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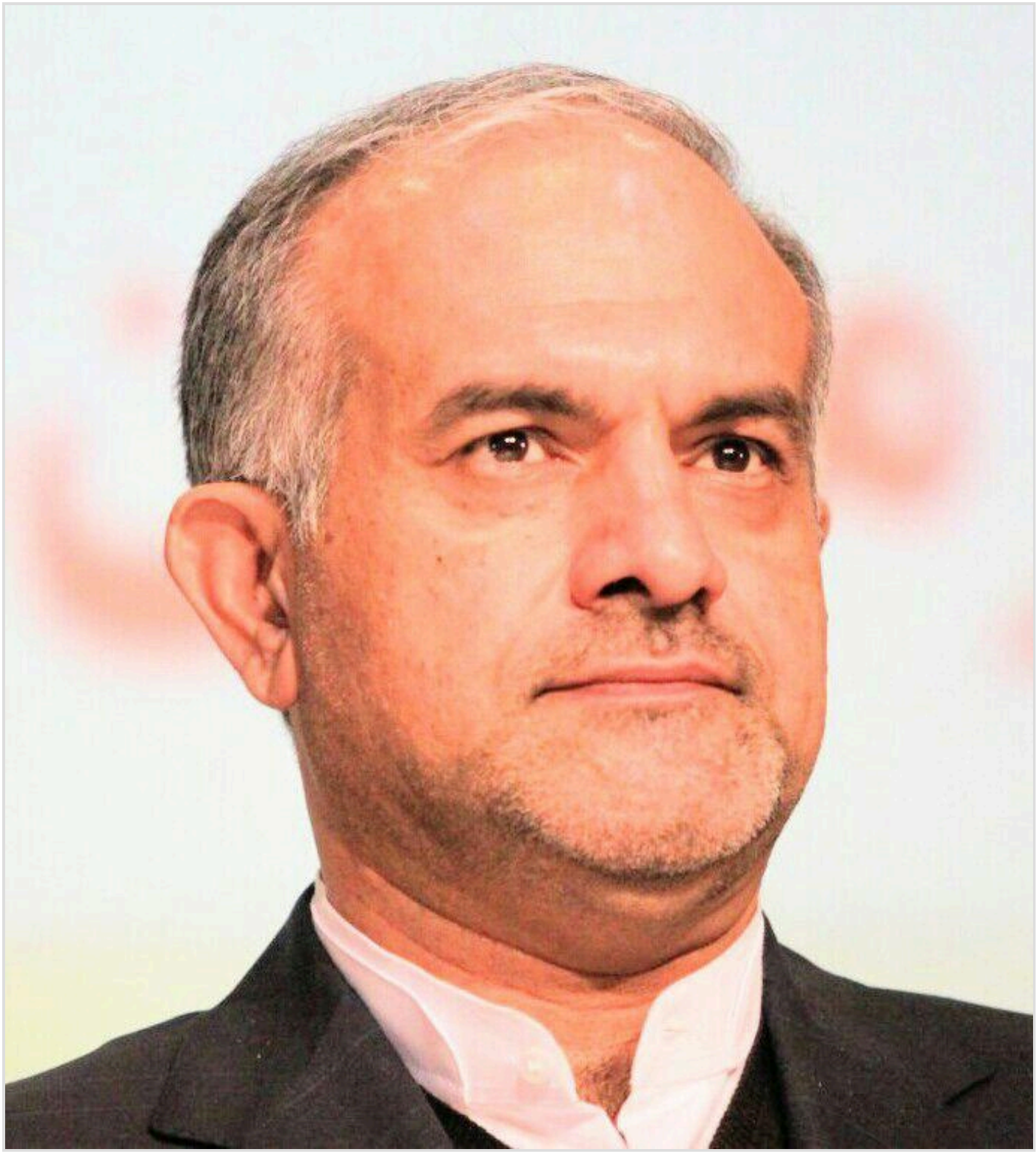

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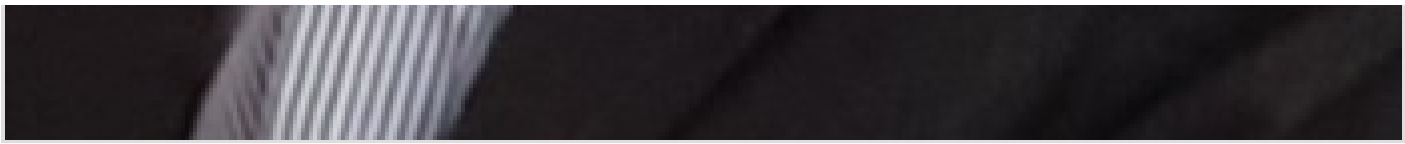

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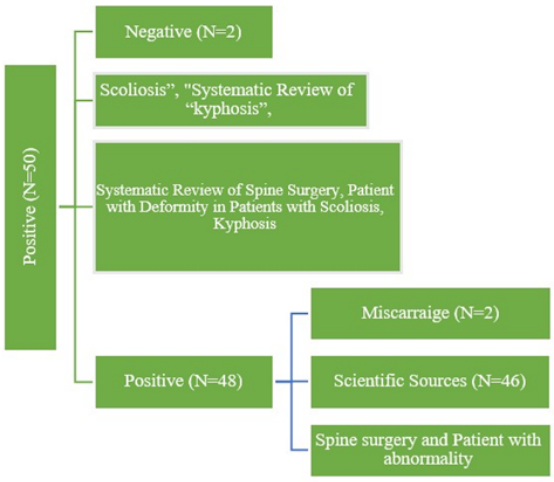

Spine Surgery in Patients with Scoliosis and Kyphosis: A Systematic Review

Adel Kiumarcy; Navid Golchin; Azadeh Rajabzadeh Kanafi

Volume 8, Issue 4 , April 2025, Pages 325-338

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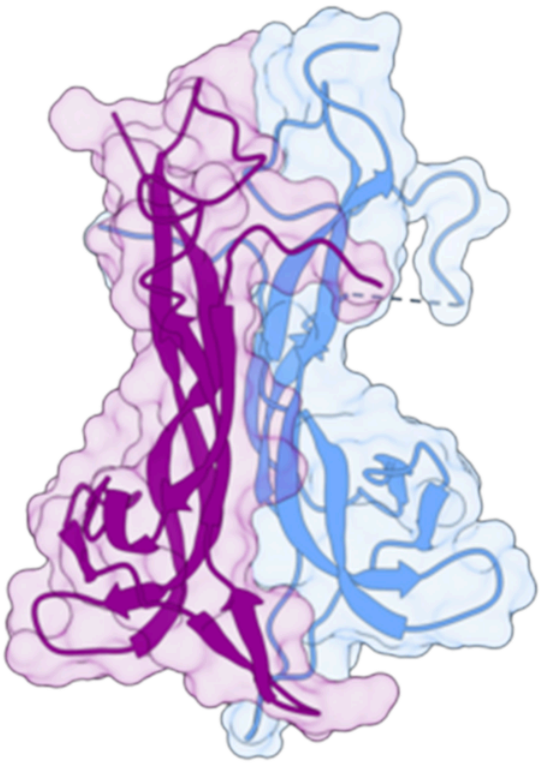

Memorizing Al-Quran Increases Serum BDNF Levels

Donna Adriani; Patwa Amani; Mustika Anggiane Putri; Yudhisman Imran; Irmiya Rachmiyani; Ahmad Fauzi; Emad Yousif

Volume 8, Issue 4 , April 2025, Pages 339-344

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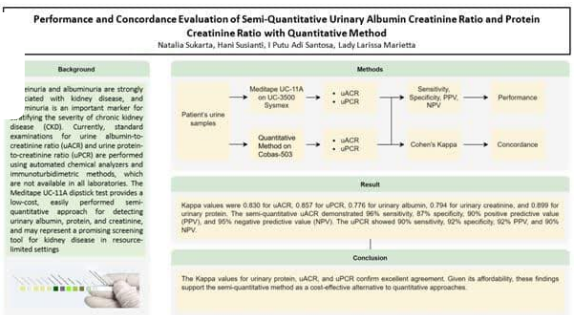

Performance and Concordance Evaluation of Semi-Quantitative Urinary Albumin Creatinine Ratio and Protein Creatinine Ratio with Quantitative Method

Natalia Sukarta; Hani Susianti; I Putu Adi Santosa; Lady Larissa Marietta

Volume 8, Issue 4 , April 2025, Pages 345-354

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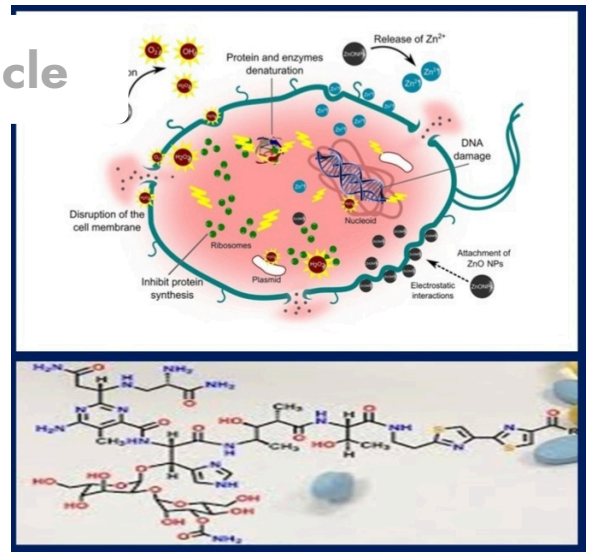

A systematic review on the chemistry of drugs and nanoparticles used in drugs used in cancer patients, relying on nursing and care tips

Shima Sadat Aghahosseini; Saghar Erfani

Volume 8, Issue 4 , April 2025, Pages 355-365

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Abstract Introduction: In the present study, the chemistry of drugs and nanoparticles used in drugs used in cancer patients

has been studied, focusing on nursing and care tips. Nanoparticles ... Read More

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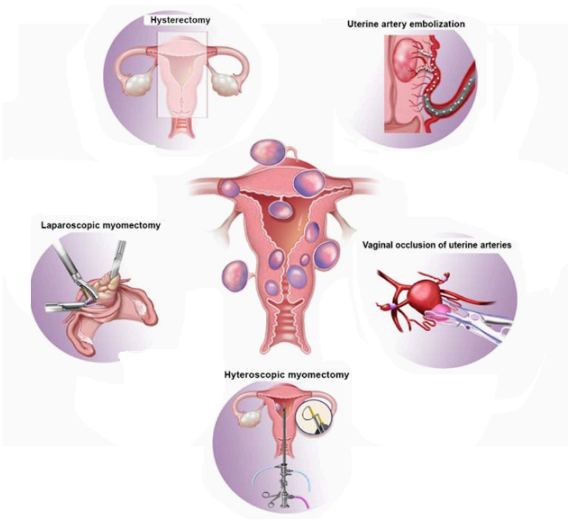

Comparative Study on Reproductive and Surgical Outcomes in Laparoscopic Myomectomy: Temporary Uterine Artery Cross-clamping for Large Submucosal Leiomyomas Compared to Alternative Methods

Zauresh Barmanasheva; Daniyar Dzhakupov; Talgat Kudaibergenov; Mariya Laktionova; Mairash Baimuratova; Vladimir Kotlobovsky; Aknur Turgumbayeva

Volume 8, Issue 4 , April 2025, Pages 366-378

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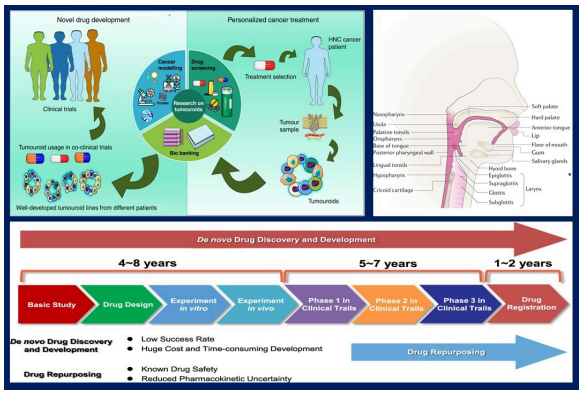

A Systematic Review of Drug Therapy in Head and Neck Cancer Patients Based on Nursing and Pharmaceutical Care

Shima Sadat Aghahosseini; Saghar Erfani

Volume 8, Issue 4 , April 2025, Pages 379-391

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Abstract This study systematically reviews drug therapy in patients with head and neck cancer based on nursing and drug care. The particles, which carry two different types of drugs, designed ... Read More

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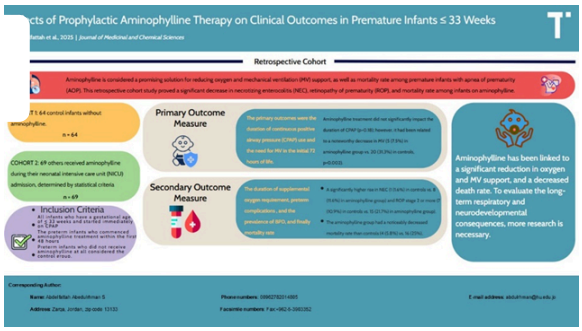

Effects of Prophylactic Aminophylline Therapy on Clinical Outcomes in Premature Infants ≤ 33 Weeks

Abedulrhman S. Abdelfattah; Hamzeh R Al-Momani; Amjad S Tarawneh; Aya M Makkawi; Zeina K Masoud

Volume 8, Issue 4 , April 2025, Pages 392-404

https://doi.org/10.26655/JMCHEMSCI.2025.4.7

Abstract Aminophylline is utilized to treat apnea of prematurity (AOP) during the critical first 72 hours of life. The aim of this study was to quantify the disparity in the length of continuous ... Read More

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Original Article

Memorizing Al-Quran Increases Serum BDNF Levels

Donna Adriani[1*], Patwa Amani[1], Mustika Anggiane Putri[1], Yudhisman Imran[2], Irmiya Rachmiyani[3], Ahmad Fauzi[4], Emad Yousif[5]

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ABSTRACT

Cognitive function refers to mental processes involving knowledge, information processing, and reasoning. Memorizing the Al-Quran can stimulate the production of brain-derived neurotrophic factor (BDNF), a crucial protein that plays a significant role in promoting the survival of neurons and synapses involved in memory and learning. BDNF levels can be used to assess cognitive function. Mild Cognitive Impairment (MCI) is often evaluated using the MOCA-INA score. This study utilized an observational analytic design with a cross-sectional approach. Extensive studies have explored the effects of learning and memorizing the Al-Quran on cognitive abilities in adults. In this study, cognitive function was evaluated by measuring serum BDNF levels and the MOCA-INA score. The study involved 88 adult participants aged 18-30 years who met the inclusion and exclusion criteria. The BDNF levels in the 11-20 juz group (45540.25 ± 11661.84 pg/mL) and the 21–30 juz group (46005.6 ± 7304.86 pg/mL) were significantly higher than those in the <10 juz group (37414.88 ± 10229.63 pg/mL). The difference between Quran memorization and BDNF levels was statistically significant ($p = 0.002$). However, the MOCA-INA scores did not show a significant difference across the three groups ($p = 0.696$). The amount of Al-Quran memorized is significantly associated with serum BDNF levels. Memorizing the Al-Quran may provide cognitive benefits, particularly in enhancing brain neurotrophic factors, and could be a beneficial practice for improving cognitive function in Muslims.

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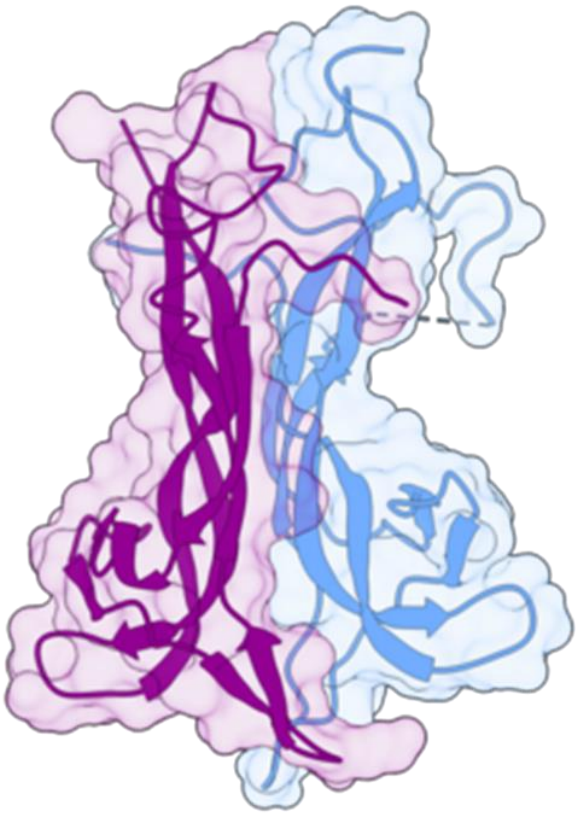
GRAPHICAL ABSTRACT



Introduction

Cognitive function refers to a set of mental processes involved in learning, memory, attention, perception, language, intelligence, and reasoning. Some of the cognitive functions that are often assessed include learning, memory, attention, and executive function [1]. Studies have shown that cognitive function tends to decline after the age of 20 [2]. One way to assess cognitive function is through the measurement of Brain Derived Neurotrophic Factor (BDNF) levels, a crucial protein that plays a significant role in promoting the survival of synapses and neurons involved in memory and learning processes [4]. BDNF is particularly expressed in the hippocampus and para-hippocampus areas, which are vital for cognitive tasks related to memory and learning [5].

Besides BDNF levels, cognitive function can also be assessed using tools such as the MOCA-INA score. The MOCA-INA score is commonly used to screen for Mild Cognitive Impairment (MCI) [6].

The Al-Quran, the holy book of Islam, is believed by Muslims to be the word of Allah SWT revealed to the Prophet Muhammad SAW [7,9]. Individuals who read, memorize, and study the Al-Quran are referred to as Hafidz [10]. Memorizing the Al-Quran is a challenging task, as it requires strong memory and high concentration [11]. Several studies have indicated that memorizing the Al-Quran may have cognitive benefits, particularly in improving cognitive function.

Materials and Methods

The aim of this study was to observe and analyze the effects of memorizing the Al-Quran on cognitive function in adults using a cross-sectional approach. The study was conducted at Perguruan Tinggi Ilmu Quran (PTIQ) to evaluate this relationship. The study involved 88 adult participants (men and women aged ≥ 18 years), who provided written informed consent after receiving a full explanation of the study's purpose and procedures.

Inclusion criteria included adults aged 18 years and above, while exclusion criteria were participants diagnosed with psychotic disorders, neurological disorders, those on antidepressant or antipsychotic medications, or those with malignancies.

Participants were divided into three groups based on the number of Al-Quran parts (juz) they had memorized: the first group (Group 1) included participants who had memorized fewer than 10 juz, the second group (Group 2) included those who had memorized 11-20 juz, and the third group (Group 3) included participants who had memorized 21-30 juz.

Cognitive function was assessed through two methods: the measurement of serum BDNF levels and the MOCA-INA (Montreal Cognitive Assessment for Indonesian participants) score. Serum BDNF levels were measured using the ELISA method, in collaboration with PRODIA Laboratory. The MOCA-INA test evaluates various aspects of cognitive functioning, including short-term memory, visuospatial memory, executive functions, attention, language, and spatial and temporal orientation. The MOCA-INA is a widely used cognitive screening tool, with scores between 25 and 30 generally considered within the normal range.

Ethics approval was obtained from the Faculty of Medicine, Universitas Trisakti (No. 179/KER/FK/X/2022). Data processing was conducted using SPSS v.25, with results presented as mean ± SD. To assess the differences between groups, an ANOVA test was applied. A statistical significance level of $p < 0.05$ was considered meaningful.

Results

Based on the data presented in the study, a total of 88 participants were included, consisting of 49 males (55.68%) and 39 females (44.32%), as indicated in Table 1. The general characteristics of the participants at baseline included their age, BDNF serum levels, and MOCA-INA scores.

The mean age of the participants was 25.18 years, with a standard deviation of 2.94 years, indicating that the participants were relatively young adults with minimal age variation. The mean BDNF serum level was recorded at 40356.55 pg/mL, with a standard deviation of 10747.37 pg/mL, reflecting a moderate variation in BDNF levels among participants. In addition, the MOCA-INA score, which assesses cognitive function, had a mean value of 25.14 with a standard deviation of 2.96, suggesting that the majority of participants had relatively stable cognitive performance (Table 1).

These baseline characteristics provide an overview of the population studied, indicating a balanced gender distribution and consistent ranges for the key variables. The data also serve as a foundation for further analysis, particularly in exploring the relationships between demographic and biological factors, such as BDNF levels and cognitive function, across different groups in the study.

Table 1: Distribution of the general characteristics of the participants at base line

Characteristics	Mean (pg/mL)	SD (pg/mL)
Age (yo)	25.18	2.94
BDNF (pg/mL)	40356.55	10747.37
MOCA-INA	25.14	2.96

The findings revealed that the serum levels of brain-derived neurotrophic factor (BDNF) were notably higher in individuals who had memorized a greater number of Al-Quran juz. Specifically, participants in the 11–20 juz group exhibited an average BDNF serum level of 45540.25 ± 11661.84 pg/mL, while those in the 21–30 juz group showed an even higher average of 46005.6 ± 7304.86 pg/mL. In contrast, participants who had memorized fewer than 10 juz had significantly lower average BDNF serum levels, measuring 37414.88 ± 10229.63 pg/mL. Statistical analysis indicated a significant correlation between the extent of Al-Quran memorization and BDNF serum levels, with a p-value of 0.002, suggesting that increased memorization activity may positively influence BDNF levels (Table 2).

However, the analysis of cognitive function using the MOCA-INA (Montreal Cognitive Assessment - Indonesian version) score showed no significant differences across the three groups, as evidenced by a p-value of 0.696. This indicates that while memorization activity appears to have a measurable impact on BDNF serum levels, it may not directly translate to observable differences in

cognitive function, as assessed by MOCA-INA, among the groups studied. These findings, summarized in (Table 2), highlight the potential neurobiological benefits associated with memorization activities while suggesting that further research is needed to fully understand the relationship between BDNF levels and cognitive outcomes.

Table 2: BDNF levels and MOCA-INA score

Characteristics	Memorization Al-Quran			*P*-value
	< 10 juz (n=29)	11-20 juz (n=30)	21-30 juz (n=29)	
BDNF (pg/mL)	37414.88 ± 10229.63	45540.25 ± 11661.84	46005.60 ± 7304.86	0.002
MOCA-INA	25 ± 3.08	25 ± 2.88	25.73 ± 2.66	0.696

Discussion

This study showed that the highest level of BDNF and MOCA-INA score was observed among the participants who memorized the Al-Quran in the category of juz 21 – 30. BDNF plays an important role in changing to brain structure. BDNF is correlated with increased cognitive function. BDNF activity improve cognitive function [3,11]. Assessment of cognitive function consists of attention and concentration, executive function, memory, language, visuoconstruction, conceptual thinking, calculation, and orientation skills [12,13].

Memorization involves processes called basic cognitive processes which include encoding, storing, and recalling memories, because these processes occur in many memory systems that function differently but are interconnected [13]. Memorization of the Al-Quran means the process of memorizing the Al-Qur'an as a whole, both memorization and accuracy of reading as well as pursuing, reciting and paying attention to keeping memorization from forgetting [14]. Memorizers of the Al-Quran in Arabic are called Hafidz Al-Quran. Hafidz Al-Quran is a person who memorizes well after going through the process of memorizing verse by verse of the Al-Qur'an on purpose. Hafiz Qur'an can recite verses of the Al-Qur'an without looking at these verses and must always keep their memorization so that they are not forgotten. Indeed, the Qur'an is easy to memorize as stated in one of its verses: "And verily We have made the Qur'an easy to understand and remember, then has anyone learned a lesson?" [15]. A study by Zoladz *et al.* repeated stimulation triggers long-term potentiation (LTP) [16].

A study by Irfannuddin et al. showed that Hafidz Al-Quran group has a significantly higher BDNF serum level than administrative workers group. Environmental stimulation related religious activity like memorizing Al-Quran may affect BDNF to support neuroplasticity [17]. Zoladz *et al.* found that BDNF regulates long-term potentiation (LTP) in the hippocampus, which is a form of synaptic plasticity that contributes to long-term memory formation. [16].

Based on Hussain MH's study (2021) the treatment group listening to the Al-Quran had increased memory and was statistically significant. This is because listening to the Al-Quran can increase mood and happy hormones [18]. Based on Irawati K's study (2018), reading the Al-Quran can prevent cognitive function decline in the elderly because reading and listening to the Al-Quran gives calm, piety, and controlling emotions for the reader [19]. Religious activities can improve cognitive function in terms of increasing the MoCa-Ina score [20,22].

Conclusion

The amount of juz memorized Al-Quran is significantly related to BDNF serum level. In practical terms, we may suggest that Muslims memorize the Al-Quran to improve cognitive function.

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Disclosure Statement

The authors declare that they have no conflicts of interest to disclose in this study.

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References

[1] Driscoll L.L., Cognitive function, Comprehensive Toxicology, Elsevier, 2018, 376 [Crossref], [Google Scholar], [Publisher]
[2] Gholipour N., Amiripour A., Relationship between personal myth and early maladaptive schemas with general health in third year male and female high school students in islamshahr. *Eurasian Journal of Science and Technology*, 2023, 3:77 [Crossref], [Google Scholar], [Publisher]
[3] Salthouse T., Consequences of age-related cognitive declines, *Annual Review of Psychology*, 2012, 63:201[Crossref], [Google Scholar], [Publisher]
[4] Adriani D., Imran Y., Mawi M., Amani P., Ilyas E.I., Effect of brain gym® exercises on cognitive function and brain-derived neurotrophic factor plasma level in elderly: A randomized controlled trial, *Universa Medicina*, 2020, 39:34 [Crossref], [Google Scholar], [Publisher]
[5] Miranda M., Morici J.F., Zanoni M.B., Bekinschtein P., Brain-derived neurotrophic factor: A key molecule for memory in the healthy and the pathological brain, *Frontiers in Cellular Neuroscience*, 2019, 13:472800 [Crossref], [Google Scholar], [Publisher]
[6] Imran Y., Adriani D., Amani P., Rachmiyani I., Prawiroharjo P., Association between brain gym and cognitive function in postmenopausal women, *International Journal of Scientific and Technology Research*, 2020, 9:1405 [Crossref], [Google Scholar], [Publisher]
[7] Alaydrus R., Adolescent metacognitive knowledge during the Quran memorization process, *Journal of Islamic Studies And Culture*, 2019, 7:12 [Crossref], [Google Scholar], [Publisher]
[8] Slamet S., The effect of memorizing quran on the children cognitive intelligence, *Humanities & Social Sciences Reviews*, 2019, 7:571 [Crossref], [Google Scholar], [Publisher]
[9] Kirmani M.N., Qur'anic approach to cognitive and behavioral change: psychological perspective, *IAHRW International Journal of Social Sciences*, 2016, 3:257 [Crossref], [Google Scholar], [Publisher]
[10] Sirin S., Metin B., Tarhan N., The effect of memorizing the quran on cognitive functions, *The Journal of Neurobehavioral Sciences*, 2021, 8:22 [Crossref], [Google Scholar], [Publisher]
[11] Charsouei S., Mohammad Rahimi M., Determining complications of neurological system in patients after kidney transplantation in northwest iran, *Eurasian Journal of Science and Technology*, 2025, 5:81 [Crossref], [Google Scholar], [Publisher]
[12] Ghaffari Y.D., Ghorbanian N., The effects of blood sugar, electrolytes, and blood pressure on postoperative cognitive dysfunction in patients candidates for general surgery under general anesthesia: A non-systematic review, *Eurasian Journal of Science and Technology*, 2023, 3:125 [Crossref], [Google Scholar], [Publisher]
[13] Basir A., Syahbudin A., Yahya M.D., Armizi A., Liriwati F.Y., What does current evidence say about prenatal education to succeed alquran

hafiz, *Nazhruna: Jurnal Pendidikan Islam*, 2022, 5:229 [Crossref], [Google Scholar], [Publisher]
[14] Adriani D., Amani P., Putri M.A., Imran Y., Fauzi A., Menghafal Al-quran: Tinjauan fungsi kognitif, *Jurnal Penelitian Dan Karya Ilmiah Lembaga Penelitlan Universitas Trisakti*, 2024, 9:147 [Crossref], [Google Scholar], [Publisher]
[15] Shukri N.H.A., Nasir M.K.M., Razak K.A., Educational strategies on memorizing the Quran: A review of literature, *Development*, 2020, 9:632 [Crossref], [Google Scholar], [Publisher]
[16] a) Raziani Y, Raziani S. Evaluation of Mental Health of Chemotherapy-Treated Cancer Nurses. *Journal of Medicinal and Chemical Sciences*. 2021,4:351-63. [Crossref], [Google Scholar], [Publisher] b) Arifin Z., Method of memorizing al-qur'an according to baduwailan, *Studia Religia: Jurnal Pemikiran Dan Pendidikan Islam*, 2019, 3 [Crossref], [Google Scholar], [Publisher]
[17] Fairuzillah M.N., Listiana A., The positive impact of memorizing the qur'an on cognitive intelligence of children, *In 5th International Conference on Early Childhood Education (ICECE 2020) Atlantis Press, 2021,* 334 [Crossref], [Google Scholar], [Publisher]
[18] Zoladz J.A., Pilc J., The effect of physical activity on the brain derived neurotrophic factor: From animal to human studies, *Journal of Physiology and Pharmacology*, 2010, 61:533 [Crossref], [Google Scholar], [Publisher]
[19] Irfannuddin M., Huffaz have higher BDNF level and better memory ability than administrative workers in same age and education, 2018 [Crossref], [Google Scholar], [Publisher]
[20] Hussain M.H., The effect of quran as a stimulus in enhancing working memory and mood, *International Journal of Islamic Psychology*, 2021, 4:1[Crossref], [Google Scholar], [Publisher]
[21] Irawati K., Madani F., Durasi membaca Al-qur'an dengan fungsi kognitif pada lansia, *Mutiara Medika: Jurnal Kedokteran Dan Kesehatan*, 2019, 19:17 [Crossref], [Google Scholar], [Publisher]
[22] Amir S.N., Juliana N., Azmani S., Abu I.F., Talib A.H.Q.A., Abdullah F., Salehuddin I.Z., Teng N.I.M.F., Amin N.A., Azmi N.A.S.M., Aziz N.A.S.A., Impact of religious activities on quality of life and cognitive function among elderly, *Journal of Religion and Health*, 2022, 61:1[Crossref], [Google Scholar], [Publisher]

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Memorizing Al-Quran Increases Serum BDNF Levels

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Original Article

Memorizing Al-Quran Increases Serum BDNF Levels

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ABSTRACT

Cognitive function refers to mental processes involving knowledge, information processing, and reasoning. Memorizing the Al-Quran can stimulate the production of brain-derived neurotrophic factor (BDNF), a crucial protein that plays a significant role in promoting the survival of neurons and synapses involved in memory and learning. BDNF levels can be used to assess cognitive function. Mild Cognitive Impairment (MCI) is often evaluated using the MOCA-INA score. This study utilized an observational analytic design with a cross-sectional approach. Extensive studies have explored the effects of learning and memorizing the Al-Quran on cognitive abilities in adults. In this study, cognitive function was evaluated by measuring serum BDNF levels and the MOCA-INA score. The study involved 88 adult participants aged 18-30 years who met the inclusion and exclusion criteria. The BDNF levels in the 11-20 juz group (45540.25 ± 11661.84 pg/mL) and the 21-30 juz group (46005.6 ± 7304.86 pg/mL) were significantly higher than those in the <10 juz group (37414.88 ± 10229.63 pg/mL). The difference between Quran memorization and BDNF levels was statistically significant ($p = 0.002$). However, the MOCA-INA scores did not show a significant difference across the three groups ($p = 0.696$). The amount of Al-Quran memorized is significantly associated with serum BDNF levels. Memorizing the Al-Quran may provide cognitive benefits, particularly in enhancing brain neurotrophic factors, and could be a beneficial practice for improving cognitive function in Muslims.

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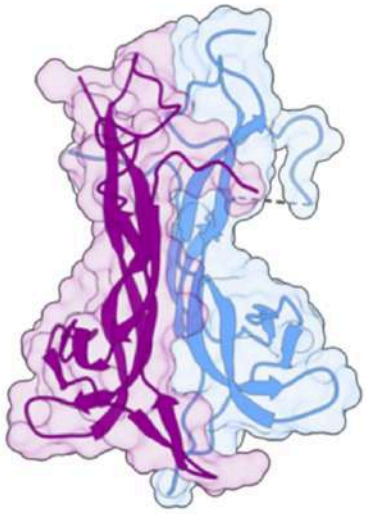
GRAPHICALABSTRACT



Introduction

Cognitive function refers to a set of mental processes involved in learning, memory, attention, perception, language, intelligence, and reasoning. Some of the cognitive functions that are often assessed include learning, memory, attention, and executive function [1]. Studies have shown that cognitive function tends to decline after the age of 20 [2]. One way to assess cognitive function is through the measurement of Brain Derived Neurotrophic Factor (BDNF) levels, a crucial protein that plays a significant role in promoting the survival of synapses and neurons involved in memory and learning processes [4]. BDNF is particularly expressed in the hippocampus and para-hippocampus areas, which are vital for cognitive tasks related to memory and learning [5].

Besides BDNF levels, cognitive function can also be assessed using tools such as the MOCA-INA score. The MOCA-INA score is commonly used to screen for Mild Cognitive Impairment (MCI) [6].

The Al-Quran, the holy book of Islam, is believed by Muslims to be the word of Allah SWT revealed to the Prophet Muhammad SAW [7,9]. Individuals who read, memorize, and study the Al-Quran are referred to as Hafidz [10]. Memorizing the Al-Quran is a challenging task, as it requires strong memory and high concentration [11]. Several studies have indicated that memorizing the Al-Quran may have cognitive benefits, particularly in improving cognitive function.

Materials and Methods

The aim of this study was to observe and analyze the effects of memorizing the Al-Quran on cognitive function in adults using a cross-sectional approach. The study was conducted at Perguruan Tinggi Ilmu Quran (PTIQ) to evaluate this relationship. The study involved 88 adult participants (men and women aged ≥ 18 years), who provided written informed consent after receiving a full explanation of the study's purpose and procedures.

Inclusion criteria included adults aged 18 years and above, while exclusion criteria were participants diagnosed with psychotic disorders, neurological disorders, those on antidepressant or antipsychotic medications, or those with malignancies.

Participants were divided into three groups based on the number of Al-Quran parts (juz) they had memorized: the first group (Group 1) included participants who had memorized fewer than 10 juz, the second group (Group 2) included those who had memorized 11-20 juz, and the third group (Group 3) included participants who had memorized 21-30 juz.

Cognitive function was assessed through two methods: the measurement of serum BDNF levels and the MOCA-INA (Montreal Cognitive Assessment for Indonesian participants) score. Serum BDNF levels were measured using the ELISA method, in collaboration with PRODIA Laboratory. The MOCA-INA test evaluates various aspects of cognitive functioning, including short-term memory, visuospatial memory, executive functions, attention, language, and spatial and temporal orientation. The MOCA-INA is a widely used cognitive screening tool, with scores between 25 and 30 generally considered within the normal range.

Ethics approval was obtained from the Faculty of Medicine, Universitas Trisakti (No. 179/KER/FK/X/2022). Data processing was conducted using SPSS v.25, with results presented as mean ± SD. To assess the differences between groups, an ANOVA test was applied. A statistical significance level of $p < 0.05$ was considered meaningful.

Results

Based on the data presented in the study, a total of 88 participants were included, consisting of 49 males (55.68%) and 39 females (44.32%), as indicated in Table 1. The general characteristics of the participants at baseline included their age, BDNF serum levels, and MOCA-INA scores.

The mean age of the participants was 25.18 years, with a standard deviation of 2.94 years, indicating that the participants were relatively young adults with minimal age variation. The mean BDNF serum level was recorded at 40356.55 pg/mL, with a standard deviation of 10747.37 pg/mL, reflecting a moderate variation in BDNF levels among participants. In addition, the MOCA-INA score, which assesses cognitive function, had a mean value of 25.14 with a standard deviation of 2.96, suggesting that the majority of participants had relatively stable cognitive performance (Table 1).

These baseline characteristics provide an overview of the population studied, indicating a balanced gender distribution and consistent ranges for the key variables. The data also serve as a foundation for further analysis, particularly in exploring the relationships between demographic and biological factors, such as BDNF levels and cognitive function, across different groups in the study.

Table 1: Distribution of the general characteristics of the participants at base line

Characteristics	Mean (pg/mL)	SD (pg/mL)
Age (yo)	25.18	2.94
BDNF (pg/mL)	40356.55	10747.37
MOCA-INA	25.14	2.96

The findings revealed that the serum levels of brain-derived neurotrophic factor (BDNF) were notably higher in individuals who had memorized a greater number of Al-Quran juz. Specifically, participants in the 11–20 juz group exhibited an average BDNF serum level of 45540.25 ± 11661.84 pg/mL, while those in the 21–30 juz group showed an even higher average of 46005.6 ± 7304.86 pg/mL. In contrast, participants who had memorized fewer than 10 juz had significantly lower average BDNF serum levels, measuring 37414.88 ± 10229.63 pg/mL. Statistical analysis indicated a significant correlation between the extent of Al-Quran memorization and BDNF serum levels, with a p-value of 0.002, suggesting that increased memorization activity may positively influence BDNF levels (Table 2).

However, the analysis of cognitive function using the MOCA-INA (Montreal Cognitive Assessment - Indonesian version) score showed no significant differences across the three groups, as evidenced by a p-value of 0.696. This indicates that while memorization activity appears to have a measurable impact on BDNF serum levels, it may not directly translate to observable differences in

cognitive function, as assessed by MOCA-INA, among the groups studied. These findings, summarized in (Table 2), highlight the potential neurobiological benefits associated with memorization activities while suggesting that further research is needed to fully understand the relationship between BDNF levels and cognitive outcomes.

Table 2: BDNF levels and MOCA-INA score

Characteristics	Memorization Al-Quran			*P*-value
	< 10 juz (n=29)	11-20 juz (n=30)	21-30 juz (n=29)	
BDNF (pg/mL)	37414.88 ± 10229.63	45540.25 ± 11661.84	46005.60 ± 7304.86	0.002
MOCA-INA	25 ± 3.08	25 ± 2.88	25.73 ± 2.66	0.696

Discussion

This study showed that the highest level of BDNF and MOCA-INA score was observed among the participants who memorized the Al-Quran in the category of juz 21 – 30. BDNF plays an important role in changing to brain structure. BDNF is correlated with increased cognitive function. BDNF activity improve cognitive function [3,11]. Assessment of cognitive function consists of attention and concentration, executive function, memory, language, visuoconstruction, conceptual thinking, calculation, and orientation skills [12,13].

Memorization involves processes called basic cognitive processes which include encoding, storing, and recalling memories, because these processes occur in many memory systems that function differently but are interconnected [13]. Memorization of the Al-Quran means the process of memorizing the Al-Qur'an as a whole, both memorization and accuracy of reading as well as pursuing, reciting and paying attention to keeping memorization from forgetting [14]. Memorizers of the Al-Quran in Arabic are called Hafidz Al-Quran. Hafidz Al-Quran is a person who memorizes well after going through the process of memorizing verse by verse of the Al-Qur'an on purpose. Hafiz Qur'an can recite verses of the Al-Qur'an without looking at these verses and must always keep their memorization so that they are not forgotten. Indeed, the Qur'an is easy to memorize as stated in one of its verses: "And verily We have made the Qur'an easy to understand and remember, then has anyone learned a lesson?" [15]. A study by Zoladz *et al.* repeated stimulation triggers long-term potentiation (LTP) [16].

A study by Arfannuddin et al. showed that Hafidz Al-Quran group has a significantly higher BDNF serum level than administrative workers group. Environmental stimulation related religious activity like memorizing Al-Quran may affect BDNF to support neuroplasticity [17]. Zoladz *et al.* found that BDNF regulates long-term potentiation (LTP) in the hippocampus, which is a form of synaptic plasticity that contributes to long-term memory formation. [16].

Based on Hussain MH's study (2021) the treatment group listening to the Al-Quran had increased memory and was statistically significant. This is because listening to the Al-Quran can increase mood and happy hormones [18]. Based on Irawati K's study (2018), reading the Al-Quran can prevent cognitive function decline in the elderly because reading and listening to the Al-Quran gives calm, piety, and controlling emotions for the reader [19]. Religious activities can improve cognitive function in terms of increasing the MoCa-Ina score [20,22].

Conclusion

The amount of juz memorized Al-Quran is significantly related to BDNF serum level. In practical terms, we may suggest that Muslims memorize the Al-Quran to improve cognitive function.

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Disclosure Statement

The authors declare that they have no conflicts of interest to disclose in this study.

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References

[1] Driscoll L.L., Cognitive function, Comprehensive Toxicology, Elsevier, 2018, 376 [Crossref], [Google Scholar], [Publisher]

[2] Gholipour N., Amiripour A., Relationship between personal myth and early maladaptive schemas with general health in third year male and female high school students in islamshahr. *Eurasian Journal of Science and Technology*, 2023, 3:77 [Crossref], [Google Scholar], [Publisher]

[3] Salthouse T., Consequences of age-related cognitive declines, *Annual Review of Psychology*, 2012, 63:201[Crossref], [Google Scholar], [Publisher]

[4] Adriani D., Imran Y., Mawi M., Amani P., Ilyas E.I., Effect of brain gym® exercises on cognitive function and brain-derived neurotrophic factor plasma level in elderly: A randomized controlled trial, *Universa Medicina*, 2020, 39:34 [Crossref], [Google Scholar], [Publisher]

[5] Miranda M., Morici J.F., Zanoni M.B., Bekinschtein P., Brain-derived neurotrophic factor: A key molecule for memory in the healthy and the pathological brain, *Frontiers in Cellular Neuroscience*, 2019, 13:472800 [Crossref], [Google Scholar], [Publisher]

[6] Imran Y., Adriani D., Amani P., Rachmiyani I., Prawiroharjo P., Association between brain gym and cognitive function in postmenopausal women, *International Journal of Scientific and Technology Research*, 2020, 9:1405 [Crossref], [Google Scholar], [Publisher]

[7] Alaydrus R., Adolescent metacognitive knowledge during the Quran memorization process, *Journal of Islamic Studies And Culture*, 2019, 7:12 [Crossref], [Google Scholar], [Publisher]

[8] Slamet S., The effect of memorizing quran on the children cognitive intelligence, *Humanities & Social Sciences Reviews*, 2019, 7:571 [Crossref], [Google Scholar], [Publisher]

[9] Kirmani M.N., Qur'anic approach to cognitive and behavioral change: psychological perspective, *IAHRW International Journal of Social Sciences*, 2016, 3:257 [Crossref], [Google Scholar], [Publisher]

[10] Sirin S., Metin B., Tarhan N., The effect of memorizing the quran on cognitive functions, *The Journal of Neurobehavioral Sciences*, 2021, 8:22 [Crossref], [Google Scholar], [Publisher]

[11] Charsouei S., Mohammad Rahimi M., Determining complications of neurological system in patients after kidney transplantation in northwest iran, *Eurasian Journal of Science and Technology*, 2025, 5:81 [Crossref], [Google Scholar], [Publisher]

[12] Ghaffari Y.D., Ghorbanian N., The effects of blood sugar, electrolytes, and blood pressure on postoperative cognitive dysfunction in patients candidates for general surgery under general anesthesia: A non-systematic review, *Eurasian Journal of Science and Technology*, 2023, 3:125 [Crossref], [Google Scholar], [Publisher]

[13] Basir A., Syahbudin A., Yahya M.D., Armizi A., Liriwati F.Y., What does current evidence say about prenatal education to succeed alquran

hafiz, *Nazhruna: Jurnal Pendidikan Islam*, 2022, 5:229 [Crossref], [Google Scholar], [Publisher]
[14] Adriani D., Amani P., Putri M.A., Imran Y., Fauzi A., Menghafal Al-quran: Tinjauan fungsi kognitif, *Jurnal Penelitian Dan Karya Ilmiah Lembaga Penelitian Universitas Trisakti*, 2024, 9:147 [Crossref], [Google Scholar], [Publisher]
[15] Shukri N.H.A., Nasir M.K.M., Razak K.A., Educational strategies on memorizing the Quran: A review of literature, *Development*, 2020, 9:632 [Crossref], [Google Scholar], [Publisher]
[16] a) Raziani Y, Raziani S. Evaluation of Mental Health of Chemotherapy-Treated Cancer Nurses. *Journal of Medicinal and Chemical Sciences*. 2021,4:351-63. [Crossref], [Google Scholar], [Publisher] b) Arifin Z., Method of memorizing al-qur'an according to baduwailan, *Studia Religia: Jurnal Pemikiran Dan Pendidikan Islam*, 2019, 3 [Crossref], [Google Scholar], [Publisher]
[17] Fairuzillah M.N., Listiana A., The positive impact of memorizing the qur'an on cognitive intelligence of children, *In 5th International Conference on Early Childhood Education (ICECE 2020) Atlantis Press, 2021*, 334 [Crossref], [Google Scholar], [Publisher]
[18] Zoladz J.A., Pilc J., The effect of physical activity on the brain derived neurotrophic factor: From animal to human studies, *Journal of Physiology and Pharmacology*, 2010, 61:533 [Crossref], [Google Scholar], [Publisher]
[19] Irfannuddin M., Huffaz have higher BDNF level and better memory ability than administrative workers in same age and education, 2018 [Crossref], [Google Scholar], [Publisher]
[20] Hussain M.H., The effect of quran as a stimulus in enhancing working memory and mood, *International Journal of Islamic Psychology*, 2021, 4:1[Crossref], [Google Scholar], [Publisher]
[21] Irawati K., Madani F., Durasi membaca Al-qur'an dengan fungsi kognitif pada lansia, *Mutiara Medika: Jurnal Kedokteran Dan Kesehatan*, 2019, 19:17 [Crossref], [Google Scholar], [Publisher]
[22] Amir S.N., Juliana N., Azmani S., Abu I.F., Talib A.H.Q.A., Abdullah F., Salehuddin I.Z., Teng N.I.M.F., Amin N.A., Azmi N.A.S.M., Aziz N.A.S.A., Impact of religious activities on quality of life and cognitive function among elderly, *Journal of Religion and Health*, 2022, 61:1[Crossref], [Google Scholar], [Publisher]

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