people with autism to acquire the necessary life skills in order to be able to continue their life without being dependent on other people, and therefore, the families of children with autism and the society should raise awareness in order to make an early diagnosis and to manage the post-diagnosis process correctly.

2. Developmental Skills of Children with Autism

2.1. Characteristics of Children with Autism

Children diagnosed with autism experience deficiencies in communication and language development. In addition, unusual behavior patterns are quite common in children with autism.

The characteristics of children with autism in these developmental areas can be listed as follows:

•Limitations experienced in the process of bonding with the caregiver

•Limitations in functional language skills

•Experiencing stress even in insignificant or minor changes

•Inadequacies in expressing oneself emotionally and empathizing

•Echolalia (Use of rhythmic and repetitive verbal expressions)

•Converting what is done in daily life into a habit

• Verbal limitations in non-verbal communication (use of gestures and facial expressions, etc.)

•Limitations in understanding non-verbal cues

•Existence of unusual (hand flapping, shaking, etc.) and obsessive behavior patterns

•Limited relationships with peers and limitations in playing games

•Inadequacies in establishing dialogue

•Stranger Fear of people, crowds and new environments

•Limitations in establishing common interest or attention

•Inability to initiate conversations

•Oversensitivity or inconsistent behavior towards stimuli

•Inability to make or maintain eye contact

•Limited using pronouns in the correct place

• Tendency to become aggressive, especially when given orders

• Inadequacy in understanding the feelings and thoughts of others

• Demonstrating behaviors that harm others and oneself

• Limitations in imaginative games

• Experiencing sleep problems

2.2.Sensory Skills of Children with Autism

Children with autism is stated that they may experience different problems related to visual, auditory, olfactory and taste senses, and it is stated that sensory problems are one of the important problems they experience. It is observed that children may overreact or do not react at all to stimuli coming through one or more senses. Children, who may be disturbed by light or loud noise, may differ in their reactions to the situation. Generally, children with autism use their senses of smell or touch when they discover new objects.

In fact, from time to time, it can be observed that children with autism try to put the object in their mouth or show behaviors such as licking in the face of new objects. It can be seen that people do not look at their faces or the objects around them, but they can look at some of the moving, rotating or shining objects for a long time. While it can be seen that they are

uncomfortable and react to physical contact made by other people, some may experience excessive contact, hugging, kissing, etc. actions can be observed.

It can be observed that children with autism can be quite disturbed by certain sounds (such as bells, ambulance sounds) or they can focus on the sound of fluorescent lamps that others do not notice while in the classroom. At the same time, it is seen that they can easily lose their balance compared to others and have difficulty in games such as jumping or jumping rope. Children with autism have problems in recording the sensory inputs from their environment and cannot understand the senses clearly. In addition, it is stated that overreacting or not responding to the senses and being in a sensory search are among the types of sensory modulation disorder. The prevalence of sensory processing disorder in people with autism ranges from 42 to 88%, and sensory processing disorder can be seen in different ways in people.

2.3.Relationship Building Skills of Children with Autism

Children with autism have problems in establishing relationships with others and have difficulties in communicating with other people (standing too close or too far away, etc.), meaningless looking at the person, looking sideways, down or up instead of making eye contact. People with autism have deteriorations in social areas from the beginning of their lives. For example; infants or young children with autism are less likely to make meaningful eye contact and focus on external sounds and faces than their normally developing peers, and therefore, children with autism tend to stay away from social environments and play alone. It can be seen that people with autism do not understand the behavior or intentions of others.

Social interaction problems observed in people with autism can be explained in three categories:

1. Social recognition problems caused by a lack of interest in others

2. Social communication problems caused by people having difficulty explaining themselves and making sense of body language

3. People having difficulty making sense of others' feelings and thoughts and social imitation comprehension problems caused by the inability to create games that reflect the imagination.

It is pointed out that people with autism have difficulties in establishing relationships between inner and outer world situations and making predictions, and that their social interactions are weak due to their inability to make or share comments appropriate to their age. For example to greet, meet, initiate and maintain a conversation, convey their needs, etc. It is stated that they have problems in the field of interaction and this situation causes them to stay away from their peers. Children with autism generally prefer to do many activities alone, such as playing games with their family or friends, eating together, they do not make an effort to attract the attention of others to certain situations or events, and their sharing is limited, such as not reacting to the praise of another person.

Autistic Children have a difficulty in understanding the feelings of others and sharing their own feelings, does not react to the attention of others, is unresponsive when they are called or wanted to interact, a stranger enters or leaves the environment, etc. It is stated that he does not show interest in situations like other children. It is also mentioned that he has no friends or few friends, he does not want to play with his peers, he interacts with certain people or special

interests, and he has difficulty in interacting while in the group, therefore he has inability to develop relationships with his peers.

2.4. Body and Object Use Skills of Children with Autism

When the object use skills of children with autism are examined; It is stated that children with autism between the ages of two and five show lower performance in social use, symbolic use of objects, and use of objects in accordance with their function compared to their normally developing peers. It is stated that children with autism display more repetitive behaviors during object use compared to children with normal development. One of the early signs that families of children with autism and related professionals can observe is that children do not play toys in accordance with their intended purpose. It is seen that children with normal development can use all their senses during the game and can use some objects symbolically. For example; The child can use the chair as a bus or as a ship by reversing the tables.

However, a child with autism at the same age should be taught how to play with these objects and turn them into games. It is seen that there is a state of extreme selectivity seen in some of the children. It is stated that they focus on a single feature rather than a holistic focus on objects or people. This may prevent children from learning new concepts and using the clues in their environment. It is stated that he uses objects for unexpected purposes (ordering cars, etc.), is extremely concerned with the sensory feature of the object, has a high interest in the object that has the ability to move, and can become obsessively attached to some objects. Motor limitations observed in children with autism; It is expressed as hand-eye coordination weakness, inability to balance, limited movements, walking on toes or making complex repetitive body movements such as flapping their arms, moving their fingers, jumping.

2.5.Language Skills of Children with Autism

Language development in children with normal development has been studied for many years and children interact with their environment in the early period and imitation and repetition methods enable them to progress in language development, however, language development in children with autism includes deficiencies. When children with normal development are 9-10 months old, they become mothers, fathers, grandfathers, etc. They can say about three or five words, and children have had efforts to speak before, but one of the first striking signs of children with autism is that they do not start to speak on time. Even if some children with autism start to speak with a little delay, they can hardly make up sentences such as "give water", and children with autism who speak only repeat what the other person said as echolalia, they cannot speak meaningfully and cannot establish mutual dialogues. Language skills in children with autism; some children are close to their peers, and some children have significantly lower language skills compared to their peers. It is seen that there is no homogeneous distribution in language skills, as in other skills. While it is observed that language skills do not develop in some people with autism, it is noted that some of them have disorders that prevent the use of language for the purpose. It is stated that children with autism have lower receptive and expressive language skills compared to children with normal development. It is seen that the language development of children with autism is behind their peers with normal development, they have problems in expressing indirect words and comments, and this situation reflects on the mental functions of children with autism. It can be observed that children with autism have difficulty in explaining what they think or feel to

others. In some cases, it can be seen that they use pictures to express themselves (for example, asking for an apple through a picture).

2.6.Self-Care Skills of Children with Autism

Social characteristics of children with autism; avoiding physical contact, not making eye contact, not reacting, not being aware of other people, and insufficient game skills. It is stated that people diagnosed with autism generally have deficiencies in basic life skills and especially low self-care, social and communication skills. At the same time, although this situation causes them to live dependent on other people, it is reported that the interactions with other people in the society are negatively affected because people with autism have deprivation in their social feelings, stay away from social areas, have difficulty in communicating with others and prefer to be alone. It is stated that people with autism have difficulties due to their inadequacy in self-care. At the same time, the lack of verbal and non-verbal skills seen in people with autism can affect their social skills negatively and prevent them from being socially accepted.

Self-care skills include toilet training, dressing or undressing, feeding and cleaning the body. Although the acquisition of basic skills differs for each child, the acquisition of self-care skills for children with autism is considered important for independence. For this reason, it is necessary to carry out practices that will enable children with autism to gain their skills, and these practices are listed as follows:

• The child should be given the opportunity to try frequently in order to gain basic skills.

• There should not be an expectation over the child's capacity to control the child's behavior.

• A supportive attitude should be displayed towards the child.

• The skills to be taught to the child should start with a simple pattern and show a pattern towards the complex shape.

• The child should be helped in a skill that he has difficulty with and should not be forced to do something he does not want to do.

3. Education of Children with Autism

Educational approaches in ASD begin to be provided in early childhood. These approaches use different teaching strategies, including the use of reinforcement, opportunity teaching, to teach spontaneous communication and specific skills. Considering that different countries use different standardized tests and methods for the treatment of ASD, the intervention program used may also differ slightly. These programs as the environment in which the intervention is implemented; It creates variability with different arrangements such as home-based, institution-based, school-based, structured environment, natural environment.

While some interventions are classified as comprehensive interventions by incorporating many developmental areas into their curriculum, some interventions focus on a specific area of development. In this context, we will talk about different educational approaches.

3.1.Behavior Modification Model

Educational programs based on the "Behavior Modification Model" are generally used in the education of autistic children, and this model is often based on operant conditioning

principles. According to Skinner, operant conditioning is defined as the process of increasing or decreasing the likelihood of behavior through the systematic arrangement of consequences. In the behavioral model based on operant conditioning techniques the following steps are given importance;

1. First of all, the current performance of the child is determined and it is determined in which areas there is a lack of skill.

2. After the skill deficiencies are determined, these skills are divided into sub-levels. The subject of education is discussed in two parts. In the first chapter, the precautions that parents can take regarding infancy are discussed. In the second part, it has been tried to explain the basic skills that should be given to these children and to gain these skills, to develop speech and to find solutions to behavioral problems.

• To enable them to overcome inadequacies,

• Reducing behavioral problems,

• Developing self-care skills,

• To gain academic skills,

• Ensuring that they enjoy life as much as possible.

In line with these purposes, starting education as early as possible will be beneficial in terms of facilitating the child's adaptation to family and social life by acquiring many basic skills as soon as possible.

3.1.1. Infancy Period

We have emphasized that the most distinctive features encountered in infancy are the lack of social relations such as the child's introversion, indifference to his environment, and lack of interaction with people. The baby may not look at her mother at all and may not respond to her speech while she is walking around or feeding him, he may even seem happy when left alone. Sometimes, mothers think that their babies like to be alone and are not aware of their surroundings, and they reduce their relations with their children in order not to disturb them. However, the mother's decrease in her child's interest may push the child to loneliness and introversion.

In order to be able to help her baby in this period, the mother should be the person who initiates and maintains the relationship and tries to be closer by ignoring the baby's lack of response. She should call his child by name, hug him, take him in his arms, and whisper beautiful words and songs in his ear. The fact that the mother establishes a relationship with the baby in this way and allows her to look at her own face will both please the baby and enable the relations to develop in a positive way. Increasing the mother's relationship with her baby will be a good start for the following years.

Mothers with autistic children often talk about feeding and sleep problems related to infancy. Feeding problems, weakened sucking in the first months. It can be seen as difficulties in switching to solid foods in the following months, and chewing difficulties in advanced ages. A small amount of solid food can be mixed in between the liquid foods that the child likes for an easier transition to solid foods. Then, depending on the acceptance of the new food, the

solid food can be increased and the liquid one can be decreased. After switching to solid foods, it is natural to encounter chewing problems. Therefore, the foods that need to be chewed should be introduced to the child gradually, and very hard foods and whole bites should be avoided at first.

In addition to feeding problems in some babies, severe insomnia problems also put parents in a deadlock. The baby cries every night, does not sleep. For such sleep problems, it is necessary to make the child comfortable first. Some children like to sleep in the dark, some in the light. It has been observed that some children hug their quilts tightly and can only sleep when their tops are tightly covered. It can give good results in rocking the child standing up. From time to time, a family member or friend who knows the child well stays with him, so that the parents who are in a strenuous pursuit can be rested.

3.1.2. Teaching Basic Skills

Parents can easily teach their normal children daily skills and social relations. However, they need information and guidance on how they can teach their autistic children the same skills. The purpose of this section is to guide parents in their children's education. Normal babies, when learning a skill, can understand behaviors that adults approve and disapprove by first evaluating their mother's tone of voice, head and facial movements. They understand the words spoken at later ages and learn new skills with the help of these words. Another important way for children to learn is to imitate an adult.

Children with autism can only make limited use of these three ways of learning. In addition, intense behavioral problems prevent them from acquiring new skills. For these reasons, many people think that autistic children cannot learn certain skills. However, autistic children can learn many skills thanks to the appropriate educational environment and programs prepared considering the characteristics of the child. There are some basic points that parents and teachers should consider when starting education. To begin with, when working with autistic children, the child's problem behaviors should be reduced and positive behaviors should be encouraged and developed.

The new skills to be taught to the child should be taught not as a whole, but by dividing them into small parts and stages, while failing the child should be avoided as much as possible. The best way to do this is to try to teach a skill, such as handwashing, by breaking it down into steps such as "turning on the tap, getting your hands wet, getting the soap". The child will learn by starting from the last and easiest stage, and will move to the next step as soon as he is successful. This will prevent the child from failing.

The child should be helped to ensure success during each new skill acquisition. First, the help should be in the form of making the skill completely, then this direct help should be gradually reduced. When teaching handwashing, the mother or father initially helps the child by standing behind the child and placing their hands on the child's hands. The assistance provided here is in the form of washing hands together. Then the assistance is reduced to holding the child's wrist, holding the arm. Another point that we need to focus on is getting to know the characteristics of the child very well. Knowing his unique learning problems, competences and inadequacies is an indispensable prerequisite for being successful in studies.

During the studies, rewards should be used to accelerate the learning process of the child and increase his success. For him, the reward is for the work he has done right. Rewards can be

things the child enjoys, such as a favorite food, a pleasant game or toy, or any behavior. While working with the child, it should always be determined what, which foods, which activities can be used as a reward. Well-chosen rewards will be the biggest help when trying to teach new skills. Especially using food (if the child likes food and does not have any eating problems) is the quickest and shortest way to teach new skills. Other types of rewards (reading a book, going to the park, cuddling, cuddling, etc.) can be used as the child learns the skill. However, if a child's favorite food is used as a reward, it should not be forgotten to cut it into very small pieces and to use different foods from time to time.

It is necessary to accept from the beginning that children with autism are different from their normal peers and their learning speed is slow compared to them. While working with the child, little or no progress may be observed in his skills, even after a long time. This should never be discouraging. Because even if it seems that he has never learned, after a while, it can be noticed that the child has gained a new skill. After summarizing the points to consider when working with the child, let's now consider where and how to start the work.

3.1.3. Learning Readiness Skills

Every child needs to learn some basic skills in order to learn new skills. We call these basic skills “Readiness Skills for Learning”. These:

“Making Eye Contact”

"Sitting"

“Come”, “Sit”

It can be listed as "following simple orders". When starting to work with the child, it should be checked whether he has acquired these skills, if not, it should be our main goal to gain these skills.

"Eye Contact" is the child's ability to look into the adult's eye whenever the child is told "look at me". If the child does not make eye contact at all - even by accident - we can start by rewarding him every time he looks at us. Later, when we want the child to look at us, we can make eye contact by holding his chin and turning his face towards us. Until the child repeats this skill with other people around him and starts to make eye contact with anyone spontaneously, we need to continue our work.

“Sitting” is the ability of a child to sit in a chair with his hands on his knees, even for a few seconds, when asked to sit. If the child does not respond when we tell him to "sit", we should hold him by the arms and make him sit on the chair and then reward him. We should gradually reduce the amount of help we will do by holding hands. When the child learns to sit at the desk for a certain period of time, it will be easy to learn new skills and will be able to share many family activities at the desk.

The third of the learning readiness skills is the ability to obey simple commands. If the child does not show any reaction when we give the command "Come", we should help him by holding his hand and reward him by bringing him where we want. After a while, it will be enough to make a "come" sign with our hands to comply with our call.When we call the child by name, if he sits at the desk with us and makes eye contact with us whenever we want, it means he is ready to acquire many new skills.

3.1.4. Self-Care Skills

These skills, which we gathered under the title of "Basic Self-Care Skills", include the most necessary skills in daily life such as drinking from a glass, washing and drying hands, using cutlery, dressing and undressing, brushing teeth and combing hair. However, autistic children may need help to acquire these skills that their normal peers can easily learn. While teaching these skills, it will not be enough for us to tell the child how to do them or to show them by doing. The best method is to get a feel for how to do the skills. If we make the child do the skill we want him to achieve by holding his arms, hands or fingers, after a while he will understand what we are asking him to do.

While teaching self-care skills, we need to teach each skill by dividing it into steps, from easy to difficult. The best method for each skill is to start with the easiest to the last, working from the bottom to the top. In addition, these skills should be ordered from easy to difficult, and taught from the easiest to the most difficult. For example, skills related to eating,

“Drinking from a glass”,

"Washing hands",

"Eating with a Spoon",

“Eating with a fork”,

If we list it as "using a knife", as a start, It is necessary to learn the skill of "drinking water from a glass". In addition, we should encourage and support the child to always use the skills he has acquired, even if he has fully learned self-care skills.

3.1.5. Toilet Training

Some autistic children acquire toilet training at the same time as their normal lives. Others cannot complete toilet training for a long time. With a little more patience and persistence, we can apply the toilet training applied to normal children to children with autism. Toilet training can take a very long time to complete; this should not discourage us. The most important point here is to change the diaper immediately and take it to the toilet regularly when the child leaks it. Thus, it should be tried to prevent him from getting used to being wet and to make him feel uncomfortable when wet,

Taking the child to the toilet, making him sit on the toilet, hugging if he is afraid, embracing, rewarding are the basic points of toilet training. If he has soiled his bottom, our course should be to change his clothes without reacting.

3.1.6. Speech Training

Autistic children should be taught to speak in slightly different ways than normal children, who learn by imitating those around them. If the child does not speak at all, a program based on imitation skills should be prepared initially. Teaching the child to imitate some motor movements (such as raising one's hand, clapping) that are easy to imitate is the first step of the study. If the child does not imitate the first move we choose, we should do it by holding his hand and reward him for doing it.

When he starts making the move, we should gradually reduce our help. When the child can do this movement without any help, we can move on to the second movement. We expect a child

who can imitate gestures such as raising his hand and clapping, first imitating movements such as wiggling his fingers and making a fist, and then imitating the mouth movements and words of adults in the later stages. It is an appropriate way to imitate sounds, words and sometimes sentences in order to improve the speaking skills of children with autism. For this reason, we can group our work in two groups.

1. In order to develop the child's vocabulary, we must first imitate words. These words are:

a. Proper names (cat name, parent name, city of residence, etc.)

b. Names of objects that he sees around him (kitchen utensils such as forks, spoons, names of animals, vehicles, etc.)

c. Verbs (sleeping, running, walking, etc.)

d. Adjectives (beautiful, ugly, good, bad, etc.)

2. To be able to develop the ability to understand and answer the questions asked in order to enable the child to use speech as a communication tool.

a. “What”, “Who”, “What is doing” questions

b. The question “where” and answers such as “in”, “under”, “above”

c. Answers starting with “Why”, “Why” questions and “Because…” can form the basis of our work.

In addition, the child's use of words in the correct order in a sentence can be another dimension of our work.

3.1.7. Reducing Behavior Problems

Behaviors such as tantrums, shouting, harming himself or his environment seen in autistic children, makes it difficult to adapt to its environment. It prevents him from learning new skills. It causes him to disturb the people he lives with. Changing, reducing or eliminating problem behaviors is a very difficult task. Therefore, problem behaviors should be approached more systematically. Regardless of the type of behavior, there are certain precautions that apply to every behavior.

The point to be considered when starting to work with behavior problems is to realize the reason for the behavior and in which environments it occurs. At what times does the child rock back and forth? When does he have the most tantrums? Does he bite his hands when something is not done, or when no one is paying attention to him? First, we need to gather this type of information for each problem behavior.

We should keep in mind that the behavior that we reward in any way is repeated by the child, and the behavior that is not rewarded decreases or disappears. In the face of the child spitting on everyone, our shouting at him or even beating him may be an undesirable reward for him. However, if we try to ignore the problem behavior, give no positive or negative response, and continue it consistently, the behavior will decrease. Admittedly, many behaviors are hard to ignore. Some positive behaviors can be taught to replace the problem behaviors of children. Activities that the child enjoys, such as playing games, watching television, and painting, do not stop a behavior that has started, but may prevent the behavior from occurring.

If a precaution has been taken regarding the child's behavior, it should be started as soon as the behavior occurs. After general precautions regarding problem behaviors, let's look in detail at what we can do for a few common behavior problems. Behaviors such as biting their hands, hitting their head, scratching themselves not only cause physical harm to the child, but also confuse and worry the parents. Such behaviors are the most difficult to reduce or change. Now let's consider what kind of reactions we show in the face of such behavior of the child. Sometimes we get angry, shout and try to stop him. In fact, these reactions, which are very difficult to avoid, play an important role in the child's behavior from time to time. Because, as a result of his behavior, everyone around him is running towards him and trying to stop him. Thus, the child attracts all the attention of the environment.

The first thing we should try in the face of this type of behavior is to ignore the behavior. In fact, it is quite difficult for parents to be a spectator to the child but this way is very useful in reducing some behaviors. It is observed that these behaviors, in which the child harms himself or herself, generally occur in cases of fear, anger, anxiety, frustration, learning a new skill, and failure. Many parents sense when the behavior will occur. In this case, it may be beneficial to prevent the emergence of the behavior and to change the environment in which the child lives.

Punishment is thought to be an effective method in reducing these behaviors that cause physical harm to the child. Punishment here may be a behavior that the child does not like at all. The point we need to pay attention to here is to apply the punishment we choose as soon as the child starts the problem behavior. In addition, observing how effective the punishment we use is and changing it if it is ineffective is another basic point of the method.

Behaviors such as swaying back and forth where he is sitting, flapping his arms, turning, and moving his fingers in front of his eyes are observed to occur when the child is idle. In addition, the child with limited social skills may lead the child to this type of behavior, even if he or she has not been able to establish relationships with peers and adults. In order to prevent this behavior, the approach of the parents should teach the child new positive behaviors.

When we direct the child to activities such as singing, watching TV, playing with a toy, it will reduce unwanted behaviors. If the child doesn't do or doesn't know any of these activities, we can always start by teaching him/her activities that he/she may enjoy. The important point that should not be overlooked here is not to allow the child to attract our attention with such behaviors and not to reward it with our attention without being aware of it. We should try to reward him when he shows the behavior we want.

3.2.Benefits of Pre-School Education in Children with Autism

The 0-6 age range, which is seen as the pre-school period, is the fastest period in the growth and development of children, and therefore the habits, skills and knowledge acquired in this period are effective in the later stages of their lives. Kindergarten is the first step of the educational system of institutions. Children with autism should be supported with education, especially in the early period. The fact that children with autism have access to quality early intervention positively affects their development and contributes to improvements in their performance.

When necessary training is received, most of the problems seen in autism in children have decreased and that children can socialize with their peers and society, whose development progresses later in life. If the necessary educational interventions are not given to the children, autism turns into a state of inadequacy that can negatively affect the lives of both themselves and those around them and continues throughout their lives. The trainings provided are beneficial in supporting the social skills of children diagnosed with autism, gaining the skills necessary to increase their functionality in daily life, and preventing behaviors that may impair their functionality.

Children with autism make it easier to socialize with their peers and have a positive developmental effect thanks to what they experience when they are with their peers. Making friends nurture their self-confidence and emotional development and interacting with their peers enables them to use their perceptual and expressive language skills. In addition, it is stated that children's social context is effective on pragmatic language skills such as making eye contact and understanding facial expressions, and it allows them to acquire social behaviors that include problem solving skills. The play environments that children with autism can observe the rules of social interaction with their peers with normal development are beneficial for their social development.

When the effects of the social skills intervention program given to the children with autism in the pre-school period were examined and as a result, it was observed that the interaction level and duration of the children with autism increased, and there were significant contributions in terms of their reactions and ability to initiate a relationship with their peers. It is clearly known that choosing children with autism as playmates by children with normal development in the classroom environment helps children with autism to initiate relationships with other people and have a more social life in their later life. In addition, it should be noted that the education to be given for the development of social interaction and communication skills of children with autism is much more important than children with normal development.

In the light of all this information, it is thought that the education that children with autism receive will have a positive effect on their developmental skills, since the kindergarten education they receive creates an environment that brings them together with their peers, and therefore the developmental skills of children with autism who receive and do not receive preschool education will differ. It would be appropriate to emphasize the characteristics of the teacher and the importance of family cooperation as well as education. Education is a whole and it is believed that ensuring consistency between school and home will contribute more positively to the developmental skills of children with autism.

3.3.Developmental-Relationship Based Approach

Relationship-based teaching includes the use of methods based on developmental theory and emphasizing the importance of establishing social relationships. These interventions are delivered in a variety of settings (eg home, classroom, community). All studies in this category all meet the stated strict criteria; Such as targeting the symptoms that define ASD, having intervention guidelines, providing high-level intensive intervention, and measuring the overall effectiveness of the program. These intervention programs may also be referred to as the Denver early-onset model (ESDM), interactive play therapy (Floortime/DIR (Developmental, Individual Differences, Relationship-based)), relationship building practice, and basic response teaching.

Influenced by both operational and social pragmatic models of development, relationship-based interventions also emphasize the interpersonal aspects of communication and language development. These interventions operate on the assumption that both social communication and language are learned through active social engagement with caregivers during natural interactions. Therefore, primary caregiver involvement is an important component of relationship-based approaches. One of the characteristics of relationship-based interventions is the regulation of all communication pathways and the environment that children have to support communication. Another feature is that the caregivers are encouraged to participate in the ideas of the children, to adapt and to be sensitive, instead of turning to the subjects they choose during the game.

3.3.1. Early Start Denver Model

The main principles and features of the Early Start Denver Model's educational content for children with ASD come from a developmental framework. The characteristics of the adult-child relationship and the approach to language are based on the science of developmental psychology. The curriculum covers a period of approximately 9 to 48 months. Incorporating developmental milestones acquired during these periods of life, the curriculum follows developmental sequences across multiple developmental areas, selecting developmental goals for learning. One of the characteristic features of the Early Start Denver Model is to prepare spontaneous learning environments by using the exploratory nature of babies. Another characteristic feature is that it uses areas such as communicative development, relationship-based approach, applied behavior analysis as a whole in the intervention. Working with an interdisciplinary team consisting of talented people in many fields such as sensory motor development, applied behavior analysis, and developmental communication is another feature of the Early Start Denver Model. The use of different methods offered by these teams is another feature.

3.3.2. The Developmental Individual Difference Relationship based Model (DIR/Floortime)

The Developmental Individual Difference Relationshipbased Model/Floortime is a caregiver-mediated home-based intervention that includes parent education to maximize parental interactions with their children. DIR/Floortime aims to foster social interaction and functional pragmatic communication and uses the principles of a relationship-based, developmental approach. The DIR model explores ways to facilitate social communication skills by acquiring social-emotional experiences in line with the child's interests, so that the child can realize participation, interest, communication and higher-order thinking, that is, symbolism and abstraction in the social context. Therefore, the task of the therapist is to establish a relationship with the child and provide developmentally appropriate relational experiences based on the child's leadership.

Floortime is a model integrated with DIR therapy principles. Floortime includes five steps that parents and educators follow. In the observation phase, the trainer or parent observes the child's facial expressions, body language, tone of voice, words he uses, what he is looking for or is interested in in the room. In the second step, the practitioner elaborates on the things that the child is interested in in line with his observations and makes an approach. In the third step, the practitioner becomes a play partner by following the child's leadership and supports the child's communication or play. In the fourth step, it aims to expand the game with practical

music and verbal stimuli in order to improve the child's problem solving skills and communication skills. In the last step, different communication circles are opened and closed depending on the interaction of the child. In these short-term processes, it is aimed that the child realizes mutual communication.

3.4.Cognitive Behavioral Approach

This approach, combined with cognitive therapy, is considered a further development of traditional behavioral strategies that emphasize social cognition and facilitate behavioral changes through cognition. Typically used with developing children, it focuses on the interaction of the learning process, social environment, and information processing factors. Cognitive-behavioral approach-based interventions focus on changing daily negative or unrealistic thought patterns and behaviors in order to positively affect emotions and the functioning of life.

3.4.1. Cognitive Behavioral Therapy

Cognitive Behavioral Therapy (CBT) has its roots in the belief that our thoughts (cognitions), emotions (feelings), and behavior (responses) are interconnected as part of a unitary system. CBT is a widely used educational model to treat anxiety, mood, and psychotic disorders in the general population. Among children with ASD, CBT was mostly used to address anxiety and social skill deficits. CBT basically consists of 3 basic assumptions. First, cognitive activity influences behavior; second, cognitive activity can be monitored and modified; Finally, behavioral change may be affected by cognitive changes later on. The functioning of CBT consists of four main steps.

The first stage, the assessment, uses a set of appropriate assessment tools aimed at clarifying the 'problem'. The next step after defining the problem is to develop a formulation according to the assumptions about the source of the problem. Small formulations will help the child by revealing the connections between thoughts, feelings and behaviors. The third stage, interventions, covers the application of methods to produce solutions that can replace the problem and to support problem-solving skills. Evaluation, which is the last stage, is the evaluation of how effective the application is in solving the problem.

3.4.2. Miller Method

The Miller Method, which includes cognitive and developmental system components, is based on the work of Heinz Werner, Jean Piaget, Lev Vygotsky and Ludwig von Bertalanffy. The Miller method is a holistic approach that addresses body organization, social interaction, and communication issues in school, clinic, and home settings, offered to children with ASD as well as to children with significant learning or communication difficulties. Miller adopted the cognitive approach because it deals with regulating children's behavior, developing concepts of time and space, human relations, problem solving and form.

The developmental aspect of the approach looks at children with ASD as completely or partially stuck in the early stages of development and therefore structures interventions to support development. The feature of this method is that it studies the need for repetitive actions, routines and problems related to the sensory sensitivities of the ASD child. Considering that children with ASD are "stuck" at certain stages of development, Miller Method practitioners develop interventions that allow children to reach and pass through the

five stages of development. These stages are environmental contact, connecting, creating a system, ritual and repertoire.

3.5.Sensory Motor Therapy

This approach is based on the assumption that the individual may be overstimulated or under stimulated from normal levels of sensory input. As a result, these individuals may have difficulty perceiving and then responding to environmental stimuli. Stereotypical and, in some cases, self-destructive behaviors such as rocking have been interpreted as attempts by the individual to moderate the level of environmental stimuli they receive. Major sensory-motor therapies; Sensory Integration Training, auditory integration training and music therapy.

3.5.1. Sensory Integration Therapy

Sensory integration is defined as a neurological process that reflects an individual's ability to regulate and process internal and environmental perceptions, lay a foundation for higher-level learning, and reflect an individual's ability to organize and function effectively in the environment. The theoretical basis of sensory integration derives from neuroscience. Sensory integration occurs in the cerebral cortex and requires a balance between the central and peripheral nervous systems, as well as between the excitatory and inhibitory neurological systems.

The practice of sensory integration therapy typically includes a range of activities and techniques to stimulate the vestibular and proprioceptive systems. Activities aimed at stimulating the vestibular system include swinging in a hammock, rolling over, turning in a chair, balancing activities, jumping on a trampoline, sitting on a bouncing ball, or riding a scooter. Activities to activate the proprioceptive or tactile systems include calming the individual between gym pads or pillows to provide "deep pressure", massaging the child's body by brushing, providing "joint compression" by repeatedly squeezing the individual's joints such as wrists or elbows, and playing with textured toys.

3.5.2. Daily Life Therapy

The conceptual framework of this model is that it conforms to the instinctive development rules specific to children. DLT predicts that although children with ASD have developmentally appropriate instincts, their ability to show them off is extremely poor. The approach is stated to be holistic with an emphasis on learning as part of a group. A program of intense physical activity, including music and dance, aims to develop both strength and concentration. It is based on the theory that exercise releases endorphins that inhibit anxiety and reduce hyperactivity. In addition, regulated routine programs allow little time for students to return to their "autistic state".

The aim is for students to become as independent as possible by learning to act in a group rather than one-on-one teaching. By imitating the teacher and peers, self-care skills are also taught. Applying the specific techniques of a structured learning style, DLT follows five basic steps of the teaching process. These stages are; 1) group-oriented training, 2) highly structured routine activities, 3) teaching techniques focused on imitation learning, 4) a rigorous physical exercise program; 5) is a curriculum that focuses on various art forms. DLT includes intense physical exercise as a core feature of its curriculum. The intensity and content of the exercise program for preschool children is regulated. Long walks are planned instead of running, and

normal playground equipment is also used for outdoor play. Sports activities include roller skating, cycling and sprinting, as well as movement games that require imitation of motors. In addition, artistic activities such as physical activities and music are used extensively in the content of DLT. In this way, the therapy that children need in a sensory sense is provided.

4. Autism Spectrum Disorder and Gastrointestinal Symptoms

Gastrointestinal system problems are more common in children with autism spectrum disorder than in healthy children, and this rate has been reported as 9%-70%. The relationship between autism spectrum disorder and intestinal microbiota continues to gain importance in recent years. Gastrointestinal system problems such as constipation, diarrhea, bloating, indigestion in autistic children has been determined that it may be associated with social and social communication deficiencies, stereotypical behaviors, hyperactivity and the degree of aggression. For this reason, it may be useful to evaluate nutritional patterns, food diversity and quality. At the same time, gastrointestinal system problems should be handled together with food allergy, food intolerance and vitamin deficiencies.

4.1.Nutrition and Nutritional Behaviors in ASD

Nutrition is a normal need in the development of all living things. According to Maslow's Hierarchy of Needs, the most basic needs are physiological needs. Physiological needs consists of needs such as nutrition, sleep and health. Many of the behaviors of children are the ones that arise from not meeting these basic needs. The fact that parents are extremely sensitive to these needs of their children can make nutritional behaviors a problem for the child, and at the same time affect the interaction between the parent and the child. Feeding behavior develops with the interaction of many variables such as homeostatic mechanisms, reward system, motor, sensory and socioemotional capacity of the child, starting from infancy.

On the other hand, the caregiving and attitude skills of the child's parents, the social environment and cultural elements of the child are closely related to the development of nutritional behavior. Parents play an important role in shaping their children's eating behaviors. Parents who provide consistent feeding routines for their children will help their children transition to internally regulated self-feeding by providing their children with the appropriate type and amount of food, allowing the child to determine how much to eat, and setting behavioral limits where necessary. Nutrition can be a source of pleasure and satisfaction for parents and children, as well as a source of stress.

With the transition to solid foods, parental attitudes play an important role in the development of the child's eating habits and the occurrence of nutritional problems. Especially as a result of harsh discipline practices, the child's sadness and anger may affect the amount of eating. Eating and feeding problems can create a vicious circle between the child and the parent. Disruptions at this stage can cause nutritional problems. It is known that 25-35% of babies and children have feeding problems and the most common feeding problems are; undereating, refusal of certain types of food, inappropriate behavior at mealtimes, and strange eating habits. Malnutrition is the behavior of not getting enough of the amount or variety of nutrients necessary for maintaining the child's weight, meeting his nutritional needs and growing against the persistent attempts of parents or caregivers.

Nutritional disorders can be seen in children with chronic and serious medical disorders and neuropsychiatric problems, as well as in children who develop completely normally. Medical

problems, individual characteristics and interpersonal relationships may play a role in the emergence of these disorders. Therefore, biopsychosocial approach is valid in the evaluation, diagnosis and treatment of eating and eating disorders. Most children with autism have feeding problems. Nutritional problems such as difficulty in eating skills, picky, strange and unusual eating behavior, sensitivity to a certain presentation of food, avoidance of new foods, excessive and persistent intake of one type of food, and mealtime problems are common.

Children with autism generally exhibit food-selective behavior. Food selectivity may result from sensory hypo/hypersensitivity. A child who is uncomfortable to touch may be uncomfortable with certain types of food in his mouth. Some children with autism may put everything in their mouth due to overstimulation. In addition to food rejection, rituals and behavioral problems during meals are also seen in children with autism. Food refusal is more common in children with autism than in children with other developmental delays, and it can often be associated with gastrointestinal problems. Another reason underlying the food refusal behavior of children with autism is their difficulty in swallowing.

Nutritional problems of children with autism, starting from infancy, are seen with severe food selectivity starting from the 15th month. However, energy intake levels and growth are not affected. Various problems are observed in children with autism, such as inadequate nutritional skills, food selectivity, different and abnormal eating behaviors during mealtimes, sensitivity due to food presentation, avoidance of new foods, and insistence on one type of food intake. These problems can sometimes go as far as dehydration and malnutrition.

Oral motor skills progress in parallel with the development of the child. Therefore, chewing problems in children with autism are more common in younger children. Food selectivity, which is one of the problems frequently seen in children with autism, and children's unusual eating behaviors are a source of stress for families. It has been reported that in situations where feeding problems are common, such as children with autism, mothers of children with autism show less touching behavior during their interactions with their children, and their children tend to stay away from their mothers. Anxiety, depression, somatic complaints, and aggressive behaviors were found to be higher in children with autism who had malnutrition, while anxiety, depression, hostile reactions, and inappropriate eating attitudes were higher in mothers.

After talking about the basic attitudes and behaviors of children with autism towards nutrition, we will now talk about the gastrointestinal systems in order to detail this issue and to better understand the effect of nutrition on autism.

4.2.Zonulin and Intestinal Permeability

Tight junctions between intestinal epithelial cells play a role in the optimal absorption and transport of nutrients, as well as in the formation of a balance between tolerance and immunity to foreign antigens. Although important information about these connections has been provided in recent years, details on its physiology and pathophysiology are very scarce. Zonulin, an important biomarker of increased intestinal permeability is a physiological and reversible regulator in a key position in tight junctions. Zonulin has a protein structure and directly controls the permeability by forming in the mucosa. Zonulin, which is released in response to stimuli such as bacteria in the lumen or gluten in foods By binding to the

receptors on the apical surfaces of intestinal epithelial cells, it triggers mechanisms that lead to disruption of the integrity of tight junctions.

4.3.Intestinal-Brain Axis

It ensures that the changes in the gastrointestinal system structure, which includes the enteric nervous system, are transmitted to the brain via the vagal nerve. It also contributes to the release of cytokines, thanks to the fact that it contains cell groups belonging to the immune system. Gastrointestinal system contributes to the secretion of cortisol-like neuroendocrine hormones, affecting intestinal permeability, barrier functions and immune system. It is stated that this dynamic pathway, called the 'intestinal-brain axis', contains many tissues and systems such as the brain, secretory glands, intestine, immune cells and bacterial flora.

It has been determined by recent studies that the composition and function of the intestinal microbiota are shaped by both genetic and environmental factors. Many factors such as age, nutrition, diseases and especially infections and drugs can be listed as environmental factors. For these reasons, the gut microbiota is a mechanism for explaining the relationship between environmental factors and autism symptoms. Bacteria in the intestinal microbiota affect the brain through the short-chain fatty acids they produce and metabolites that act on the nervous system, and thus they can shape the functions of the brain and the behavior of the individual.

In addition, there is evidence that the intestinal walls are more permeable in individuals with autism spectrum disorder and that bacteria belonging to the genus Clostridium may adversely affect the brain-intestinal axis in these individuals. The increased level of serotonin in the blood was evaluated as the first biomarker discovered in autism spectrum disorder. The increase in serotonin level causes a decrease in social interaction ability and stereotypical behavior pattern. Serotonin causes communication disorders and repetitive behaviors through increased neuronal permeability.

4.4.Autism Spectrum Disorder and Microbiota

Changes in the intestinal microbiota content affect the immune system. Inflammation in the intestines is an important factor affecting epithelial barrier permeability. It was concluded that an increase in the amount of Clostridia and a decrease in the amount of Bifidobacteria detected in intestinal microbiota stool analyzes in autistic cases triggered the inflammatory response by causing an imbalance in inflammatory cytokines, and therefore, an increase in intestinal permeability occurred due to damage to the epithelial barrier.

4.5.Diet and Mental Health

Due to the fact that nutrients are the precursors of neurotransmitters, which are chemicals that affect the functioning of the brain; The foods and diet shape the chemical composition of the brain. Depending on the level of transmission of neurotransmitters along the nerve conduction; mental health, mood, sleep patterns and cognitive functions vary. For this reason, the foods consumed affect the mood, behavioral patterns and cognitive functions of individuals. Nutrients and components that are effective on mental health; carbohydrates, proteins, fats, vitamins and minerals.

4.5.1. Carbohydrates

Carbohydrates serve as the main energy source in the body, and the brain meets all of its energy needs from glucose. In terms of being functional, the type and amount of carbohydrate consumed is as important as the type of food consumed as a source of carbohydrate. While whole grains, legumes and vegetables are expressed as healthy carbohydrate sources; Sugar, starch, refined grains and sweets are not recommended as sources of beneficial carbohydrates. Excessive consumption of refined carbohydrates causes an increase in the level of insulin and tryptophan by raising blood glucose, and therefore changes in mood with a sedative effect. Excessive consumption of carbohydrates in children is suggested that negative effects such as attention deficit and hyperactivity disorder may occur and may cause insufficient intake of other essential nutrients required for brain functions and mental health.

4.5.2. Proteins

Many neurotransmitters in the brain are synthesized from amino acids, which form proteins and are the building blocks of the body. Synthesis of dopamine neurotransmitter from tyrosine amino acid and serotonin from tryptophan amino acid can be given as an example. Since amino acid deficiency in the body will cause a decrease in the level of brain neurotransmitters, brain damage and mental defects may occur in tryptophan deficiency. For this reason, it is suggested that adequate consumption of high-quality protein sources meats, eggs, milk and dairy products in the diet, and the intake of essential amino acids that cannot be synthesized in the body, can affect brain function and mental health positively by providing them from outside.

4.5.3. Fats

Due to the fact that the structure of the brain contains approximately 60% fat; The amount and type of dietary fats affect individuals' mood and brain functions. The gray matter of the brain is especially rich in omega-3 fatty acids, which are very important for brain functions. Effects of omega-3 fatty acids on mental health is thought that it is involved in the membrane structure, neurotransmitters, neural degeneration and inflammation. For this reason, it is assumed that omega 3 fatty acids may have effects on bipolar diseases, Alzheimer's and stress.

5. Autism Spectrum Disorder and Diet

5.1.Nutritional Problems in Autism Spectrum Disorder

Nutritional problems are considered as a feature in patients with autism spectrum disorder. The rate of autistic children having feeding problems 5 times more frequently than those with typical development was determined as 13-87%. Food selectivity is the most common nutritional problem in children with autism spectrum disorder. The time of emergence of nutritional problems seen in autism spectrum disorder varies. It has been determined that children diagnosed with ASD consume less vegetables and fruits and consume a limited variety of foods compared to healthy children after the first 6-month period from birth.

Although the relationship between selective nutrition and nutritional deficiency in autism spectrum disorder is not clear. Malnutrition, vitamin D, calcium and iron deficiency and scurvy are common complications in cases. Although there is no difference between normally developing children and children with autism spectrum disorders in terms of body mass index, there are quite large differences in terms of food selectivity. Early diagnosis and intervention

in terms of nutritional problems in autistic children can have positive effects on cognitive, motor and behavioral development seen at early ages.

5.2.Micronutrient Deficiencies

It is stated that the diets followed in children with autism may cause gastrointestinal problems due to insufficient micronutrient intake. In children with autism has been determined that there are deficiencies in the intake of iron, calcium, iodine, vitamin A, vitamins C and D, zinc, folate and fiber. Another factor affecting children with autism is the deficiency of vitamin B12, which is known to be associated with various neurological disorders. In addition, when the iodine level in children with autism was examined, it was determined that some symptoms were related to iodine levels and that approximately 95% of the children had insufficient dietary iodine intake.

5.3.Heavy Metals

The concentration of glutathione antioxidant, which has the ability to remove free radicals and heavy metals such as mercury, was determined to be lower in autistic children than in healthy children. Glutathione acts as a scavenger that binds mercury and ensures its excretion through bile. In experiments on experimental animals, it has been determined that the use of oral antibiotics reduces the rate of excretion of mercury from the body. Mercury exposure has been reported to occur through environmental pollution, seafood, and maternal dental fillings. It has been determined that the mercury exposure in autistic children is two times higher than in healthy children.

In addition, it has been determined that the increase in the level of mercury in the blood increases the level of neuropeptide, which has an important role in the formation of autism spectrum disorder, and that aluminum triggers the appearance of autism in the clinic by causing oxidative stress in the brain tissue. Cadmium, lead, mercury and aluminum metals can interact with toxic metals. The presence of iron deficiency increases the absorption of cadmium, lead and aluminum metals in the body. Lead, on the other hand, reacts with calcium and causes cognitive development to be adversely affected.

The presence of high lead levels in the blood has been associated with cognitive retardation, learning and behavioral disorders, attention deficit and hyperactivity. It is thought that most of the symptoms seen in autistic children may be related to the deformations caused by the excretion of toxic metals. In addition, low molybdenum levels are held responsible for disorders in verbal communication, and it is stated that low blood zinc levels negatively affect cognitive functions. It has been determined that serum lithium levels are low in autistic individuals, and lithium, which is an important option in the treatment of neurological diseases, also plays an effective role in the transport and distribution of vitamin B12.

6. Autism Spectrum Disorder and Nutritional Patterns

After learning general information about nutrition and symptoms, we will examine the effects of some types of diets on autism spectrum disorder.

6.1.Mediterranean Diet

Considering the variations in intestinal microbiota; The rate that diet is responsible for is about times higher than genetic factors. Classic Mediterranean diet content high consumption of olive oil, vegetables, fruits, whole grains, legumes, oilseeds and nuts, moderate

consumption of fish, wine and dairy products, and low consumption of meat and products. It is thought that pulp may have positive effects on health due to its high content of mono and polyunsaturated fatty acids, antioxidants and bioactive compounds. Considering the relationship between the Mediterranean diet and the microbiota, a decrease in the inflammation signal occurs due to the consumption of mono- and polyunsaturated fatty acids and the consumption of less saturated fatty acids.

The increased consumption of fruit and grains also leads to an increase in the amount of SCFA 17 (acetate, propionate and butyrate) in the intestine. Presence of plant foods in the Plant-based diet is associated with the proliferation of beneficial bacteria species that produce butyrate and methane, as well as Bifidobacterium and Lactobacillus spp. causes an increase in species. The Mediterranean diet affected the amount of short-chain fatty acids and Prevotella and Firmicutes much more positively than other similar diet types; It has been reported that it is not effective on inflammatory indicators.

When the effects of Mediterranean diet application on intestinal microbiota and inflammatory markers in Crohn's disease were examined, a decrease in serum levels of inflammatory markers such as C-reactive protein was determined. It has been determined that with the Mediterranean type nutrition model, positive developments in the intestinal microbiota may reduce the risk of oxidative stress, inflammation, insulin resistance and chronic disease.

6.2.Gluten Free-Kazein Free Diet

Gluten, a storage protein found in grains such as wheat, barley, rye and oats; It is found in the form of hordein in barley, avenin in oats, and secalin in rye. Casein is present as part of cow's milk proteins. It is known that gluten is metabolized to gliadorfin and casein to casomorphin peptides by the digestive process. Gliadorfin and casomorphine leak through the epithelial barrier and act on the nervous system, thereby triggering the symptoms of autism. Following the elimination of the gluten-free-casein diet, foods containing gluten and casein can be added to the diet in specified amounts in order to determine whether they are the cause of certain symptoms.

Long-term gluten-free diet may cause insufficient intake of some nutrients. In addition, the high sodium and sugar content of gluten-free products compared to gluten-containing products is also an important problem. In a study, it is stated that after a 5-month gluten-free-casein-free diet, the behavior of children with autism spectrum disorder improved.

6.3.Low Carb and Ketogenic Diet

Carbohydrates, especially indigestible carbohydrates, can exert a prebiotic effect and regulate intestinal microbiota composition, diversity and metabolic profile. By reducing daily carbohydrate consumption to less than 50 g in a ketogenic diet is used in the treatment of autism, multiple sclerosis and infantile resistant epilepsy. In a study, it was shown that while the ketogenic diet increased Bacteroides and Prevotella, it decreased the Cronobacter level by about 50%. While the gluten-free diet applied in autistic individuals reduces the rate of Clostridium in the intestinal flora in healthy individuals.

It is stated that it causes a decrease in the beneficial Bifidobacterium and Lactobacillus bacteria, and also causes an increase in Escherichia coli and Enterobacteriaceae bacteria, which are stated as opportunistic pathogens.

When gluten-free-casein-free diet and ketogenic diet were evaluated in individuals with autism, it was determined that both gluten-free-casein-free diet and ketogenic diet caused significant improvement in autism symptoms.

6.4.Eliminated Allergy Diet

Most children with autism have food sensitivities. This sensitivity is due to the reaction of beneficial bacteria in the gut to undigested carbohydrates or amino acids. For this reason, it is recommended to determine food allergy or intolerance by performing the necessary tests first, or to monitor allergic symptoms when the food thought to be suspicious is removed from the diet for 2 weeks and added again. Elimination of allergenic foods from the diet can lead to improvements in gastrointestinal system symptoms as well as behavioral and attention-related findings.

6.5.Specific Carbohydrates Diet

The purpose of special carbohydrate nutrition is to keep the damaged intestinal walls and the proliferation of bacteria in the intestinal flora under control, to regulate the intestinal flora by restricting carbohydrates that can be the food of opportunistic pathogens. Within the framework of this nutrition has been stated that restricting complex carbohydrates and removing simple carbohydrates from the diet are effective in improving diseases such as irritable bowel syndrome (IBS), celiac disease and autism. The special carbohydrate diet is gradual. A limited amount of nutrition is started, and the amount of food is increased as the intestinal tract heals. Starch is banned and basically the use of meat, chicken, fish, eggs, vegetables, fresh fruit, nuts, oil seeds, fermented foods and probiotics is encouraged.