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Reading Holy Quran to Improve Episodic Memory in Elderly

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Abstract

Aging is a normal biological process accompanied with physical and cognitive declines as a natural consequence. One of the first affected cognitive functions by aging is the episodic memory. Episodic memory declines with age. As a result, a decline in memory function can affect an elderly person's quality of life. The brain plasticity is required for memory formation. According to the neuroplasticity theory, a cognitive training may benefit the brain by stimulating the formation of new neural pathways and maintaining existing ones. As a result, researchers want to see how reading the Holy Quran affects elderly episodic memory.

Aims: This study aimed to discover the effect of reading the Holy Quran on episodic memory within a controlled program to promote the wellness of the elderly.

Methodology: A quasi-experimental design with a pre-test-post-test control group was used in this study. The subjects were elderly (> 60 years old) at Triyola Clinic, Surakarta, Central Java. The control group (CG) did not receive treatment, whilst the intervention group (HQ) read the Quran in 30 minutes daily. The episodic memory assessed using an immediate and delayed word list recall test. The Paired T-test and Independent Sample T-test were used to analyse the data.

Results: There were 22 elderly participants in total, 9 males and 13 females, all of them had a normal Mini-Mental State Examination (MMSE) score greater than 24. Both groups got increased scores for the word-list recall test. No significant improvement in CG. However, there was an improvement in the HQ group, represented by a significantly higher score after the treatment.

Scientific Novelty: Elderly people's episodic memory enhanced with the Holy Quranic reading habit.

Conclusion: The two-week reading routine of the Holy Quran improved the episodic memory in the elderly.

Keywords: Reading; Holy Qur'an; Episodic Memory; Neuroplasticity; Elderly

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Introduction

Ageing is a natural occurrence and stage of life, which everyone needs to pass through at their own pace and time. It is a natural biological process that leads to physical and cognitive decline [1]. In 2019, 703 million people globally were above 65 years old. Indonesia is slowly moving toward an ageing society [2]. According to Susenas 2019, the population of individuals aged of 60 years and above has reached 25.7 million, or approximately 9.6 per cent of the total population [3].

Furthermore, the population of elderly individuals is expected to reach around 10% in 2020 and 20% by 2040 [4]. The ageing population poses health risks, including a rise in the prevalence of disease and disability, most notably cognitive dysfunctions. Particularly, the cognitive impairment decreased the life quality in both standard and pathological ageing [1]. Furthermore, it significantly increases the risk of dementia and death among elderly individuals. Additionally, people suffering from this disorder have more significant difficulties with memory, learning, and concentrating on a task [5].

Episodic memory is one of the first cognitive functions affected by the ageing [6]. It significantly degrades with age, and longitudinal studies typically demonstrate declines from the age of 60 [7]. Furthermore, the episodic memory is the ability to subjectively capture and recall experienced episodes (what) associated with a particular spatial (where) and temporal (when) context [8]. Neurobiologically, memory formation is primarily determined by the function of the hippocampus and its connections to other brain areas [9]. The hippocampus is a limbic system structure located deep within the brain's medial temporal lobe. Its principal roles are consolidating declarative (episodic) memories, facilitating the context-dependent spatial learning, and regulating emotional states. In addition, anatomical and functional integrity of the hippocampus is necessary for appropriate learning and memory consolidation. Therefore, this structure is prone to degradation during ageing [1].

As a result, a decrease in older adults' memory function also affects their life quality [10]. The brain plasticity, or the ability of brain cells to change their structure, is necessary for the memory formation [9]. According to the neuroplasticity theory, the cognitive activity helps the brain by stimulating the construction and maintenance of new and existing neural pathways, thereby accumulating a brain reserve against future decrease [11].

There are many cognitive activities, including cooking, making handicrafts playing chess, puzzle, Sudoku or games that sharpen the brain [12,13]. Moreover, several activities involved in the brain's work Johansson et al. (2015), such as reading newspapers, magazines, books, and the Holy Quran [14].

Reading the Holy Quran provides many benefits, including reducing stress and pain and treating mental disorders [15–17]. In addition, this activity is useful as a healing and treatment method. The therapeutic ability of the Holy Quran is widely held among Muslim patients [18], and interestingly, Muslim is the major religion of the Indonesian elderly.

Reading activities contribute to the developmental theory of neuroplasticity. It also affects the episodic memory by activating specific brain areas in the frontal lobe. For instance, the prefrontal cortex, typically associated with supervising working memory, is also crucial for episodic memory. Meanwhile, both systems stimulate the left dorsolateral parts of the brain, particularly the mediotemporal lobe [19]. Additionally, an observational study of the duration and frequency of reading the Holy Quran states that daily reading of the Holy Quran, lasting for at least 15 minutes, is effective at preserving cognitive function and lowering the incidence of dementia [20].

Based on the studies, it appears that older adults maintain adequate cognitive function as long as they engage in regular activities. This study is the basis for developing a cognitive training intervention that includes the elders reading the Quran. Accordingly, it is necessary to investigate the impact of Holy Quran reading activity on episodic memory function in the elderly.

Research Problem

Based on the studies, it appears that older adults maintain adequate cognitive function as long as they engage in regular activities. This study is the basis for developing a cognitive training intervention that includes the elders reading the Quran.

Research Focus

The study involved elderly individuals residing in Central Java, Indonesia, who are enrolled in a wellness promotion program. This population was chosen due to its relevance to the local context and the significance of promoting cognitive health in aging populations.

Research Aim and Research Questions

This study aimed to discover the effect of reading the Holy Quran on episodic memory within a controlled program to promote the wellness of the elderly. Is there a difference in the episodic memory of elderly people who regularly read the Quran and those who don't?

Research Methodology

General Background

This experimental study was conducted in 2021 in the Triyola Clinic, Surakarta, Central Java. The respondents were informed of all experiments and voluntarily declared their participation. Therefore, the informed consent was obtained from all individual participants involved in the study.

Sample / Participants / Group

The inclusion criteria for the respondent were: the patient needed to be 60 years at minimum, capable of reading the Holy Quran for the treated group, and a Muslim. In addition, all respondents were tested by a Mini-Mental State Examination (MMSE) with a score greater than 24. The Mini-Mental State Examination (MMSE) was a widely used psychometric screening tool for determining the level of cognitive function. It was intended for use in a clinical setting in order to evaluate the course and severity of dementia. Furthermore, the MMSE considered several cognitive abilities, including memory, attention, and language [21]. The exclusion criteria, which were a must for all respondents, included psychiatric problems, head trauma, hearing loss, neurological disorder, excessive alcohol intake, hypertension, and diabetes.

A total of 22 individuals met the requirements and were divided into the control group (CG) and the treated/intervention group (HQ). The first was the control group (CG), composed of ten individuals, while the second group read the Holy Quran (HQ) for 30 minutes every day for two weeks and consisted of twelve individuals.

Twelve respondents in the HQ group participated in the program conducted by the researcher. This program aimed to promote wellness in older patients. This program lost for two weeks. The elderly was asked to read the Quran for 30 minutes daily in this program. Reading the Quran for 30 minutes did not have to be completed at one time; it could be divided into several times, for example, in the morning after dawn for 15 minutes and the remaining 15 minutes at night after the Maghrib prayer. In addition, researchers monitored the group every day through social media in the form of WhatsApp.

Instrument and Procedures

The measuring instrument used to assess the episodic memory function was the immediate and delayed word list recall test which consisted of 10 words. Afterwards, the subject was asked to recall any words that were remembered as much as possible for one minute, with no requirement that the words be mentioned in the order in which they were readout. First, the words were read to the subject at one word every three seconds. Subsequently, the subject was asked to recall any words remembered in the order in which they were mentioned. Finally, after twenty minutes, the participants were asked to recall for one minute which words they remembered from the list that had been read to them earlier [22]. Each correctly mentioned word is worth 1. However, when the respondent misses the word, it was given a value of 0; hence, the maximum value of this test was 10, and the minimum value was 0 for each immediate and delayed test. The list of 10 words was bulan, kebun, petani, hidung, kopi, sendok, sungai, kursi, rumah, dan gelas, which meant moon, garden, farmer, nose, coffee, spoon, river, chair, house, and glass, respectively [22–24].

Data was collected using instruments like the Immediate and Delayed Word List Recall Test. Furthermore, the examinations were conducted in the clinic before and two weeks after the therapy in the control and treatment groups, respectively. A detailed explanation of the steps for data collection can be seen in Figure 1.

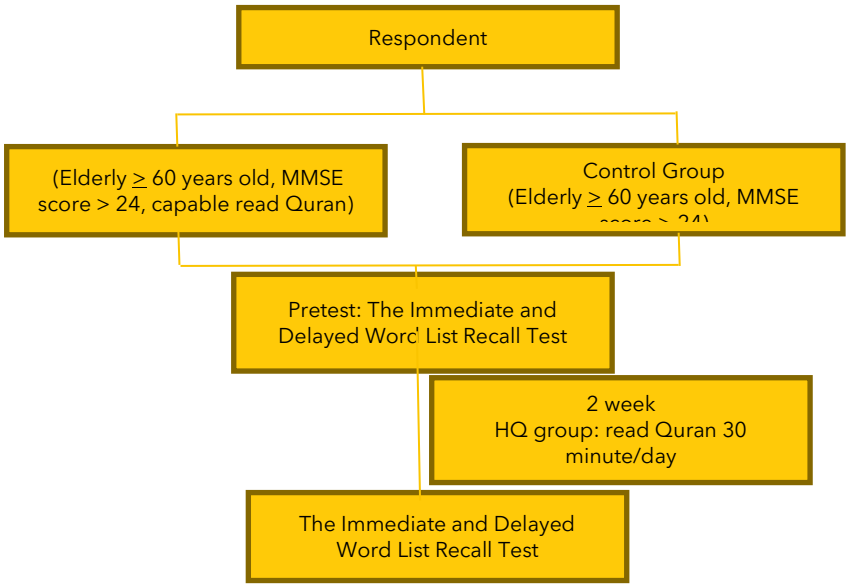

Figure 1. Data collection steps

Data Analysis

The Paired T-test was then used in order to determine the difference in mean scores between one group's pre- and post-intervention scores. At the same time, the independent T-test was used to compare pre-and post-intervention score averages between groups. IBM SPSS Statistics 25 for Windows was used to examine the data. Therefore, when p was less than 0.05, it was considered significant.

Research Results

The elderly individuals involved in this study ranged from 60-77 years. Table 1 shows the summarised detail of the participants demographic characteristics. Figure 1 and 2 shows the statistical analysis of episodic memory score after a two-week reading activity intervention with 22 study subjects.

Table 1. The Participant Demographics Characteristics'

Characteristic	Groups	
	CG	HQ
Total Participant	10	12
Age		
60-64	5	4
65-69	2	8
70-74	2	0
75-77	1	0
Gender		
Male	7	2

Female	3	10
MMSE Score		
24	1	1
25	1	1
26	2	-
27	3	5
28	1	1
29	2	4

The average pre-test episodic memory scores for the control and intervention groups did not substantially differ. Furthermore, the groups improved their post-test scores relative to pre-test scores. However, the average post-test episodic memory of the intervention group was more significant than the control group.

This study's statistical tests were the parametric test, paired sample t-test, and independent-sample t-test. IBM SPSS Statistics 25 for Windows was used for conducting the statistical tests. Furthermore, the normality test was initially performed as a pre-parametric test assumption. As a result, the normality test results are significant ($p>0.05$) for each group, implying that the data are typically distributed. Additionally, the homogeneity test on all score data at each step produces significant results ($p>0.05$), indicating that the data variance is homogeneous.

The paired T-test is the first parametric test to compare each group's pre- and post-intervention episodic memory scores. Figure 2 shows the results of the paired T-test.

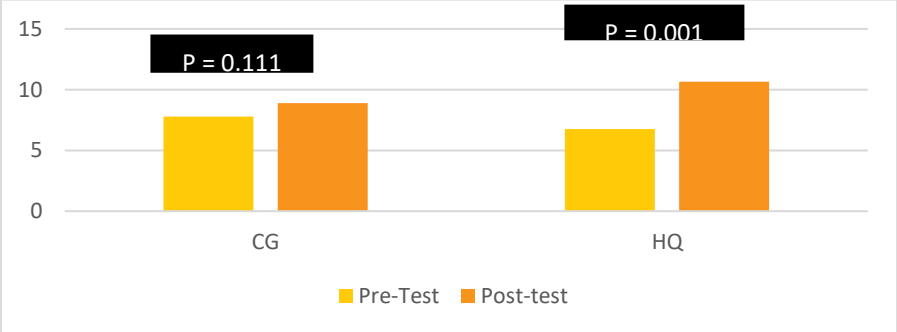

Figure 2. Episodic memory scores of the participants before and after intervention with a p-value of Paired sample T-test

Figure 2, shows the results of the paired t-test to be $p>0.05$ in the Control Group ($p = 0{,}111$) and $p<0.05$ in the Holy Qur'an Group ($p = 0{,}001$). In this study, $p<0.05$ was obtained for the intervention group. These results showed a significant mean difference solely between the pre-test and post-test scores of the intervention group.

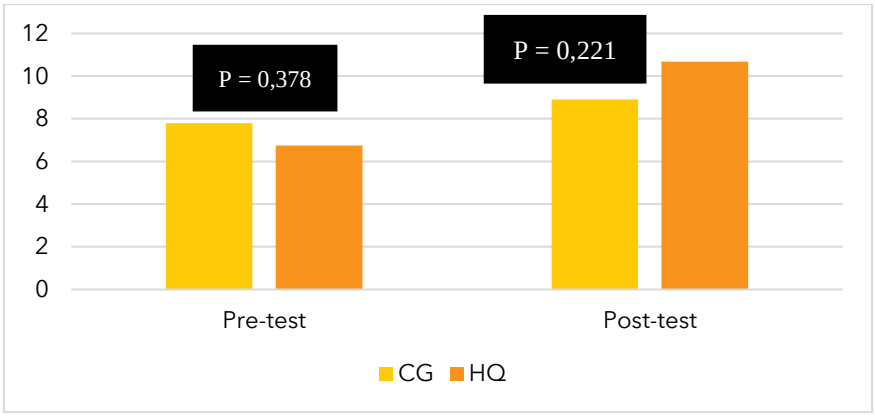

Figure 3. Episodic memory scores of the participants before and after intervention with a p-value of independent sample T-test

The independent sample t-test is the second test used to determine the difference in scores between the groups. Figure 3 summarises the Independent Sample T-test. In this study, the result was $p>0.05$ for the pre-intervention ($p = 0.378$) and post-intervention ($p = 0.221$). These results imply no significant difference in post-test or postintervention scores between the CG (Control Group) and HQ (Holy Qur'an).

Discussion

Episodic memory is defined as a system that includes memories and experiences that make up a person's historical record. Encoding, storing, and retrieving information while maintaining its spatiotemporal context is its main job; this is an essential step in making information retrieval easier [25][26].

This study shows a significant mean difference between the pre-test and post-test of HQ group. These were supported by the previous observational study, which stated that the elderly individuals that participated in the routine cognitive activity had higher cognitive function scores [12]. Regular reading is one example of cognitive activity. According to a previous study, Afifah et al (2021), it was discovered that elderly participants improved their episodic memory scores following cognitive training such as reading [27]. Additionally, it implies that the frequent reading is associated with a long-lasting cognitive performance across the adult lifespan and protects against late-life cognitive decline [19].

Reading activities promote maturation and strengthen interneuron connections through neuroplasticity, which increases cognitive function [28][14]. When a sentence is read, a situation model is constructed using information from verbal long-term memory to process and integrate incoming sentence information, including episodic and semantic verbal memory. However, most theories assume semantic rather than episodic memory [29].

This statement about reading activities enhancing cognitive function is also supported by an observational study showing the effectiveness of daily Holy Quran reading activities lasting at least 15 minutes in maintaining cognitive function [20]. According to another experimental study, reading the Holy Quran significantly increased activity in the left prefrontal, right prefrontal, and right parietal areas. The results showed that there are thinking activities that involve emotions as mental representations when reading the Holy Quran, and there are religious activities [30]. A study found that reading and writing the Quran for three months improved memory function in subjects with mild cognitive impairment [31]. Another study on high school students found that memorising the Quran enhanced short-term memory recall performance [32]. Additionally, scripture memorisation, including memorising the Quran, has been associated with reduced brain atrophy [33].

The results of this study showed that reading the Holy Quran, as an application of the neuroplasticity theory, has a positive effect on improving cognitive function, particularly the episodic memory, in adults [20,30]. The Quran has been found to have various positive effects on cognitive function and mental health in the elderly. Reading the Quran has been shown to have a significant impact on cognitive function in the elderly [34]. It has also been found that reading the Quran can improve verbal fluency in the elderly [35]. Additionally, listening to the recitation of the Quran has been found to reduce anxiety [36] and improve the quality of sleep in the elderly [37]. Moreover, a systematic review has shown that listening to, reciting, or memorising the Quran can have positive effects on the physical and mental health of Muslims [38].

Limitations

This study has several limitations. First, the number of populations and samples used to examine the effect of reading the Holy Quran on episodic memory remains small, resulting in statistical bias. Second, there were no distinctions between subjects based on sociodemographic characteristics, such as gender or educational history. Third, since this was conducted in a short period, a follow-up study needs to be established over a more extended period to further learn about the effect of an intervention.

Conclusions and Implications

It was concluded that a two-week, 30-minute daily reading of the Holy Quran improved the episodic memory in the elderly. Therefore, the elderly need to read the Quran regularly, at least 30 minutes every day. This routine helps maintain the cognitive function of the elderly to promote wellness in elderly people.

Declarations

Author contributions

All authors have sufficiently contributed to the study and agreed with the results and conclusions.

Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

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Conflicts of Interest

The author declares that there is no conflict of interests regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely observed by the authors.

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