

# CORRELATION BETWEEN FREQUENCY AND DURATION ON READING THE QUR'AN WITH COGNITIVE FUNCTION AT ELDERLY

(Running Head: Reading The Qur'an and Cognitive Function of the Elderly)

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**ABSTRACT---Background** The population of elderly people in Indonesia is increasing, so decrease of cognitive function will be more common to be found therefore the implementation of cognitive activity of reading as a non-pharmacologically management is needed to maximize cognitive function in elderly.

**Objectives:** To know the existence of a relation between frequency and duration of reading Al-Quran with cognitive function at elderly.

**Methods :** This study used case-control and sampling design that conducted according to incident cases. In the study subjects performed cognitive function examination with MoCa-Ina questionnaire, then measured frequency and duration of reading Al-Quran by interview. The data analysis was using Chi-square.

**Results :** There were 68 study subjects that consisting of 34 subjects with abnormal cognitive function and 34 subjects with normal cognitive. Out of the 34 subjects whose has cognitive abnormal, there was 27 (50.9%) people who read the Quran with frequency <12 x/week, and 7 (46.7%) people read with frequency  $\geq 12$ x/week. There was no correlation between the frequency of reading the Quran with cognitive function ( $p = 0.770$ ). Then, 34 subjects whose cognitive abnormal were 14 (40%) people read the Quran, with a duration of 1 times reading <30 minutes and 20 (60.6%) people who read the Quran, with a duration of 1 times reading  $\geq 30$  minutes.

**Conclusion:** There was no correlation between the duration of reading the Quran with cognitive function ( $p = 0.0890$ )

**Conclusion :** There was no correlation between the frequency and duration of reading the Quran with cognitive function in the elderly.

**Keywords---** Cognitive Activity, Reading The Quran, Cognitive Function, Elderly, MoCa-Ina

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## I. INTRODUCTION

The elderly population in Indonesia is experiencing an increasing life expectancy, an average increase of up to 70 years. The number of elderly in Indonesia is quite high(1,2).Decreased cognitive function will be increasingly encountered in line with the rapid growth of the elderly(3)thus lead to the urgency of health promotion (1,4,5).The number of people with cognitive impairment is estimated to be about a third of the population over the age of 70 years(6).Previous research mention that about 10% of parents older than 65 years, and 50% over 85 will experience cognitive impairment, which will present mild cognitive impairment to dementia(7).

Fifteen percent of individuals with mild cognitive impairment will become demented within 1 year and increase to 50% chance of becoming dementia within 3 years. Dementia occurs 25% at age >75 years and 40% at age >80 years(8).Treatment of cognitive disorders requires a large cost(6,9).In the United States, cognitive impairment becomes the largest contributor of inpatients by 40%(10).While in the UK, 800.000-900.000 people with dementia are estimated to cost 22-23 billion annually, and dementia maintenance costs in 2060 in Australia that expected to swallow the entire health budget(11).

Cognitive function is one factor that affects independence, quality of life(12,13)and survival in elderly(9).The poor cognitive function is also a predictor of death and as a marker of general health status in the elderly1.Management of cognitive impairment is best performed as early as prevention or maintaining cognitive function(14), thereby improving quality of life, prolonging self-reliance and reducing economic and social burdens.

Nonpharmacological management is important, especially for the elderly population at greatest risk of side effects from polypharmacy(15).Reading is part of the cognitive activity and one of the non-pharmacological management to maximize cognitive function in the elderly(16).Reading the holy book of the Qur'an, was part of the cognitive activity, also part of the religious activity. One of the factors of active aging by the program of the World Health Organization (WHO). Active aging is the process of optimizing the opportunity to be healthy, participating and safe to improve the quality of life in elderly. The word 'active' is meant to remain actively participating in the social, economic, cultural, and spiritual/religious fields, not just the ability to become physically active as a workforce(17).This study was aimed to know the existence of a relation between frequency and duration of reading Al-Quran with cognitive function at elderly and expected to be used as one of the easiest and inexpensive ways to maintain cognitive function or slowing the decline in cognitive function in the elderly.

## II. METHODS

The type of research conducted was observational analytic and the design used was case-control. This design was chosen because it considered in accordance with the problems studied and the objectives to be achieved. The subjects of the study were elderly men and women of Islam aged 45-70 years who could read the Quran, could read and write, and were willing to participate the research, and Moca-Ina <26 test and lived in old age community of Gubeng Village and Airlangga, Surabaya. This research was conducted in June 2016 to June 2017 from literature to research report. The implementation of research conducted in January to May 2017.

Reading the Quran is a reading activity by opening the holy book of the Quran (*hijaiyah*) instead of *iqro* by seeing and issuing a voice regardless of the meaning or not, and not the act of memorizing the Quran. People who could read the Quran, frequency, and duration of reading determined based on the interview. In this study was assessed the activity of reading Al-Quran own.

The frequency of reading the Quran, the number of times study subjects read the Quran in 1 week were being observed. The frequency data will be presented in a categorical form that was rarely (<cut off point) and frequent ( $\geq$  cut off point). The duration of reading the Quran, how long the study subjects read the Quran (in minutes) for once read. Data duration will be presented in the form of categorical that was short (cut off point) and long ( $\geq$  cut off point). Confounding variables include age, education, diabetes mellitus, hypertension, hypercholesterolemia and smokers.

Cognitive function is the cognitive ability measured by using MoCA-Ina test which yields the measuring value. Interpretation of the test is if the score  $\geq 26 / 30 - 30/30$  points mean normal, and  $< 26$  points means any cognitive/abnormal disturbance. Points added 1 if the subject has a history of  $\leq 12$  years. Data cognitive function will be presented in the form of categorical cognitive abnormal and normal.

The research instrument used a patient data collection sheet. Examination of cognitive function was performed by using MoCA-Ina. Research procedure was all subjects included in the inclusion criteria and given an explanation of the purpose and usefulness of the study, then asked to participate in the study without coercion. At the end, If the subject has understood and agreed, then asked to sign a consent statement by following the research.

This study has received an ethical eligibility letter at the Research Ethics Committee of RSUD dr. Soetomo / FK Universitas Airlangga Surabaya. The data obtained from the data collection sheet that later being analyzed. The correlation between elderly frequent and rare, short and long of reading the Quran with cognitive function in the elderly was calculated and analyzed by appropriate statistical tests using SPSS 20.

### III. RESULTS

Demographic data include sex, age, education level, marital status, and occupation. (Table 1). Clinical data of study subjects include cognitive function, hypertension, diabetes mellitus, hypercholesterolemia, smoking, frequency, and duration of reading the Quran (Table 2). Out of 34 subjects with abnormal cognitive was 28 (48.3%) with age  $\geq 60$  years, and 6 (60%) by  $< 60$  years old. There was no significant correlation between age and cognitive function statistically ( $p = 0.493$ ) (Table 3).

In addition, out of 34 subjects with abnormal cognitive, there was 29 (52.7%) people with education level  $\leq 12$  years and 5 (38.5%) with education level  $> 12$  years. There was no significant relationship between educational level and cognitive function statistically ( $p = 0.355$ ) (Table 4). Then, out of 34 subjects with abnormal cognitive, there by 16 (43.2%) people with hypertension and 18 (58.1%) was not hypertensive. There was no significant correlation between hypertension and cognitive function statistically ( $p = 0.223$ ) (Table 5). However, out of 34 subjects with abnormal cognitive, there was 9 (47.4%) people with Diabetes Mellitus and 25 people (51%) with no DM. There was no significant association between DM and cognitive function statistically ( $p = 0.787$ ) (Table 6).

Then, out of 34 subjects with abnormal cognitive, there was 21 (51.2%) people with hypercholesterolemia and 13 (48.1%) with no hypercholesterolemia. There was no significant association between hypercholesterolemia and cognitive function statistically ( $p = 0.804$ ) (Table 7). Then, 34 subjects with abnormal cognitive, there were no smokers (0%) and 34 (50.7%) non-smokers. No analysis could be made of the correlation between smokers and cognitive function (Table 8). Addition, out of the 34 subjects whose cognitive abnormal, there was 27 (50.9%) people read the Quran with frequency  $< 12$  times/week (rare), and 7 (46.7%) people with frequency  $\geq 12$  times/week (frequent). There was no correlation between the frequency of reading the Quran and cognitive function with cut off

point 12 times/week ( $p = 0.770$ ) (Table 9). There was no correlation between reading frequency of the Quran and cognitive function, with the cut off point in each frequency.

Then, out of the 34 subjects whose cognitive abnormalities was 14 (40%) people read the Quran, with a duration of once times read <30 minutes (briefly) and 20 people (60.6%) who read Al-Quran, with a duration of once times reading  $\geq 30$  minutes (long). There was no correlation between the duration of reading the Quran with cognitive function with a 30 minute cut off point ( $p = 0.0890$ ) (Table 10). There was no relationship between the duration of reading the Quran with cognitive function, with a cut off point in each duration.

Based on 68 subjects, we obtained 27 subjects who read the Quran every day by using a 120-month cut-off point. There was 15 people with abnormal cognitive that consisting of 10 (62.5%) people reading the Quran daily from <120 months, and 5 people (45.5%) read the Quran every day since  $\geq 120$  months. There was no significant relationship between how long to read the Quran every day with statistical cognitive function. ( $p = 0.452$ ) (Table 11).

#### IV. DISCUSSION

The study showed there was no relationship between the frequency and duration of reading the Koran with cognitive function in old age. The intensity of cognitive activity is difficult to measure, varies between individuals, and between various activities(13).Based on the results of a review by Sajeev et al mentions that cognitive activity in old age has the opportunity to reduce the risk of DA and other dementias, but more data are needed much to confirm about the relationship between them, the optimal type of activity, duration, intensity, and time(18).The study also explained that there was no relationship between how long reading the Koran each day with cognitive function, however, the subject who read the Koran every day for a long time found a tendency to have abnormal cognitive with smaller proportions. Apart from that, the study studied can be used as a reference to confirm further understanding of the correlation of the frequency and duration of Al-Qur'an reading on the cognitive function of the elderly considering that little attention has been paid to the issue.

There was no significant association between confounding variables and cognitive function in elderly. Research subjects were mostly female (88.4%), aged  $\geq 60$  years (85.3%), educated  $\leq 12$  years (80.9%), married and spouse still alive (75%), working as housewives (61.7%). Along with the increasing of age then the cognitive function will decrease(19).Table 3 shows the relationship between age and cognitive function. Furthermore, education has a protective effect on memory function, crystallized intelligence and minimal effect on fluid cognition(20)Table 4 shows the relationship between education level and cognitive function. Thus Table 5 shows the relationship between hypertension and cognitive function. Uncontrolled hypertension causes a negative effect on independent cognitive functioning apart from the aging factor(21).Long-term blood pressure reductions improve cognitive functioning, especially the function of the executive despite the large cerebrovascular damage(22). A total of 24 (65%) people of 37 research subjects with hypertension had received antihypertensive therapy.Hencetable 6 also shows the relationship between diabetes mellitus and cognitive function. Earlier study mentioned that cognitive dysfunction in patients with diabetes mellitus was associated with poor sugar control(23). Patients who were not treated, compared to patients receiving treatment had a 2-point decrease in MMSE values within 2 years with a long duration of >5 years of illness(24). A total of 17 people (89.5%) of 19 subjects with Diabetes Mellitus have received treatment to control their blood sugar levels. Moreover, The result of data analysis showed there was no significant correlation between hypercholesterolemia with statistical cognitive function that is shown at table 7.

Increased total cholesterol, Low-density lipoprotein (LDL), Very Low-density lipoprotein (VLDL) and LDL/High-Density Lipoprotein (HDL) ratios were associated with impaired MMSE values. Cholesterol, especially LDL is the most significant risk factor, especially on the subject who also smoked, while in this study was not checked LDL levels(24). Other studies have shown that there was no evidence of an association between blood cholesterol and cognitive ability(25).

There was a negative effect of smoking on cognitive function that consistent with the results of the systematic review, which suggests that smoking causes poorer cognitive abilities in middle age to old age(25). From table 8 shows the relationship between smokers with cognitive function. There were no smokers in the group with abnormal cognitive function.

In this study used to cut off point on each frequency that exists. The result of statistical analysis did not get the relationship between the frequency with cognitive function by using cut off point at each frequency. Table 9 shows the relationship between the frequency of reading the Quran and the cognitive function using a cut-off point of 12 times/week. From the results of the analysis, there was no correlation between the frequency of reading the Quran with the cognitive function in a statistical manner . The results of this study were in accordance with research by Geda et al that there was no correlation between reading frequency (magazine and newspaper) with risk of mild cognitive impairment(26),

However, there are several differences with the aforementioned study. In research conducted by Geda that involving subjects of research aged 70-89 years and measured the activity of reading books in 1 month(26), while in this study age of research subjects 45-70 years and measured the activity of reading the Quran in 1 week. In addition, the tool used to measure cognitive function in this study was the MoCA-Ina test that more sensitive in detecting the presence of cognitive dysfunction while the previous study was by using the Mini-Mental State Examination(MMSE)(27). In the study by Verghese et al, the older study subjects of age 75-85 years and the assessed output was dementia(28), whereas in this study the age of subjects 45-70 years with abnormal or normal cognitive output. The cause of no correlation between the frequency of reading the Quran with cognitive functioning possibility due to high subjectivity of the research subject, the small sample size ( $\beta$  error = 94% at cut off point 12 times/week), the researcher did not prove whether the subject research could indeed read the Quran and with the frequencies mentioned by the research subjects.

Research subjects who read the Quran more frequently ( $\geq 12$  times/week and  $\geq 14$  times/week) showed a tendency to have abnormal cognitive function with a smaller proportion of 46.7% and 42.9%. By using the cut-off point on each duration of reading the Quran, there was no relationship between the duration of reading the Quran and cognitive function. Table 10 shows the relationship between the duration of reading the Quran and the cognitive function using a 30-minute cut-off point. The results of this study were in accordance with research by Wang et al but in contrast to some of the following studies(16,29). Research with reading and writing for 3 months, 3 times/week, and 30 minutes/session improves memory function in subjects with MCI age 50-70 years. A 15-minute study of reading the Quran improved memory function. The cause of no significant relationship between the duration of reading the Quran and cognitive function could be due to the high subjectivity of the research subjects, small sample size ( $\beta$  error = 60% at the cut-off point 30 minutes). Furthermore, from the data on subjects who read the Quran every day since long time ago has obtained the tendency to have abnormal cognitive with a smaller proportion

Based on the literature it was obtained that individuals who had higher levels of cognitive activity over a lifetime (as measured by Lifetime of Experiences Questionnaire (LEQ) had smaller hippocampal atrophy of 3.6% for 3 years, whereas individuals with lower cognitive activity levels experienced hippocampal atrophy 8.3% for 3 years ( $p = 0.042$ )<sup>32</sup>. Individuals who more often perform cognitive activities throughout their lives was correlating with slower cognitive decline<sup>(30)</sup>. Overall, the study is contributed in extending the literature about cognitive function in elderly. However, the study has several limitations<sup>1)</sup> Researchers did not prove whether the research subjects really could read the Koran and with the frequency and duration mentioned by the research subjects; <sup>(2)</sup> This research does not analyze other cognitive activities (writing, playing puzzles, gardening, cooking, sewing, knitting, etc.), physical activity, social involvement, which can affect cognitive function; <sup>(3)</sup> This research does not analyze other confounding factors such as socioeconomic status/ <sup>(4)</sup> small sample size.

## V. CONCLUSION

The study found that there was no correlation between the frequency and duration of reading the Quran with cognitive function in the elderly. Confounding variables studied also show a non-significant relationship on the functioning of the elderly cognitive. Further research needs to be done using this type of interventional or observational research with a cohort study design and paying more attention to other confounding factors not analyzed in this study, or by using more objective measurement tools (standardized questionnaires, diaries, or time-keeping devices) and enlarge the sample.

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## TABLES

Table 1: Demographic data of research subjects

Variable	Amount	Percentase (%)
Sex		
Male	8	11.76
Female	60	88.24
Age		
<60 y/o	10	14.7
≥60 y/o	58	85.3
Education Level		

≤12 year	55	80.9
>12 year	13	19.1
<b>Job</b>		
Housewife	42	61.7
Pension	17	25
Self-managed	8	11.8
Unemploye	1	1.5
<b>Marriage Status</b>		
Married, and the parther still alive	51	75
Widow/Widower	16	23.5
Un-married	1	1.5

Table 2: Clinical Data of Subject Research

Variable	Amount	Percentase (%)
<b>Cognitive</b>		
Abnormal	34	50
Normal	34	50
<b>Hypertension</b>		
Yes	37	54.4
No	31	45.6
<b>Diabetes Melitus</b>		
Yes	19	27.9
No	49	72.1
<b>Hypercholesterolemia</b>		
Yes	41	60.3
No	27	39.7
<b>Smoker</b>		
Yes	1	1.5
No	67	98.5
<b>Frequency of reading the Quran in a week</b>		
< 12 times	53	77.9
≥ 12 times	15	22.1
<b>The duration of reading the Quran in 1 time reading</b>		
< 30 menit	35	51.5

$\geq 30$ menit	33	48.5
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Table 3: Correlation between age and cognitive function

Age	Cognitive		Total	P	RO (CI95%)
	Abnormal	Normal			
$\geq 60$			58		
<60	28 (48.3%)	30 (51.7%)	(100%)	0.493	0.622 (0.159-2.439)
	6 (60%)	4 (40%)	11 (100%)		
Total	34	34	68		

Table 4: Correlation between education level and cognitive function

Education Level	Cognitive		Total	P	RO (CI95%)
	Abnormal	Normal			
$\leq 12$ year			55		
> 12 year	29 (52.7%)	26 (47.3%)	(100%)	0.355	1.785 (0.518-6.145)
	5 (38.5%)	8 (61.5%)	13 (100%)		
Total	34	34	68		

Table 5: Correlation between Hypertension and Cognitive Function

Hypertension	Cognitive		Total	P	RO (CI95%)
	Abnormal	Normal			
Yes			37		
No	16(43.2%)	21(56.8%)	(100%)	0.223	0.550 (0.210-1.445)
	18(58.1%)	13(41.9%)	31 (100%)		
Total	34	34	68		

Table 6: Correlation between Diabetes Mellitus and Cognitive Function

DM	Cognitive		Total	P	RO (CI95%)
	Abnormal	Normal			
Yes	9 (47.4%)	10 (52.6%)	19(100%)	0.787	0.864 (0.299-2.495)
No	25 (51%)	24 (49%)	49(100%)		
Total	34	34	68		

Table 7: Correlation between Hypercholesterolemia and Cognitive Function

Hypercholesterolemi a	Cognitive		Total	P	RO(CI95%)
	Abnormal	Normal			
Yes		20			
No	21 (51.2%)	48.8%)	41 (100%)	0.8	1.131
	13 (48.1%)	14 (51.9%)	27 (100%)	04	(0.428-2.989)
Total	34	34	68		

Table 8: Correlation between Smoker and Cognitive Function

Smoker	Cognitive		Total	P	RO (CI95%)
	Abnormal	Normal			
Yes	0 (0%)	1(100%)	1(100%)		
No	34 (50.7%)	33(49.3%)	67(100%)		
Total	34	34	68		

Table 9: Correlation between Frequency of reading the Quran and Cognitive Function

Frequency	Cognitive		Total	P	RO (CI95%)
	Abnormal	Normal			
<12 x	27(50.9%)	26(49.1)	53(100%)	0.770	1.187
≥12 x	7(46.7%)	8(53.3)	15(100%)		(0.376-3.742)
Total	34	34	68		

Table 10: Correlation between Reading the Quran Duration and Cognitive Function

Duration(minut e)	Cognitive		Total	P	RO (CI95%)
	Abnormal	Normal			
<30	14 (40%)	21(60%)	35(100%)	0.089	0.433
≥30	20 (60.6%)	13(39.4%)	33(100%)		(0.164-1.145)
Total	34	34	68		

Table 11: Correlation between how long Read the Quran daily and Cognitive Function

How long has it been to read the Quran daily? (month)	Cognitive		Total	P	RO (CI5%)
	Abnormal	Normal			
<120 month	10 (62.5%)	6(37.5%)	16(100%)	0.452	2
≥120 month	5 (45.5%)	6(54.5%)	11(100%)		(0.420-9.516)
Total	15	12	27		