



EFFECTIVENESS OF EAR ACUPUNCTURE THERAPY AND BEHAVIORAL THERAPY IN CHILDREN WITH ADHD

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Abstract

ADHD (Attention Deficit Hyperactivity Disorder) is one of the neurodevelopmental disorder. ADHD characterized by signs and symptoms such as inattention, hyperactivity, and impulsive. The purpose of this research was to determine the effectiveness of ear acupuncture therapy and behavioral therapy in children with ADHD. This research used Quasy Experimental Design with pretest and posttest design. This research was conducted in February-April 2023 at SLB Autis Alamanda and SLB Harmony Surakarta. The sample is children with ADHD who met the inclusion and exclusion criteria. The sample was divided into two groups, 15 children each group. Ear acupuncture therapy using earseeds at point zero, shenmen point, and liver point. Behavioral therapy using ABA method (Applied Behavioral Analysis). Data were analyzed using Independent Sample T-test. The result of this test showed that significance value is 0.849 ($p > 0.05$). The conclusion of this research is ear acupuncture therapy and behavioral therapy were not effective to decrease ADHD behavior in children at SLB Autis Alamanda and SLB Harmony Surakarta.

Keywords: *Ear acupuncture, Behavioral Therapy, Children, ADHD*

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INTRODUCTION

Human life cannot be separated from the phase of growth and development. Human growth begins in the womb, continues in infancy, childhood, adolescence, and ends in adulthood which is characterized by the cessation of physical growth. Human development begins from the womb and will continue as long as humans live (Sudirjo & Alif, 2018). In the process of human development is influenced by several important factors, namely genetic factors or heredity, environmental factors, pregnancy conditions, nutritional fulfillment, health care, and stimulus behavior. These various factors cause differences in development between one individual and another (Isnainia & Na'imah, 2020). Humans experience rapid biological development in childhood. Based on the age category, childhood is divided into 2 namely, early childhood at the age of 2-6 years and late childhood at the age of 6-12 years (Sudirjo & Alif, 2018). Childhood is a golden period but it is also a period that is prone to growth and development disorder (Nathania, 2018). One of the developmental disorders that often occur in children is ADHD (Attention Deficit Hyperactivity Disorder) (Fadila & Ratnawati, 2016). Traditional Chinese Medicine described ADHD by the imbalance of *yinyang*, namely insufficient *yin* and excessive *yang*. ADHD is associated with an imbalance in the *zang* organs, namely the heart, liver, kidneys, and spleen. The heart is *shen* home that influences mind, perception, memory and consciousness. The liver is the home of the *hun* who influence the ability to organize and plan work, affect the balance of creativity, and rational thinking. The kidneys are the *yin* base of all organs in the body that control calmness and focus. The kidneys also produce the marrow that fills the brain, where the brain is a sea of marrow. The spleen is *yi* home that affects memory, concentration, and learning (Ni et al., 2014; Avern, 2018). ADHD is caused by poor diet, poor rest patterns, and unstable emotions.

ADHD is characterized by typical signs and symptoms such as inattention, impulsive behavior, and hyperactive behavior. This will cause problems in child development and affect daily activities (Kusyanti, 2019). The prevalence of ADHD in the world is estimated to increase every year. Data from ADHD Institute (2022) shows the average prevalence of ADHD cases in children under 18 years old in Asia, Europe, America, and the Middle East ranges 0.1-8.1%. The average ratio of female to male in 10 European countries ranges from 1:3 to 1:16. The prevalence of ADHD in Indonesia has no definite data, this is because there have not been many studies conducted. Harumi et al. (2022) shows that the incidence of ADHD in YPAC Surakarta in boys as many as 24 people (60%) and in girls as many as 16 people

(40%). The study also showed the most cases of ADHD in children with an age range of more than 6 years as many as 22 people (55%).

Management of ADHD can be done through pharmacology and non-pharmacology. Pharmacological management is carried out by administering psychostimulant drugs such as methylphenidate, amphetamines, and modafinil (Sari, 2020). Psychostimulants are effective drugs for the treatment of ADHD, but taking these drugs for a certain period of time can cause side effects (Marlinda, 2018). Non-pharmacological management can be done with behavioral therapy and acupuncture therapy.

Behavioral therapy is one of the therapeutic techniques to decrease or eliminate socially unacceptable behavior. Behavioral therapy aims to establish and habituate acceptable behavior to the surrounding environment (Sunu, 2012). In children with ADHD, behavioral therapy can be done with the ABA (Applied Behavior Analysis) method or with other behavioral therapy methods. ABA is a method that teaches discipline in daily activities that are carried out consistently to improve changes in children's behavior (Imania dan Bariyah, 2018).

This study used ear acupuncture therapy methods. Ear acupuncture therapy is one component of the body's microacupuncture system that involves the stimulation of auricular acupoints according to specific areas of the body and complaints (Oleson, 2014). Some studies show ear acupuncture therapy has an effect on reducing ADHD symptoms. Ear acupuncture therapy in ADHD children leads to the improvement of dysfunction in the mesolimbic-dopaminergic system activated by changes in neurotransmitters such as serotonin, enkephalin, GABA, and dopamine. Disruption of this system is shown to lead to impulsive behavior, whereas an increase in this system is able to reduce impulsivity (Blum et al., 2011; Binesh et al., 2020). Farokhzadi et al. (2018) shows that ear acupuncture therapy can improve attention and hearing alertness in ADHD children.

Researchers conducted a preliminary study using interview methods and questionnaires at SLB Autis Alamanda and SLB Harmony Surakarta. The results of a preliminary study obtained 30 children that experienced inattention and/or hyperactivity-impulsive (ADHD). This makes researchers interested to knowing the effectiveness of ear acupuncture therapy and behavioral therapy to decrease ADHD behavior at SLB Autis Alamanda and SLB Harmony Surakarta.

METHOD

Research Design

This research uses Quasy Experimental Design with the research design used is pretest-

posttest design (Aprianti et al., 2023). The design of this study involved a control group and an experimental group but the selection of these groups was not randomized. The purpose of this study design is to determine the causal relationship. Both groups were given a pretest before getting an intervention, after getting an intervention both groups were given a posttest (Rinaldi & Mujianto, 2017).

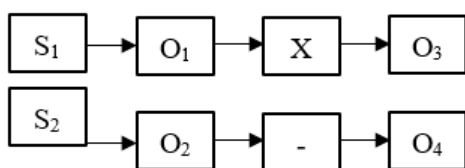


Figure 1. Research Design (Rinaldi dan Mujianto, 2017)

Information:

- S1 = Experimental group
- O1 = Pretest value before ear acupuncture therapy and Behavioral therapy
- X = Provision of ear acupuncture therapy and behavioral therapy
- O3 = Posttest value after ear acupuncture therapy and Behavioral therapy
- S2 = Control group
- O2 = Pretest value before behavioral therapy
- O4 = Posttest value after behavioral therapy

Place and time of research

This research was conducted from February-April 2023 at SLB Autis Alamanda and SLB Harmony Surakarta.

Population and Sample

The population in this research are children with ADHD at SLB Autis Alamanda and SLB Harmony Surakarta. The sample in this research are children with ADHD who met the inclusion and exclusion criteria.

- a. Inclusion criteria
 - 1) The subjects were students at SLB Autism Alamanda and SLB Harmony Surakarta
 - 2) The subjects aged 7-15 years
 - 3) The subjects had an SPPHAI assessment score of at least 29
 - 4) The subjects are undergoing behavioral therapy
 - 5) The subjects were willing to undergo ear acupuncture therapy 1x a week for 8 weeks.
- b. Exclusion Criteria
 - 1) The subjects were not students at SLB Autism Alamanda and SLB Harmony Surakarta
 - 2) The subjects were less than 7 years old

- and over 15 years old
- 3) The subjects had SPPHAI assessment scores of less than 29
- 4) The subjects were not currently undergoing behavioral therapy
- 5) The subjects of the study resigned

Research Variable

The independent variable in this study was a combination of ear acupuncture therapy at point zero, shenmen point, liver point, and behavioral therapy. The control variable in this study was behavioral therapy. The dependent variable in this study, namely changes in the behavior of ADHD children measured using the SPPHAI questionnaire.

Operational Definition

Ear acupuncture therapy is done by administering earseed acupuncture at point zero, shenmen point, and liver point. The measuring instruments used are images of the location of points and the accuracy of the anatomical location of ear acupuncture points with precise or incorrect criteria. Behavioral therapy is carried out using the ABA (Applied Behavior Analysis) method. The measuring instrument used is a therapy schedule with regular or irregular criteria. Changes in ADHD children's behavior before and after therapy were measured using the SPPHAI questionnaire (Indonesian Child Hyperactivity Behavior Assessment Scale) filled out by teachers, with a score criterion of >29 indicating the presence of ADHD.

RESULTS AND DISCUSSIONS

This study began with a preliminary study conducted in October 2022 to determine the number of research subjects who experienced ADHD. The results of the preliminary study obtained 30 research subjects who met the research criteria. The study subjects were divided into two groups, namely the behavioral therapy group as a control group of 15 children and a combination group of ear acupuncture therapy and behavioral therapy as an intervention group of 15 children. Both groups received therapy for 8 week.

Univariate Analysis

Characteristics of Research Respondents

Table 1 Characteristics of Respondents

Characteristics of Respondents	Kel Perilaku (n=15)		Kel Akp Telinga Perilaku (n=15)	
	Frekuensi	Persentase	Frekuensi	Persentase
Gender				
Male	12	80,0%	12	80,0%

Characteristics of Respondents	Kel Perilaku (n=15)		Kel Akp Telinga Perilaku (n=15)	
	Frekuensi	Persentase	Frekuensi	Persentase
Female	3	20,0%	3	20,0%
Age (years)				
7-9	4	26,7%	6	40,0%
10-12	3	20,0%	6	40,0%
13-15	8	53,3%	3	20,0%
Differentiation syndrome	6	40,0%	3	20,0%
Heat in the heart and or heart	3	20,0%	6	40,0%
Phlegm misting the mind	2	13,3%	0	0,0%
Kidney and or Liver <i>yin</i> deficiency	4	26,7%	6	40,0%
Spleen <i>qi</i> and Heart blood deficiency	6	40,0%	1	6,7%
Dominant subtype	2	13,3%	8	53,3%
Inattentive				
Hyperactive-impulsive				
Combined				

Table 1 showed that the most gender is male as many as 24 children (80.0%), the most age is age 13-15 as many as 11 children (36.7%), the most differentiation syndrome is spleen *qi* deficiency syndrome and heart blood as many as 10 children (33.3%), the most dominant behavior subtype is inattentive type as many as 12 children (40.0%).

Mean SPPHAI Score in Pretest-Posttest Experiment and Control Group

Table 2 Mean SPPHAI Score in Pretest-osttest Experiment and Control Group

SPPHAI	Group	
	Experiment Score (Mean ± SD)	Control Score (Mean ± SD)
Pretest	51.13 ± 12.98	49.47 ± 13.46
Posttest	43.20 ± 12.18	2.33 12.43

Table 2 showed that the difference in the mean value of SD ± in the experimental and control groups before therapy was 1.66 ± -0.48, while the difference in the mean value of SD ± in the experimental and control groups after therapy was 0.87 ± -0.25.

Bivariate Analysis

Table 3 Independent Sample T-test

SPPHAI	N	Mean ± SD	p
Posttest Experiment	15	43,20 ± 12,184	0,849
Posttest Control	15	42,33 ± 12,437	

Table 3 it can be seen that $p > 0.05$, the results showed H_a rejected and H_o accepted which means ear acupuncture therapy and behavioral therapy are not effective to decrease ADHD behavior children at SLB Autis Alamanda and SLB Harmony Surakarta.

Discussion

The results of the data analysis based on the most gender is male, there are 24 children (80.0%). The results of this study are in line with the results of research by Harumi et al., (2022)

which shows that ADHD is more experienced by boys than girls. This is influenced by RORA's performance. RORA (Retinoic Acid-Related Orphan Receptor-Alpha) is a gene regulating brain function controlled by testosterone and estrogen. The hormone testosterone in men will inhibit the performance of RORA, while the hormone estrogen in women will increase the performance of RORA. Inhibited RORA performance will cause body coordination problems, such as neurobiological disorders that affect brain function (Sayad et al., 2017). The results of data analysis based on the most age were in the age range of 13-15 years as many as 11 children (36.7%). The results of the study by Novriana et al., (2014) showed more ADHD symptoms in the age range of 11-13 years. The results of the study showed more ADHD symptoms in children with higher age levels. The results of data analysis based on the most differentiation syndromes, namely spleen and heart blood *qi* deficiency syndrome as many as 10 children (33.3%). Greenwood's research (2020) explains that ADHD is a condition of heat excesses or wind in the head, exacerbated by the stagnation of liver *qi*, moisture, which is rooted in spleen and kidney Qi deficiency. The results of data analysis based on the most dominant behavior subtypes were inattentive type as many as 12 children (40.0%). The results of this study are different from the results of research by Novriana et al., (2014) which shows that hyperactive-impulsive type is a subtype that is often experienced by children. The study also showed that older children were more inattentive subtypes than other types. As children get older, symptoms of hyperactivity and impulsivity will decrease, but symptoms of inattention tend to increase (Novriana et al., 2014).

The results of data analysis using the Independent Sample T-test obtained a significance value of 0.849. The results of the test can be seen that H_a was rejected and H_o was accepted, because the p value > 0.05 . These results show that ear acupuncture therapy and behavioral therapy are not effective for behavior change in ADHD children in SLB Autis Alamanda and SLB Harmony Surakarta. Factors that influence the results of this study, namely earseeds are removed prematurely, differences in diet patterns and rest patterns applied to each child, and therapy schedules adjusted to the child's condition. This requires cooperation between parents, teachers, and therapists so that therapy can be done more optimally so as to achieve optimal results.

CONCLUSION

Characteristics of subjects based on gender with the most frequency in male as many as 24

children (80.0%). Based on age with the most frequency in the age range of 13-15 years as many as 11 children (36.7%). Based on acupuncture differentiation syndrome, with the highest frequency of spleen *qi* deficiency and heart blood as many as 10 children (33.3%). Based on the dominant subtype with the most frequency is inattentive type as many as 12 children (40.0%). The Independent Sample T-test obtained a significance value of 0.849, then H_0 was rejected and H_a was accepted. These results showed that ear acupuncture therapy and behavioral therapy were not effective for decrease ADHD behavior in children at SLB Autism Alamanda and SLB Harmony Surakarta.

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