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ORIGINAL RESEARCH

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## EFFECT OF AUDIO THERAPY USING AL-QUR'AN MURROTAL ON BEHAVIOR DEVELOPMENT IN CHILDREN WITH AUTISM

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### ABSTRACT

**Background:** Autism is a neurodevelopmental disorder. Audio therapy is considered as one of the complementary therapies to improve the behavior of children with autism.

**Objective:** This study was to analysis the effectiveness of the Al-Qur'an murrotal audio therapy on behavioral development in children with autism.

**Methods:** This study was a true-experimental research using pretest and posttest approach with control group. This research was conducted on November 2016 in the Autism Foundation of Semarang City, Indonesia. There were 30 samples were selected using simple random sampling, with 15 samples assigned in the experiment and control group. Mann Whitney and Wilcoxon tests were used for data analysis in this study.

**Results:** Results showed that there was a significant difference in the mean of behavioral development after given intervention between the experiment group and control group with p-value 0.034 (<0.05). The mean of behavioral development in the experiment group (4.53) was higher than the mean in the control group (3.47).

**Conclusion:** The Al-Qur'an murrotal audio therapy is effective to develop behavior of children with autism. Therefore, it is expected that this audio therapy can be applied an alternative therapy for children with autism.

**Keywords:** Al-Quran, behavioral development, autism, audio therapy

## INTRODUCTION

The first five years of the child's life period is the most rapid growth and development of the human brain. A toddler period is a very sensitive period for the child's brain in absorbing information and knowledge from the surrounding environment.<sup>1</sup> The basic growth in the toddler will affect and determine the next cycle of human development. The presence of monitoring, stimulation and early detection is necessary for the success of growth and development of children in toddlers and can prevent any delay or interference with their growth such as autism.<sup>2</sup>

According to the US Centers for Disease Control and Prevention in 2006 reported that about 1 in 110 children suffer from ASD (Autism Spectrum Disorder). In 2008 there was an increase of incidence of autism, with 1 of 88 children has been diagnosed as ASD. While in 2010 and 2012 CDC stated that 1 of 68 children have been identified as ASD. This means that there has been an increase in the prevalence of ASD from year to year. The average number of autistic prevalence in 2006-2012 increased from 9.0% to 14.6% per 1,000 children.<sup>3</sup> In addition, the prevalence of male patients is four times greater than women. Incidence of increased autism also occurs worldwide, in the UK there has been incidence of autism of 1.1%.<sup>4</sup> According to a survey from the Central Bureau of Statistics in 2010, the number of people with autism in Indonesia reached 2.4 million people, and the addition of about 500 people every year.<sup>5</sup> Autism occurs because of interference in the development of the central nervous system, causing disruption to verbal and non-verbal communication,

social interaction and limited and repeated behavior.<sup>6</sup>

Disorders in autism can actually be controlled if parents are always monitoring and knowing the existence of deviation / impaired behavioral growth in their children as early as possible. The existence of behavioral development disorder in toddler with autism can delay developmental tasks that must be done according to toddler's age; and failure in doing developmental task will have an impact on rejection in society, especially on socialization process and lack of autonomy.<sup>7</sup>

The presence of health personnel in performing SDEIGH (Stimulation, Detection and Early Intervention in Growth and Development) is very influential in preventing and overcoming the growth disorders in infants, toddlers and pre-school children. Implementation of SDEIGH is also an effort in following up the parents' complaints about the problem in their children growth and development. Management of early detection in children with autism is included in the early detection of mental and emotional deviations that are part of the SDEIGH. Management of early detection of autism disorder in toddlers can be done by using CHAT instrument (Checklist for Autism in Toddler) and CARS (Childhood Autism Rating Scale) to detect the severity of autism so that intervention, prevention and promotion can be done to prevent the development of behavioral disorder in children with autism. One alternative therapy used in preventive and promotive efforts is an audio therapy.<sup>8</sup>

Audio therapy such as listening to the murrotal voice of the holy verses of the Qur'an is one of the complementary therapies that are effective enough to improve behavioral development in autism. The murrotal of the Qur'an can be used as alternative therapies for speech therapy, brainwave therapy and relaxation. In the study conducted by Tumiran, et al stated that the Al-Qur'an's murrotal audio therapy is better than other musical sounds / therapy. It is because murrotal audio therapy can produce higher waves that affect the function of the brain stem, which has an impact on improving serotonin function.<sup>9</sup>

Recent research showed that when listening to Qur'an verses there was a significant increase in brainwaves generated before and after listening to the holy verses of the Qur'an. This is also in accordance with the results of research conducted by Magda stated that reading and listening to the Qur'an can cause the dominant increase of brain waves of beta, alpha and theta.<sup>10</sup>

## METHODS

### *Design*

This study was a true-experimental research using pretest and posttest approach with control group

### *Settings*

This research was conducted from 2 to 11 November 2016 in the Autism Foundation of Semarang City.

### *Population and Sample*

The target population in this study was toddlers (1-5 years old). Due to the limited number of under-fives population with autism in the Autism foundation of

Semarang city, so that the number of samples only reached the minimum requirement of sample for experiment research, namely 30 samples, with 15 assigned in the experiment and control group.

The inclusion criteria of the sample in this study were as follows: 1) Moslem with age 1-5 years, 2) Toddlers with mild-moderate degree of autism, and 3) Children who got the permission from their parents to be involved in this study. The exclusion criteria were respondents who were sick and hospitalization during the study.

### *Intervention*

Respondents in the experiment group received the Al-Qur'an murrotal (Surah Ar-Rahman) therapy in the morning directly using a laptop media with music pressure of 60 dB for 2 weeks in 6 times therapy on day 1,3,5,7, 9, and 11. The therapy was implemented in the morning in the private room before the routine lessons begin at the foundation. During therapy, respondents were accompanied by therapists, researchers and enumerators to keep the environment comfortable and conducive. While respondents in the control group were given a routine lesson according to the schedule determined by the autism foundation in accordance with their needs.

### *Instruments*

The behavioral developments were measured using the CARS (Childhood Autism Rating Scale) instrument. The CARS instrument is one of the scales or guidelines that can be used to measure the severity of toddlers with autism so as to measure the rate of development of their behavior. The CARS consists of 15 items of behavioral rating scales to identify the

severity quantity of autistic disorder. The CARS was developed by Schopler and Reichler.<sup>11</sup> The CARS instrument has a 94% sensitivity rate, 85% specificity and 95% reliability level. Based on this scale, the severity of autistic disorder symptoms is divided into 4 categories: a) If score 15-25 = not autism; b) score 26 – 35 = mild autism; c) score 36 – 50 = moderate autism; and d) score 51 to 60 = severe autism.

#### *Ethical Consideration*

The study permission has been obtained from the Department of the National Unity, Political and Social Protection of Semarang. The Ethical Clearance was obtained from the Health Research Ethic of the POLTEKKES Semarang with number 210 / KEPK / Poltekkes-Smg / EC / 2016. In this study, the researchers have

confirmed that each respondent has obtained an appropriate informed consent.

#### *Data Analysis*

Mann Whitney and Wilcoxon tests were used for data analysis in this study.

## **RESULTS**

Table 1 shows that the majority of respondents in the experiment group aged > 3-5 years as many as 9 respondents (60%), while in the control group the majority of respondents aged 1-3 years as many as 9 respondents (60%). The majority of sex distribution was males in the experiment group (86.7%) and control group (80%); and the severity level of autism in the experiment group was in a mild level (60%) and in the control group was in a moderate level (60%).

**Table 1** Frequency distribution of the characteristics of the respondents based on age, gender and severity level

Variable		Experiment group		Control group	
		Σ	%	Σ	%
Age (Year)	1-3	6	40	9	60
	>3-5	9	60	6	40
	Total	15	100	15	100
Gender	Male	13	86.7	12	80
	Female	2	13.4	3	20
	Total	15	100	15	100
Severity Level of Autism	Mild	9	60	6	40
	Moderate	6	40	9	60
	Total	15	100	15	100

**Table 2** Mean difference of behavioral development of children with autism before and after given intervention in the experiment and control group using Mann Whitney Test

No	Behavior development variable	Group		p-value
		Experiment	Control	
1.	After Intervention			0.034
	Mean ± SD	30.84±1.96	31.93±1.10	
	Min-max	28-35	30-33	
2.	Difference of behavior development before and after intervention			-
	p-value	0.001	0.000	
3.	Mean difference			0.052
	Mean ± SD	4.53±1.13	3.47±1.060	
	Min-max	2-6	3-6	

Table 2 shows that the average of behavioral development after given intervention in the experiment group was 30.84 and in the control group was 31.93. Mann Whitney test showed that there was a significant difference in the mean of behavioral development after intervention between the experiment group and control group with p-value 0.034 ( $<0.05$ ). Wilcoxon test also obtained p-value  $<0.05$  in both groups, with the mean of behavioral development in the experiment group (4.53) was higher than the mean of it in the control group (3.47).

## DISCUSSION

### Characteristics of the respondents

The characteristics of the respondents in this study were in line with the research conducted by Hapsari and Romdzati<sup>12</sup> indicated that the number of male respondents was more than female respondents. Similar with the research conducted by Whiteley, et al<sup>13</sup> in the UK stated that the ratio of autistic patients between males and females was 7:1.

The high incidence of autism in males because of the production of testosterone while females produces more estrogen. Both hormones have the opposite effect on a brain-functioning gene called Retinoic Acid-Related Orphan Receptor-Alpha (RORA), located in the brain neurons. Testosterone can inhibit RORA work, while estrogen can improve the performance of RORA.<sup>13</sup> The inhibition of RORA performance causes various body coordination problems, such as disruption of biological clock or circadian rhythm that impact on sleep patterns. Disorders in sleep patterns and nerve damage due to inflammation in the brain

are some of the complaints that are often experienced by children with autism.<sup>13</sup>

In addition, the characteristics of the respondents in this study were majority in the toddler age, which is in line with the research conducted by Minropa,<sup>14</sup> indicated that the age of 2-5 years is the ideal age to deal with children with autism such as by providing murrotal audio therapy. The principle of providing therapy as early as possible in toddler age is much better than the treatment in children  $>5$  years old. Early administration of therapy will provide optimal results to address behavioral development problems in children with autism.

Symptoms of autism can be seen in children before 3 years old from their social interaction, communication, behavior, and the way they play unlike other normal children. Saharso<sup>15</sup> states that undetected children with autism before 3 years old and not immediately treated will exacerbate the developmental of disorder behavior.

Child progress in therapy is influenced by the severity of autism. The more severe the autism, the more difficult to develop into normal, but keep in mind that as mild as the symptom, children should get therapy so that the disorder does not get worse.

This is in accordance with research conducted by Minropa<sup>14</sup> indicated that children with severe autism did not show any progress after given treatment (76.8%). Thus, it could be said that there are two factors influencing the time of achievement of the success rate of therapy, namely the severity of autism and outside therapy outside.

### **The effectiveness of the Al-Qur'an's murrotal audio therapy on behavioral development in children with autism.**

In autism, an interruption occurs in the function of neurotransmitters as a linkage of messages from neurons of sensory nerve cells to motor neurons nerve cells so that the impulses received by the effector cannot be conveyed and cannot cause the desired response by the body. The presence of disorders in the neurotransmitter can cause behavioral development disorders in children with autism.<sup>16</sup>

The impulse received by the receptor from the external environment, carried by the neuron / sensory nerve cells to be connected by the neurotransmitter, which is ejected through the synaptic cleft into the motor neuron and then passed to the effector (muscle). Inside the effector, the impulse brought from the outside will result in a movement or change in the effector in response to an impulse received from outside. Messages received from the outside will be well conveyed and create movements / responses according to the impulse if the delivery of messages / links from one neuron cell to another neuron (neurotransmitter) works well.<sup>17</sup>

The neurotransmitter is inside the synapses and is removed through the synaptic cleft. In the neuron, the synapse lies between the dendrite and the axon. Campbell states that the music that a person hears will be channeled by the auditory nerve and then causes the resulting sound activity and recorded on the EEG (Electro Encephalo Gram) in the superficial cerebral cortex layer, then into the dendrites, cortical cells and cell body. These dendrites are complex units in the cerebral cortex. The activity of the

dendrite unit runs synchronously and forms alpha waves resulting in a calm and relaxed condition.<sup>18</sup>

The presence of alpha waves generated by dendritic activity will improve the function and number of neurotransmitters in the synapses located between dendrites and axons. Thus, the neurotransmitter released by the synaptic cleft will deliver impulses from the sensory neuron to the motor neuron well, and the effector will respond appropriately to the impulse received from the receptor. If the impulse gets an appropriate response, then there will be no disruption to the development of human behavior, especially in children with autism.<sup>17</sup>

## **CONCLUSION**

There was a significant increase of a behavioral development of the children with autism after given the Al-Qur'an murrotal audio therapy using a soft pressure (60 dB) with duration of 12 minutes 15 seconds for 2 weeks as many as 6 times therapy. Therefore, it is expected that this audio therapy can be applied an alternative therapy to improve behavioral development in children with autism.

### **Declaration of Conflicting Interest**

None declared.

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### **Authorship Contribution**

All authors have equal contribution in this study.



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