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Massage Therapy Can Prevent the Risk of Autism Spectrum Disorders in Children Aged 18-36 Months

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ABSTRACT

Background: Research on massage therapy for children with autism spectrum disorders conducted over a period of 10-15 years is mostly aimed at children who have been diagnosed with autism spectrum disorders with the average age of children being between 3-6 years. Meanwhile, research on massage therapy in children at risk for autism spectrum disorders, especially in Indonesia, has not been widely published. **Aims:** This study aims to provide an overview of the results of massage therapy in an effort to prevent the risk of autism spectrum disorders in children aged 18-36 months. **Methods:** The study was conducted from May 2019 to March 2020 at three community health centers in Jakarta, 10 children aged 18-36 months who were previously screened with M-Chat were then given massage therapy for 40 times to see the effect on changes in status risk of autism spectrum disorderThe results of therapy were then assessed by modifying the M-Chat score through the receiver operating characteristic (ROC) in order to obtain a new cut off point to determine the risk status of autism spectrum disorders. **Results:** The results of massage therapy showed that there was a decrease in M-Chat scores and changes in the risk status of autism spectrum disorders starting in the third period of 30 days of massage therapy. **Conclusion:** The conclusion of this study is that massage therapy can change the risk status of ASD children from autism risk to normal to prevent the risk of autism spectrum disorders.

Keywords: massage therapy; autism spectrum disorder risk; modified check list for autism in toddler

INTRODUCTION

Background

Autism spectrum disorders from year to year tend to increase, but the exact incidence has not been obtained until now. In the past decade, research on the autism spectrum disorder has received a lot of attention from experts in the field of child welfare, especially in the field of child health. Autism spectrum disorders start from infancy to the age of three year(1). Autism spectrum disorders are present from birth and can be diagnosed in infants aged 18 months(2). Data on autism spectrum disorders are often obtained from hospitals, polyclinics, doctor's practices, special schools or certain institutions, while data from research results in the community regarding the prevalence or incidence of autism spectrum disorders can still be obtained and accessed accurately. Autism is still less well known, especially in developing countries. The Ministry of Women's Empowerment and Child Protection of the

Republic of Indonesia reports that in the world the prevalence rate of autism is 1-2 per 1000 population. In Canada the prevalence of autism is 1% out of 67000 children aged 3-20 years, where boys are more than girls with a ratio of 4:1[3]. According to The US Centers for Disease Control and Prevention (CDC), the prevalence of autism was 14.6 per 1000 children aged eight years in 2012[4]. In Indonesia, it has increased from 1 per 1000 population to 8 per 1000 population in 2009 and in 2015 it is estimated that 12,800 children have autism and 134,000 have autism spectrum [5]. Although this research has been studied from various aspects, the problem of autism spectrum disorders in other parts of the world is still high, both in developed and developing countries, including Indonesia.

Many efforts have been made to overcome the problems of autism spectrum disorders, such as systemic psychotherapy, social therapy, structural focused therapy and solutions with primary caregivers to massage therapy approaches[6-10], However, these efforts have not been maximized because all of them are carried out on children who have autism. Because these efforts are carried out on infants who have experienced autism spectrum disorders, these actions only address psychosocial developmental disorders of children who have autism spectrum disorders.

Because the results of the research above are aimed at infants who have experienced autism spectrum disorders at an older age, the solution is only limited to treatment to reduce the limitations that occur in children's psychosocial development[10,11]. However, solutions to overcome the high risk of autism spectrum disorders cannot be achieved. Therefore, an intervention is needed as an effort to prevent the increase in risk factors for children under 36 months of age who have autism spectrum disorders.

In connection with the above, it is necessary to have an intervention in the form of massage therapy from the parents of the baby as a prevention effort in children aged 18-36 months who have a tendency to risk autism spectrum disorders which can be measured based on the Modified Check List for Autism in Toddler scores (M-Chat). This research is necessary because massage therapy can be done anywhere and anytime by the baby's parents. In this case, baby massage in Indonesian society is a local wisdom that has been passed down from generation to generation[12], which socio-culturally is something that is usually done with the aim of increasing body weight, sleep quality and improving the ability to eat and breastfeed babies[11,12], but not aimed at preventing the occurrence of risk factors for autism spectrum disorders in children. Therefore, this research is very important to do in order to prevent the increased risk of autism spectrum disorders in children based on the M-Chat criteria.

METHODS

The Stages of Development of Massage Therapy Models in children at risk for autism spectrum disorders were identification of massage therapy through literature studies, research studies and tracing of the baby massage/massage therapy matrix, the development of massage therapy models is carried out in consultation with the Expert Team and Focus Group Discussion (FGD).

The M-CHAT Score Modification stage was carried out on 904 respondents aged 18-36 months in Jakarta area who were screened using the 2018 version of M-CHAT from August to September 2020 online by filling out the M-Chat form via Google Form. The screening results were then analyzed using the ROC method using the Stata E 12 program. The analysis was aimed at determining the sensitivity and specificity values, and cut of points. The results of the sensitivity and cut of point values obtained were used to determine the new score from M-CHAT in assessing the risk status of children with autism spectrum disorders who were given massage therapy. The criteria for the risk status of autism spectrum disorders based on the modified M-Chat score used are: high risk >49; the risk of autism is 24-49 and normal <23.

The stage of applying Massage Therapy which has been developed by researchers/writers is then given to 10 respondents. Previously, screening was carried out using M-CHAT in 2018 from the Indonesian Ministry of Health and Diana L Robins on 1065 children at three community health center in the Jakarta area. The results of the screening showed that 14 children were at risk for autism spectrum disorders and only 10 children were included in this study. This study is a descriptive study in which each child received massage therapy 40 times and evaluated every 10 times to see changes in the M-CHAT score and changes in the risk status of children with autism spectrum disorders. The change in the M-CHAT score used is the Modification of the M-Chat score that has been done previously.

All parents of children who were sampled in this study filled out informed consent. This study was approved by the health research ethics committee of the University of Indonesia.

RESULTS

Characteristics of the sample

The results of the analysis of the characteristics of the sample data obtained that the age of 18-24 months had the highest number, namely 9 people (90%) compared to the age of 25-36 months, namely 1 person (10%), On the gender factor, it showed that the sample was more in the male gender. male, namely 7 people (70%)

compared to female sex, namely 3 people (30%). For risk factors for autism spectrum disorders in children, it shows that other factors are greater, namely 9 people (90%) than factors due to chromosomal abnormalities, which are 1 person (10%). In terms of childbirth, generally children who are at risk for autism spectrum disorders have a history of normal delivery, namely 8 people (80%) compared to other factors such as caesarean section, which are 2 people (20%). Thus, it can be concluded that the sample of this study is generally children under 24 months of age with the most sex being male with the biggest causal factors being other factors outside of chromosomal abnormalities, infection and the environment, with the most history of normal deliveries.

Table 1. Characteristics of the sample based on age, gender, causative factors, maternal birth history

Variable	Frequency	Percentage
Age (months)		
18 – 24	9	90
25 – 36	1	10
Total	10	100
Gender		
Male	7	70
Female	3	30
Total	10	100
Causative factor		
Chromosomal abnormalities	1	10
Infection	0	0
Environment	0	0
Etc	9	90
Total	10	100
Maternal birth history		
Normal	8	80
Caesar	2	20
Tool Help	0	0
Total	10	100

Changes in M-CHAT score and status on the risk of autism disorders

The results of massage therapy from each period I – IV from the stages of giving therapy from 10 respondents were evaluated from each period of giving massage therapy. Period I The first day of therapy is a pre-test or initial M-Chat score which will be evaluated for changes every 10th day after being given massage therapy. Assessment of changes in M-Chat Score using the results of Modification of the M-Chat Score that has been done previously using ROC, AUC and Sensitivity analysis results of ROC analysis to obtain the cut of point M-Chat score. Changes in the M-Chat Score from period I to period IV of each respondent can be seen from table 6 and figure 2 below. The results of the evaluation of changes in the M-Chat Score on the application of massage therapy from the ten respondents will be explained below.

Table 2. Changes in M-CHAT score and status on the risk of autism disorders in the application of massage therapy periods I – IV

Respondent	Initial risk status	Period I day 10	Period II day 20	Period III day 30	Period IV day 40	Final risk status
		Score	Score	Score	Score	
1	Autism risk	40	40	33	28	Autism risk
2	Autism risk	27	27	25	25	Autism risk
3	Autism risk	32	32	28	26	Autism risk
4	Autism risk	25	25	24	24	Autism risk
5	Autism risk	43	43	35	25	Autism risk
6	Autism risk	37	37	37	37	Autism risk
7	Autism risk	35	35	26	23	Normal
8	Autism risk	34	34	30	28	Autism risk
9	Autisme risk	42	42	31	26	Autism risk
10	High risk	58	58	56	54	High risk

The initial risk status for autism spectrum disorders from respondents 1-9 is at risk of autism, with a score of period I therapy days 1-10 is from 23-43, except respondent 10 is high risk with a score of 58. The initial risk status for autism spectrum disorders from respondents 1-9 is at risk of autism, with a score of period I therapy

days 1-10 is from 23-43, except respondent 10 is high risk with a score of 58. The decrease in the score can be seen from the third period of therapy to 30. In respondent 7, the risk status of early autism spectrum disorders is the risk of autism, after therapy days 21-30 period III there is a decrease in the score to 26 and day 31-40 period IV the score becomes 23 with the risk status of autism spectrum disorders changed to : normal. The risk status of the initial autism spectrum disorder of the 10 respondents, although experiencing a change in score but not being able to change the risk status of the autism spectrum disorder, remains at high risk.

Thus it can be concluded that the modified value of the M-Chat score in therapy periods 1 and 2 shows the same value and in therapy periods 3 and 4 has decreased, meaning that the modified score of the M-Chat score has changed in the form of a decrease after the baby is massaged after therapy periods 1 and 2.

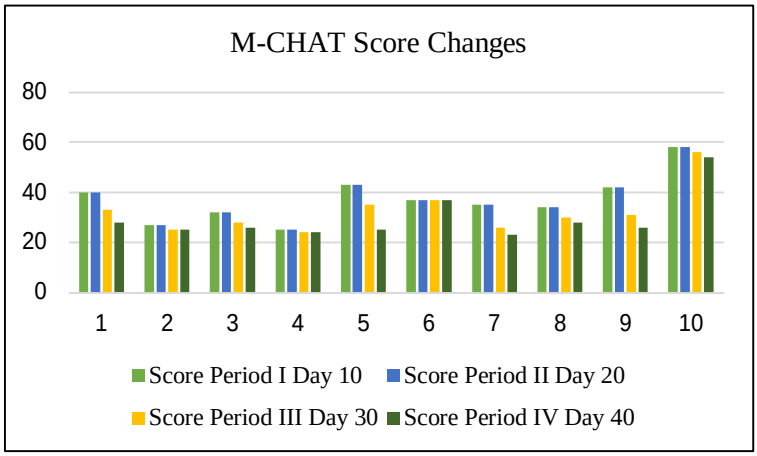

Figure 1. Graph of changes in M-Chat score period I – IV on the application of massage therapy

In Figure 1. it can be seen a graph of changes in M-Chat scores for periods I - IV on the application of massage therapy from respondent 1 to respondent 10. From the graph it can be seen that there is a decrease in M-Chat scores from each respondent from periods I - IV, except for the 6th respondent, where the score remains unchanged.

While in respondent 7, there was a decrease in the M-Chat score towards the risk status of autism spectrum disorders from the risk of autism changing to normal. Respondent 10 also saw a decrease in score from period I – IV but the risk status remained at High Risk status. Thus it can be concluded that the modified value of the M-Chat score in therapy periods 1 and 2 showed the same value and decreased in therapy periods 3 and 4, meaning that the modified value of the M-Chat score changed in the form of a decrease after the baby was massaged after therapy periods 1 and 2.

DISCUSSION

Autism spectrum disorder is a term used to describe a state of deficit in social communication and repetitive sensory-motor behavior that appears early in children associated with genetic components and other causes[13]. This study was conducted on children aged 18-36 months based on the results of screening using the M-Chat score who have a tendency to risk autism spectrum disorders. The results of the study obtained a sample of generally children under 24 months of age with the most gender being male with scattered factors being other factors outside of chromosomal abnormalities such as children's habits of playing gadgets with mobile devices, lack of interaction and attention from parents with children because work so that the inner bond or bonding decreases, infection and the environment, with the most history of labor due to normal delivery. The age of the sample is under the age of 24 months because this study was conducted before the child had autism by identifying risk factors for autism as early as possible. This is done by researchers in the hope that early intervention can be carried out in children to prevent the occurrence of more severe autism spectrum disorders. This age can also identify cognitive and language scores so that more positive results can be obtained[14]. The age of 24 months is the most appropriate age for diagnosing children at risk for autism spectrum disorders[15,16]. For the gender factor, there were more males than females at risk for autism spectrum disorders. This has not been scientifically proven[17], but the results of the study did not show any differences between the sexes in the occurrence of autism spectrum disorders[18]. Male gender is estimated to be more at risk of autism spectrum disorder around 4:1[19], due to the influence of parenting, which expects excessive behavior and social pressure than boys[17]. Furthermore, the female sex may be protective of social disabilities so that there is a lack of detection for diagnosis[13, 17, 20]. The causative factors show that other factors are more dominant than chromosomal disorders, infection and environmental factors. This is because most parents do not understand the causes. Even the use of mobile devices that are not in accordance with official guidelines, will cause health problems for children, including behavioral disorders, reduced attention and increased aggressiveness[21-23]. Birth

history shows that children born normally have the highest risk of autism spectrum disorders compared to Caesarean deliveries. This can happen because the normal delivery process has many risks during and after childbirth. Risks in normal delivery can be in the form of maternal old age, narrow hips so that the baby is in vacuum or labor induction and hypertension[24,25].

Massage therapy has an effect on reducing the risk of autism spectrum disorders. The mechanism can be achieved because gentle massage in children will cause stimulation and relaxation of the autonomic nerves as one of the physiological bases so that it has a reflex effect on the autonomic system. The relaxing effect can occur when the child feels fear, anxiety or pain or has an emotional reaction[26]. This happens because of massage, the hypothalamus will be stimulated by impulses to the spinal cord, causing sympathetic release as a self-protection mechanism[27]. Massage can improve behavior, social or communication skills as well as tactile and other sensory symptoms[28]. Massage therapy can reduce stress as a factor that affects the body's physiological and psychological changes[29].

Changes in the M-Chat score occurred after the child was given massage therapy for 21-40 days (can be seen in table 2 and figure 1. This mechanism occurs because with massage the child will experience relaxation, be less stressed and more focused on activities. Stress will affect the physiological and psychological system of the body, causing an increase in the frequency of cardiac output, reducing peripheral and kidney blood flow so that children become unfocused, behavioral disorders, reduced attention and increased aggressiveness[21, 22, 29], so that it can increase the M-Chat score, which means the child has a high risk of autism spectrum disorder. By giving massage therapy, children will become relaxed because massage therapy will overcome tactile disorders in children [28], besides massage therapy for six weeks will improve children's emotions, friendliness, show better face-to-face interaction behavior, experienced a decrease in urinary stress (cortisol) and catecholamines (norepinephrine, epinephrine) as well as increased levels of serotonin[30], as a result the M-Chat score decreased even the risk status of autism spectrum disorders changed to normal so that children reduced or even did not have the risk of experiencing autism spectrum disorders.

CONCLUSION

Massage therapy has an effect on decreasing children's M-Chat scores and changes in the risk status of autism spectrum disorders which causes the risk of children's autism spectrum disorders to become normal. It takes twenty-one to forty days to do massage therapy on children to get a change in the risk status of a child's autism spectrum disorder to normal based on the M-chat score.

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