



RELATIONSHIP BETWEEN POLY THERAPY DUE TO MEMORY IMPAIRMENT IN CHILDHOOD EPILEPSY PATIENTS

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ABSTRACT

Background: Memory impairment is a negative impact that often occurs in childhood epilepsy patients. Memory impairment affects cognitive function and reduce their quality of life. The incidence of memory impairment is ranging from 20 to 50% of childhood epilepsy. Polytherapy is a factor may affect memory impairment in childhood epilepsy patients.

Objective: To know relationship between polytherapy and memory impairment in childhood epilepsy patients.

Methods: A cross sectional study was performed in outpatient pediatric neurology division at Haji Adam Malik tertiary hospital Medan between October until November 2017. Characteristics and therapy of epilepsy were obtained from parents interviewed and medical records. Epilepsy were diagnosed from clinical symptoms and electroencephalogram test. Memory test was performed with multiple substests of Wechsler Intelligence Scale for Children-IV.

Results: There were 6 children (85.7%) from 7 children with polytherapy who had memory impairment, where all of them have interference at the examination of concentration substest. The polytherapy has a relationship to the memory impairment in childhood epilepsy with $PR=3.995$ ($p=0.032$).

Conclusion: This study showed that the polytherapy has a relationship to the memory impairment in childhood epilepsy patients.

KEYWORDS : Childhood Epilepsy, Polytherapy, Memory Impairment

1 INTRODUCTION

Epilepsy is one of the most frequent diseases in children with a very varying incidence of 5 to 74 per 1000 children in developing countries.¹ In Indonesia, the incidence of epilepsy in children in Indonesia is estimated to be 35 to 150 per 100 000 per year, but the prevalence is still difficult to determine.² Children with epilepsy patient in RSUP Haji Adam Malik Medan in 2013 was 126.³ The high incidence of epilepsy in developing countries was due to central nervous system infection, head trauma and perinatal morbidity.⁴ Central nervous system infection, head trauma, and perinatal morbidity may be the epileptic focus.^{5,6}

Children with epilepsy need appropriate management, because uncontrolled epilepsy increase morbidity and mortality risk by 2 to 3 times than the normal population due to sudden death, trauma, suicide, and epileptic status.^{7,8} Comprehensive management is also necessary because of recurrent epilepsy will decrease the patient's quality of life.⁸ Decreased quality of life in epilepsy is due to uncontrolled seizures and impaired mental health including memory loss, learning disabilities, personality disorders, and poor social life.^{8,10}

Memory is needed in the learning process, especially in children in development stage.⁹ Memory of a person will be disrupted if there is interference in one of the process of making an information.⁹ The process of recognition and storage of information is vulnerable disrupted by abnormal electrical activity.⁹ Research conducted in Australia in 2004 proves that epilepsy patients are at risk of decreased cognitive function due to decreased memory function.¹⁰ As a result of memory impairment many children with epilepsy do not achieve high levels of education, which can result in long-term difficulties such as job difficulties and negative stigma who settled into adulthood.⁶

Memory disorders occur in 20 to 50% of children with epilepsy.^{10,11} The disorder results from: (1) epilepsy itself, age at epilepsy (onset),

frequency of epilepsy, epilepsy, type of epilepsy or epilepsy syndrome, and epilepsy etiology,¹¹ (2) Anti-epileptic drugs; (3) Psychosocial factors such as negative stigma in society against epilepsy patients, causing depressed patients who will further disturb the attention required in the process of making information,¹¹ (4) Comorbids such as abnormalities that occur during fetal brain development, asphyxia at birth, head injury, brain tumor.¹² Memory disorders that occur should be immediately detected so that intervention can be done in children with epilepsy and can improve or prevent the worsening of cognitive function.^{9,10}

Since the incidence of memory impairment in epilepsy is high, the researcher is interested in conducting research on the proportion of memory disorders in children with epilepsy and for finding relationship between polytherapy and memory impairment in children with epilepsy at RSUP Haji Adam Malik Medan.

2 METHOD AND SAMPLE

2.1 Population and sample

We have performed a cross sectional study. The target population of this study is children with epilepsy. The population of this research is epilepsy children patient who seek treatment in child neurology outpatient clinic RSUP Haji Adam Malik Medan in October 2017 until November 2017. Sampling in this research by using consecutive sampling technique. With inclusion criteria epilepsy patients aged 5 - 15 years and suffer from epilepsy at least 1 year. Patients with Down syndrome, rett syndrome, autism ADHD and cerebral palsy and clinical symptoms of depression were excluded.

2.2 Data analysis

Processing and data analysis in this study using statistical software. The nominal independent variable is described in proportion. The dependent variable is memory, which in this study is examined by verbal memory test, visual, and concentration test is in nominal scale, that is disturbed and undisturbed.

To see the relation of each independent variable to dependent variable, bivariate test is done by using Chi-square test with Fisher's Exact test alternative test. In this analysis, the prevalence ratio (PR) will be determined. The PR score will be accompanied by a 95% confidence interval (95% CI), where the p value <0.05 is considered significant.

3 RESULT

The study was conducted in child neurology outpatient clinic, Department of Pediatric, RSUP Haji Adam malik Medan. The total number of epilepsy patients during the period of October and November was 156 people and the sample fulfilling the inclusion criteria was 50 people. From the results of the research obtained from bivariate analysis, it was found that one variable had $p < 0.25$ on memory in children with epilepsy in in child neurology outpatient clinic, Department of Pediatric, RSUP Haji Adam malik Medan, so multivariate analysis were not done. Characteristics of the subject in this study can be seen in table 1.

TABEL 1.Characteristic of subject

Characteristic	n=50	
Sex,	Boy	26 (52)
	Girl	24 (48)
Mean age, year(SD)		9.21(3.05)
Parents education, n(%)	Elementary school	2 (4)
	Junior high school	10 (20)
	Senior high school	34 (68)
	University	4(8)

Memory examination were conducted by a psychologist at RSUP HAM Medan. Memory impairment in children with epilepsy can be seen in table 2

TABEL 2. Results of memory assessment in children with epilepsy

Memory	n=50
Mean visual score, (SD)	10.10(5.28)
Mean verbal score, (SD)	10.12(4.96)
Mean concentration score, (SD)	11.28(4.03)
impaired n(%)	20 (40)
unimpaired n(%)	30 (60)

From 20 children with epilepsy child neurology outpatient clinic RSUP HAM Medan who experienced recalled memory, it was found that the 20 samples had interference on the concentration subtest (working memory) and got the average score of 7.00 ± 3.04 . The subtest results for the 20 samples with recalled memory can be seen in table 3.

TABEL 3. The results subtest visual, verbal, and concentration abilities in children with epilepsy

Impaired memory	n=20
Visual	
Mean score, (SD)	4.95(3.98)
Impaired, n(%)	17(85)
Unimpaired, n(%)	3(15)
Verbal	
Mean score, (SD)	4.65(4.39)
Impaired, n(%)	18(90)
Unimpaired, n(%)	2(10)
Concentration(working memory)	
Mean score, (SD)	7.00(3.04)
Impaired, n(%)	20(100)
Unimpaired, n(%)	0(0)

Chi-Square test or alternative test with Fisher's Exact test to find out the polytherapy can affect the memory of children with epilepsy patient in children neurology outpatient clinic RSUP Haji Adam Malik Medan. The relationship between polytherapy and memory impairment can be seen in table 4.

TABLE 4. Relationship between polytherapy and memory impairment in children with epilepsy

Polytherapy	Memory			P	PR
	Unimpaired	Impaired	Total		
No	29 (96.7)	15 (75)	44 (88)	0.032	3.955(0.653-23.966)
Yes	1 (3.3)	5 (25)	6 (12)		

4 DISCUSSION

Epilepsy research still remains the most common chronic neurological disorder in children. The incidence of epilepsy has increased steadily over the past decade.⁴¹ Decrease in quality of life is a common negative impact in children with epilepsy. Cognitive impairment is one of the most frequently complained by parents of children with epilepsy. Memory is one of the most important components of cognitive function.²¹

Studies conducted over the past decade show a marked improvement in the prevalence of memory impairment in children with epilepsy. Nolan et al conducted a study in Australia under the WRAML subtest examination method and reported the prevalence rate of memory impairment between 20 to 50% of children with epilepsy.¹⁰ In Indonesia, studies of memory impairment in children with epilepsy have been examined differently by using subtest of WISC-III and reported a number that was not much different, that is 46%.²⁹ In Netherlands, Hendriks et al reported the prevalence of memory impairment in children with epilepsy was equal to Nolan et al at 46%.¹¹

This study found 40% of children with epilepsy in Neurology outpatient clinic RSUP HAM Medan Medan with memory impairment. Memory examined in this study with some subtest such as forward digit span, backward digit span, and coding from WISC-IV. In this study, it was obtained from 20 people who had memory impairment, 100% had working memory, 90% had verbal disorder, and 85% had visual problems. This is consistent with the Leoncio research in Brazil, et al found that working memory is the most with childhood epilepsy.⁴² Nolan et al. found out from the study that in children with epilepsy, especially those with symptomatic epilepsy and intractable epilepsy obtained interference from the ability of verbal, visual and especially disturbance in recall or in repeating the information, it can be seen that epilepsy sufferers mostly experience concentration disorder or working memory.¹⁰

The results of this study also found 26 men from a total of 50 research samples. Mean age of 9.21 ± 3.05 years. Patients with epilepsy in the Neurology of Child Health outpatient clinic RSUP Haji Adam Malik Medan with memory disorders have a mean score of visual ability of 4.95 ± 3.98 , the average score of verbal ability of 4.65 ± 4.39 , and the mean score of concentration of 7.00 ± 3.04 . In a study conducted by Leoncio, et al obtained 57.1% of patients with epilepsy is male and obtained an average age of 9.14 ± 2.03 tahun.⁴² A study conducted by Leoncio, et al also obtained the average score of verbal ability of 9.52 ± 2.06 , the average score of visual ability of 5.86 ± 1.86 , and the mean score of concentration ability of 6.19 ± 1.63 .⁴²

In this study we found children who receiving polytherapy affect memory impairment in children with epilepsy in Haji Adam Malik Hospital Medan ($p=0.032$) and who receiving polytherapy 3.9 times more than children receiving monotherapy caused memory impairment, in accordance with research conducted by Suzette I, et al.⁴³ Suzette I, et al found in their study children receiving polytherapy have a distractibility and lack of concentration ($p<0.05$).⁴³ In a study conducted by Sung-Pa Park, et al said children who get treatment polytherapy affect to decrease verbal and visual abilities ($p<0.001$).⁴⁴ Monotherapy is usually preferred over polytherapy whenever possible in epilepsy care.⁴⁴

5 CONCLUSION

This study showed that the polytherapy has a relationship to the memory impairment in childhood epilepsy patients $PR=3.955$ ($p=0.032$). This study showed from 50 children with epilepsy, 40%

had memory problems. Average age of 9.21 ± 3.05 . From 20 people who experienced memory impairment were all experiencing impaired concentration with a mean score of 7.00 ± 3.04 .

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