

THE BENEFITS OF NON-BIOLOGICAL THERAPY IN CHILDREN WITH AUTISM SPECTRUM DISORDER (ASD)

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REVIEW

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ABSTRACT

Introduction – Autism Spectrum Disorders (ASD) are a group of neurodevelopmental disorders characterized by three main problems, namely the presence of communication disorders, impaired reciprocal social interaction with the surrounding environment, and restricted, repetitive, and stereotyped behavior patterns in the first 3 years of age. In Indonesia, there were around 112,000 ASD sufferers in 2012, while in 2015 it was estimated that 1 in 250 children had ASD, or around 134,000 people.

Methods – The author used the literature review method by collecting the results of several kinds of literature on ASD, and non-biological therapy and their benefits in ASD children. The literature on non-biological therapy and its benefits in ASD children is limited to 2011-2021.

Results – Autism is a lifelong disorder, so it is important to recognize it as early as possible, and parents need to understand the problem. It's important to remember that the cause of autism is unknown, and no single drug has been found that can cure ASD, but some therapies can suppress ASD symptoms that can help ASD lead a more productive life by reducing symptoms and improving skills.

Discuss – There is no definitive therapy that can cure ASD, but therapy is aimed at improving ASD symptoms. Non-biological therapy which includes behavioral therapy (such as TEACCH or ABA) is currently used as first-line therapy for ASD.

Conclusion – Symptoms that appear in ASD children vary widely, therefore the therapy given is individual and depends on the circumstances and symptoms that appear. There are many types of non-biological therapies for ASD, such as ABA, TEACCH, PECS, Caregiver-mediated Intervention, Parent-mediated Communication, SIT, and AIT. These therapies have been shown to have benefits in improving ASD symptoms such as communication skills, social interaction, and behavior, where each therapy has different benefits in each type. These therapies are given to everyone as needed.

Keywords: non-biological, children, autism.

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INTRODUCTION

Autism Spectrum Disorder (ASD) is a group of neurodevelopmental disorders marked by impaired social communication and reciprocity, as well as restricted and stereotyped patterns of behaviors and interests.¹ This disorder ranges from mild to severe. Symptoms of autism generally appear before the child reaches the age of 3 years.² ASD is characterized by three main problems, namely the presence of communication disorders, impaired reciprocal social interaction with the surrounding environment, and restricted, repetitive, and stereotyped behavior patterns in the first 3 years of age. ASD has distinctive social behaviors, including avoiding contact, being unable to control emotions or understanding the emotions of others, and having a very limited range of interests and activities.³

In Indonesia, there were around 112,000 people with ASD in 2012, while in 2015 it is estimated that 1 in 250 children suffer from ASD or approximately 134,000 people.⁴ Currently, the prevalence of autism disorder (ASD), according to recent large-scale studies, is about 1% - 2% of the total world population.³ The incidence of ASD has increased over the past two decades.⁵ Although the increase in incidence is due in part to changes to the Diagnostic Manual and the Statistical Manual of Mental Disorders (DSM) and younger age at diagnosis, an increase in risk factors cannot be excluded.³ In 2016, the number of ASD cases worldwide was around 62 million cases, which is 0.83%.⁶ Regarding the burden of disease, there are over 9 million disability-corrected life years and 121 disability-corrected life years per 100,000 people worldwide.⁷ In high-income countries, the estimated prevalence of ASD is around 1% among all age groups.⁸

The exact cause of ASD is not fully known. Several studies have stated that the cause of autism is a disturbance in the function of the central nervous system due to abnormalities in the structure of the brain when the fetus is under 3 months old. A mother may have TORCH virus (toxo, rubella, cytomegaly, herpes), eat foods that contain chemicals that interfere with brain cell growth, breathe toxic air, and experience heavy bleeding. Genetic factors also play an important role in ASD². Many factors have been associated with incidents of ASD including genetic and environmental factors.¹

METHOD

In this article, researchers used the literature review method by collecting the results of several kinds of literature on ASD, and non-biological therapy and their benefits in ASD children. The literature on non-biological therapy and its benefits in ASD children is limited to 2011-2021.

RESULT

Currently, there is no definitive therapy that can cure ASD, but therapy is aimed at improving ASD symptoms. Non-biological therapy which includes behavioral therapy (such as TEACCH or ABA) is currently used as first-line therapy for ASD. In addition, the use of pharmacological drugs such as risperidone or aripiprazole is only used to suppress autistic symptoms such as irritability and aggression.¹

DISCUSS

Non-Biological Therapies

1. Applied Behaviour Analysis (ABA)

ABA is an applied science or method (technical-practical) that uses behavior change procedures to teach autistic children to master various activities with standard values that exist in society, by breaking various activities into small parts, then being taught/trained individually, intensively, systematically, and structured.⁹ Compared with other behavioral therapies, ABA therapy is the most frequently used. ABA is a method of teaching correct behavior by dividing tasks into small steps that are discreet and with systematic and precise learning. ABA is used to reduce disruptive maladaptive behaviors, enhance and reinforce desired adaptive behaviors, learn new skills, and generalize behaviors to new situations and conditions. ABA methods are used because there is a theory that children with ASD find it difficult to learn by imitating and listening as their peers do. ABA has a structured format, which is especially suitable for ASDs because they tend to respond to directness and routine. This method can be applied to both everyday situations (such as eating or playing at home) and structured situations (such as during formal learning activities in class).¹⁰

The ABA technique can be done using the principle of giving the stimulus (instruction), the response of the child (behavior), and the consequences of the response or behavior that appears. Through structured learning methods, it is hoped that children with ASD can understand what behavior (behavior) is expected to be done by the child after receiving instructions, and it is hoped that this behavior will tend to occur again when

autistic children get consequences (consequences of behavior that have been done, for example, such as being given a gift) which are fun.^{2, 11}

The first ABA-related study was conducted in 1987 and showed that a significant increase in IQ scores was seen in ASD children who received ABA.¹⁰ Based on a study conducted in 2018, it was found that the ABA method was effective for use in dealing with the behavior of children with ASD. It is proven that ABA can improve language skills in ASD children. Before the ABA method was applied, the language ability of an ASD child to learn one type of vocabulary could take four to five lessons or four to five days, but with poor results. After applying the ABA method, the ability of autistic children to learn one vocabulary increased, only requiring one to two lessons or one to two days with good results.¹¹

A meta-analysis method for 29 studies in 2018 showed that ABA has very high effectiveness in improving intellectual abilities; medium-high effectiveness in improving expressive language skills and communication; and moderate effectiveness in improving IQ scores from tests of non-verbal, adaptive behavior, socialization, and receptive language skills. While the effectiveness of ABA in daily living skills is low¹². Improvements in the language skills of ASD patients were the most significant effect.¹⁰

2. TEACCH (Treatment and Education of Autistic and Related Communication-handicapped Children)

TEACCH has principles that are adapted to the characteristics of children with ASD. The principles in this TEACCH method include structured and organized classroom arrangements, information is provided visually, children's interests are used as reinforcement, and carry out meaningful communication. The application of the principles of the TEACCH method in the learning process makes it easier for ASD to understand the material presented. In addition, the application of the TEACCH method makes students happier in the learning process.¹⁰

TEACCH is based on four basic principles: 1) environmental management, 2) visual information, 3) reinforcement through special interests, and 4) meaningful communication.¹³

Environmental management consists of several components, namely: (a) Students' physical environment, such as classrooms and homes, is referred to as their physical structure. the physical structure aims to organize the main environment separately between resting and learning places (b) Students require a schedule as part of their learning structure. The goal of scheduling is to provide a framework for the teacher to effectively teach students (c) The work system is concerned with the content of the assignment given to the child to inform him of what is expected of him during an activity, how much should be accomplished, and what happens after the activity is completed. The goal is to teach students to work on their own.¹³

Visual information can assist in giving routine structure, increasing understanding, encouraging independence, and providing opportunities for patients to interact with others.¹³

Special interest as an amplifier is an object or activity that students enjoy and are interested in that can be provided after a behavior is completed to apply these behaviors repeatedly in the future.¹³

In structured teaching, meaningful communication employs meaningful language, so that when practicing children do not just learn by saying words. Structured instruction assumes that receptive comprehension is the foundation for expressive communication.¹³

A meta-analysis method for 13 studies in 2013 showed that TEACCH has little effect on improving motor, verbal, perceptual, and cognitive abilities of children with ASD; does not have an effect on communication skills and activities of the daily life of children with ASD; have a moderate to large effect on maladaptive behavior and social behavior in children with ASD.¹⁴ Based on an experimental study conducted in 2011 on a total of 19 ASD children aged 6-14 years, the TEACCH method can significantly improve social communication skills (speaking and understanding skills) and help reduce social interaction difficulties in children with ASD when compared to a control group. Additionally, TEACCH significantly reduces stereotyped behavior in ASD children.¹⁵

3. Picture Exchange Communication System (PECS)

A picture exchange communication system is a type of augmentative communication system that is commonly used in children with ASD. The goal of PECS is to teach ASD children how to initiate communication with partners, by asking children to give the picture they are holding to their partner in return for the item they want. The image can be used in place of or in combination with speech.^{3,10} PECS is an approach or method that uses non-verbal symbols in the form of image media to stimulate children to improve their communication skills. The use of PECS media is based on the concept of visual support which involves the use of several image symbols on cards attached to the communication board.¹⁶

PECS is a program that is divided into six stages. Each has a role to play in the development of children's speaking skills and their ability to communicate. Each step should be completed in the correct order. In the first phase, students learn to express their needs with picture cards on their own. One card will be used at a time by the students. Teachers will expand vocabulary in the second phase by increasing the number of cards used, using the same technique. Teachers teach students how to identify the cards in the third phase and assist them in placing them on the whiteboard. In phase four, the teacher uses sentences to teach the students basic sentence structure. The teacher expands vocabulary with adjectives and other words in the fifth and sixth phases.¹⁷

The results of a study conducted in 2018 showed that PECS could improve structured speaking skills in ASD children. There are 11-12 meetings in the four phases of the PECS program, which are carried out in natural settings, such as during the learning process in class, when participants interact with the teacher or their friends. The results showed an increase in structured speaking skills in children with ASD after giving PECS therapy.¹⁶ Meanwhile, based on a 2017 study conducted for a total of 4 weeks using phases one to

three of PECS, it was found that there was an increase in speech ability after two intervention phases.¹⁷

In the 2014 study, 14 participants were given PECS therapy and then assessed after six months and one year after PECS therapy. The results suggest that PECS training can help children with ASD improve certain social communication skills in the long term. In addition, PECS has also been shown to improve the abilities of children with ASD in various areas, including communication skills, questioning skills, games, and cooperative activities.¹⁸

4. Caregiver-mediated Intervention

With this approach, carers actively train the children to perform daily activities, such as watering, caring for plants, and helping to wash clothes. JASPER (Joint attention symbolic play engagement and regulation) was used to guide the intervention.¹⁹

In 2014, many low-resource children with ASD participated in a multisite, randomized, comparative study using this method. Children's skills in social communication before and after treatment will be assessed and followed for 3 months in this study, which involved 112 families who were randomly assigned to the intervention. The outcomes of joint engagement and joint attention, as well as symbolic play, showed significant improvement. This intervention has limitations such as it is difficult to keep the interventions going without the active support of the caregiver.¹⁹

5. Parent-mediated Communication

The therapist instructs parents in this method to increase parental sensitivity and responsiveness to child communication while also reducing inappropriate parental responses.^{3,10} A systematic review of 13 studies published in 2019 found strong evidence for the effectiveness of parent-mediated interventions in enhancing child joint attention. Moderate evidence was found for improvements in scores on language, expressive language, initiation and response to interactions, nonverbal communication, play, behavior, adaptive functioning, social interaction, and symptoms of ASD.²⁰

6. Sensory Integration Therapy (SIT)

People with ASD often have a reduced ability to process sensory information. As a result, situations involving exposure to light, sound, smell, taste, or texture can be overwhelming for the patient. Sensory Integrative Therapy often uses specifically studied play activities to regulate how the brain responds to sight, touch, sound, and movement¹. Sensory Integration Therapy aims to focus directly on the neural processing of sensory information that underlies the learning of higher-level skills. Sensory Integration Therapy is not aimed at teaching specific behaviors or skills, but rather to improve a child's ability to interact with their environment more adaptively and correct the motor dysfunction that causes the disorder to induce tactile, cognitive, gravity, auditory, visual, and vestibular stimulation. This therapy is usually given by an occupational therapist.¹⁰

Based on a 2014 study conducted on 34 children with ASD, it was found that 3 sessions of Sensory Integration Therapy per week for 6 months assists those children in becoming more

independent and participating in daily activities.²¹ According to a 2015 literature review study, it can be concluded that sensory integration therapy can significantly improve some of the key symptoms of autism such as communication, social interaction, and motor functioning.¹

7. Auditory Integration Training (AIT)

Sensory processing disorders are common in people with autism. Auditory issues, such as hyperacusis, frequently complicate language disorders in autism. AIT includes

listening to music that has been filtered and modulated to present sounds of varying volumes and pitches. It is usually given in two half-hour sessions twice a day for about ten days.¹⁰ According to a meta-analysis of 13 randomized controlled trials published in 2018, ABC (Autism Behavior Checklist) and ATEC (Autism Treatment Evaluation Checklist) scores in children with ASD were significantly lower when they received AITs. The results also showed that IQ scores were significantly higher in the AIT group than in the control group.²²

national disability-adjusted life-years (DALYs) for 333 diseases and injuries and healthy life expectancy (HALE) for 195 countries and territories, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. *Lancet*. 2017;390:1260–344.

CONCLUSION

Autism is a lifelong disorder, so it is important to recognize it as early as possible, and parents need to understand the problem. It is important to remember that the cause of autism is unknown, and no single drug has been found that can cure ASD, but some therapies can suppress ASD symptoms that can help ASD lead a more productive life by reducing symptoms and improving skills. Symptoms that appear in ASD children vary widely, therefore the therapy given is individual and depends on the circumstances and symptoms that appear. There are many types of non-biological therapies for ASD, such as ABA, TEACCH, PECS, Caregiver-mediated Intervention, Parent-mediated Communication, SIT, and AIT. These therapies have been shown to have benefits in improving ASD symptoms such as communication skills, social interaction, and behavior, where each therapy has different benefits in each type. These therapies are given to everyone as needed.

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