

Quran memorization and early childhood development: a case-control with neuroscience approach



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ABSTRACT

Background: Early childhood is the crucial period in forming children's learning modalities. Various innovations are carried out to optimize early childhood development. Studies on the early childhood development in the *tahfidz* program school in Indonesia are still few and limited. This study investigates the relationship between Quran memorization and early childhood development in six aspects: religious and moral values, physical-motoric, social-emotional, cognitive, linguistic, and art.

Method: A total of 316 kindergarten children between the age of 60 to 84 months were involved in the study. The study consists of Group A (n = 155) with memorization of 0 up to 20 chapters, and Group B (n = 161) with minimum memorization was 21 up to 37 chapters. Data of Quran memorization and development aspects were obtained from the classroom teachers. The development aspects indicators including developed very well, developed as expected, starting to develop, and undeveloped. It was then converted and processed in the form of a rating scale. The analysis was carried out using the Mann-Whitney test. Group A showed better development outcomes in the mean ranks of each aspect than Group B.

Result: Group A's early childhood development achievements were better than Group B. The childhood development comparison aspects between the two study groups showed religious and moral values (p=0.001), physical-motoric (p=0.001), social-emotional (p=0.001), cognitive (p=0.002), linguistic (p=0.045), and art (p=0.001). Meanwhile, there was no significant difference in comparing cognitive and linguistic aspects between boys and girls in each group (p>0.05).

Conclusion: The study implication was focused on brain workload management strategies based on the neuroscience approach. Appropriate learning support and strategy are required for children with more Quran memorization to prevent disproportionate childhood development.

Keywords: childhood, development, education, neuroscience, Quran.

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INTRODUCTION

The high public interest in early childhood education has encouraged the rapid growth of early childhood schools in Indonesia. Statistical data on Indonesia's early childhood education in 2017/2018 showed the number of private schools is 87,726 (96.31%) while the remaining 3,363 (3.69%) are public schools. Central Java, which has 14,116 schools, is the second-highest number of early childhood schools in Indonesia after Yogyakarta. Parents' interest in the *tahfidz* (Quran memorization) program is motivated by the desire to have noble personalities, good cognitive abilities, and high achievement outcomes.¹

Early childhood is identified as a period that influences the learning development of a human during his life.² Learning stimulation given to early childhood forms the networks of children's brains that function as a learning force throughout their lives. Hence, memorizing the Quran must be adjusted to each child's abilities to achieve the child's development in other life and learning aspects.

A previous study on Quran memorization in early childhood showed the memory increased after listening to the reading of the Quran for 15 minutes.³ However, if memorization is designed as a mandatory target for children, it potentially causes uncomfortable experiences that will

affect their development. Stress in children predisposes individuals toward stressful events that affect adulthood's physical and mental disorders.⁴ The incidence of adverse childhood experiences originating from unpleasant experiences during childhood influences children's success at higher education levels.⁵

The study on the learning capacity to memorize Quran becomes a concern to optimize children's overall development. Hence, this study aims to determine the relationship between the Quran memorization and early childhood development through the neuroscience approach.

METHOD

The participants of this case-control study included 316 children ($n_{\text{girls}}=171$, $n_{\text{boys}}=145$) based on Epi Info™ Calculation for windows with a 95% confidence level. They were selected from six randomly selected early childhood schools in Surakarta. The age range criteria are 60 to 84 months. Other baseline demographic data were not analyzed in this study. Without considering the sex aspect, the children were grouped randomly based on their memorization ability of 30th juz (this juz consisting of 37 Quran chapters). Group A ($n = 155$) with the amount of 0-20 chapters memorization and group B ($n = 161$) with the amount of 21 up to 37 (entire 30th juz) chapters memorization. The collecting data period was September-November 2021. The data collection and assessment were performed by fifteen class teachers trained to carry out children's development assessments. Data on children's development were obtained by reviewing each child's progress report and face-to-face focus group discussions with each class teacher. The children's development achievement was adapted from the Early Childhood Education Assessment.

The achievements were assessed into four criteria: developed very well, developed as expected, starting to develop, and undeveloped. These achievements criteria were then converted into a rating scale: the conclusion of the development is developed very well or as expected without undeveloped indicators (score = 5), with one undeveloped indicator (score = 4), with two undeveloped indicators (score = 3), with three undeveloped indicators (score = 2), with four or more undeveloped indicators (score = 1), and the conclusion of the development is undeveloped or starting to develop (score = 0). Furthermore, in each group, an analysis of cognitive and linguistic aspects between boys and girls was also conducted to show the children's fundamental abilities related to the memorization process. Intergroup data were analyzed using IBM SPSS Statistics 24. The analysis was performed with a non-parametric Mann-Whitney test. The p -value <0.05 was statistically significant.

Table 1. The baseline characteristics of the study population.

Baseline data	Value
Sex	
Male	145 (45.88 %)
Female	171 (54.12 %)
Age (months)	
60-69	93 (29.43 %)
70-79	122 (38.60 %)
80-84	101 (31.97 %)
The 30 th juz Quran memorization	
0-20 chapters	155 (49.05 %)
37 chapters	161 (50.95 %)

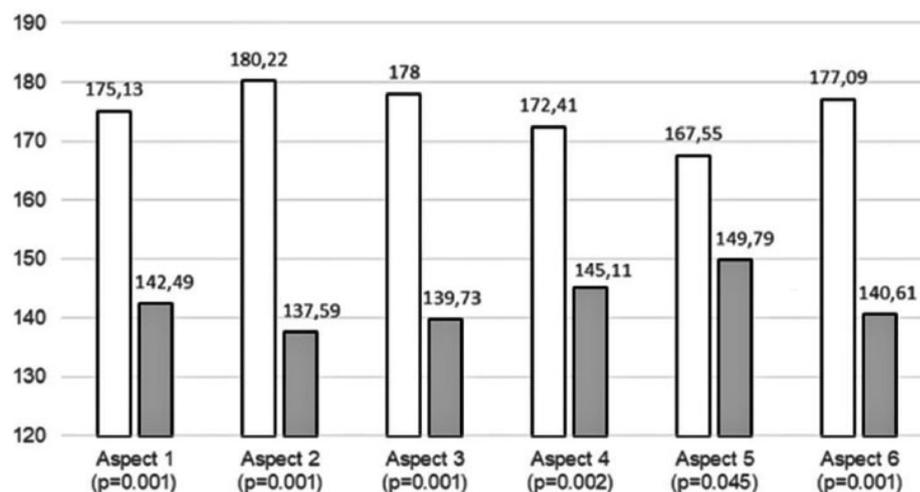


Figure 1. Mean score comparison of each aspect of development. Note: White bars = Group A ($n = 155$), children with 0-20 chapters memorization; Black bars = Group B ($n = 161$), children with 21-37 chapters memorization; Aspect 1, Religious and moral value; Aspect 2, Physical-motoric; Aspect 3, Social-emotional; Aspect 4, Cognitive; Aspect 5, Linguistics; Aspect 6, Art.

Table 2. Comparison of cognitive and linguistic aspects between boys and girls in each group.

Memorization of the 30 th Juz	Sex	N	Cognitive	Linguistic
0-20 chapters	Boys	84	72.92	73.36
	Girls	71	84.01	83.49
	p-value*		0.064	0.096
21-37 chapters	Boys	87	77.16	80.96
	Girls	74	85.51	81.05
	p-value		0.200	0.989

*Mann-Whitney Test

RESULTS

The participant's baseline study data were shown in Table 1. Early childhood development aspects include religious and moral values, physical-motoric, social-

emotional, cognitive, linguistic, and art. The results showed that Group A's early childhood development achievements were better than Group B in all six aspects mentioned above. The comparison of all six aspects between the two study groups

was significantly different ($p < 0.05$) (Figure 1).

Boys and girls have different aspects directly related to initial memorization ability: cognitive and linguistic skills. Further testing was conducted to compare the cognitive and linguistic skills aspect (Table 2). The result shows no significant difference ($p > 0.05$) in boys' and girls' cognitive and linguistic abilities in each group.

DISCUSSION

Learning Activities in Quran Memorization

The optimization of development aspects in early childhood must prioritize playing activities full of exploration, challenging, and fun, not restricting children.⁶ Quran memorization activities with a pattern of giving mandatory targets can interfere with optimal early childhood development. Therefore, the Quran memorization task must also consider volunteerism and convenience for children.

A study showed that children preferred to perform the active-playing method while memorizing the Quran rather than memorizing in a long sitting position state.⁷ Therefore, Quran memorization for early childhood should be designed in fun activities like Tami Otaka Method.⁸ This method is designed to bring a sense of pleasure, eliminate boredom, and improve 30th juz chapters memorization. Those conditions undoubtedly will promote children's engagement in the learning process.

Maslow's hierarchy proposed that people are motivated by five levels: physiological needs, safety needs, belonging needs, esteem needs, and self-actualization needs.⁹ While several reports have reviewed the hierarchy in some fields, it is still challenging to implement it in childhood education. Every child has a basic need that should be fulfilled before learning to occur. That essential need is motivation, an environmental-mediated dynamic process of inner urges and necessity which stimulates external behavior to fulfill a task or mission.¹⁰

Students will need the second level of Maslow's hierarchy in the early childhood education process once the first physiological needs are met. Maslow's

hierarchy helps teachers to consider students' needs levels as they enter the classroom. Considering whether the students seem upset, sleep deprived, hyperactive, or else, Maslow's hierarchy helps teachers adjust and deal with the students' current state.¹¹

Several aspects are known as influential factors that affect children's social and emotional skills, such as external and internal factors such as children's temperament and developmental characteristics.¹² The Quran is written using Arabic words. Hence, children with a family and environmental background that are not Arabic need humanistic approaches to emphasize guidance education and develop students' potency in cognitive, affective, and psychomotor. Those approaches should be based on concepts that basic need levels are met as in Maslow's hierarchy.¹³

Early Childhood Brain Development

Since six years old of childhood, childhood gray matter development precedes the peak in total brain volume, and the brain reaches 95 percent of adult brain volume.¹⁴ The volume of the white matter then increases to its peak in adulthood. The increase in white matter volume is in line with the increase in language's cognitive abilities.¹⁵ The brain's cortical thickness reaches its maximum peak at the age of 8 years, with the peak amount of gray matter first occurs in the primary somatosensory area, followed by the association and other brain areas.¹⁶ Therefore, the age of 5 to 7 is a critical period for optimizing early childhood development, which determines the development of religious and moral values, physical-motoric, social-emotional, cognitive, linguistic, and art in the upcoming years.

There are differences in brain structure maturation pace between males and females. Cerebral white matter is a collection of axonal structures that also play a role in connecting Brodmann areas. During childhood, this structure undergoes maturation and structural growth at a faster pace for females than males.¹⁷ This may explain the difference in Table 2, although it is statistically insignificantly different ($p > 0.05$).

Learning Workload and Early Childhood Development

Two factors play a significant role in children's brain capacity and readiness to receive sensory information and memorize the information, including information content (verbal or spatial) and the amount of information.¹⁸ From the childhood learning experience, these two factors functionally train the individual's ability of working-memory.¹⁹

Information content on working memory consists of verbal and spatial content that dominates the left and right hemisphere neuronal activation.¹⁴ The chronic exposure of increased working memory due to a long-term high amount of information load can cause undesirable responses and disproportionate growth error. However, if a high amount of information load can be adapted and optimized correctly by an appropriate learning method, it will lead a person to optimal cognitive function maturation.

Humans learn formally and informally to form simple behaviors, such as making complex movements. Successful learning processes cause changes in the brain and are reflected as appropriate behavior based on relevant memories.²⁰ The mechanism is unknown, but it is suspected through several external sensory stimuli into the brain. Furthermore, those stimuli will be stored as memory and encourage humans to voluntarily start the learning process, such as brainstorming or discovering new experiences.²¹

Studies over the past two decades showed that stress hormones and neurotransmitters released during and after stressful events are the central modulators of memory formation.²² Stress in learning can increase the formation of unpleasant memory and interfere the memory retrieval. Stress can also inhibit new memory formation and reduce cognitive flexibility (ways of thinking become rigid).²² It can cause some learning difficulties and inhibit memory formation if it occurs during the classroom's learning process.²³ Therefore, learning processes in the school must be designed with specific pressures that can form learning resilience and help the learning process optimally.

Study Limitation

The limitations of this study were the lack of analyzed baseline characteristics data and the participant's readiness and steadiness during the assessment session. Furthermore, they can lead to bias in the study results.

CONCLUSION

Children with more memorization of the Quran need additional appropriate learning support and method to avoid excessive growth in their development aspects. The support can be providing interactive media, methods, situations, and an enjoyable learning environment. Every early childhood education institution that implements the *tahfidz* program is encouraged to provide Quran memorization through play-based activities.

DISCLOSURE

Conflict of Interest

The authors declare there is no conflict of interest regarding the publication of this article.

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Ethical Consideration

This research is ethically approved by the Health Research Ethics Committee of Universitas Sebelas Maret No.091/UN27.06.6.1/KEPK/EC/2020.

Author Contribution

All co-authors have given consent to the submission of this manuscript. All authors contributed equally to this manuscript. All authors read and approved the final manuscript.

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