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The Influence of Fitness Level on Al Qur'an Memorization Ability among UMY UNIRES Students

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ABSTRACT

One of the activity programs that students at UMY University Residence (UNIRES) must complete within the first year is memorizing Al-Qur'an juz 30. Physical fitness has been linked to good memorization abilities and improving overall cognitive function. More evidence is needed to see how fitness level influences the ability to memorize Al-Qur'an, especially among students. This research aimed to determine the effect of providing an aerobic fitness program on the ability of UNIRES students to memorize Al-Qur'an. The quasi-experimental pre-post test research method without a control group involving 29 participants was conducted; it consisted of 15 male and 14 female residents of UNIRES, who were taken using convenience sampling. The intervention was an aerobic exercise fitness program guided by an instructor, which is carried out every two days for 30 minutes for 14 days and can be followed independently via the YouTube link provided. The fitness test is carried out using the 6-minute walk test method, given before and after students are given aerobic treatment and determined by measuring VO2 max. Participants were asked to memorize Al-Qur'an Surah An Nisaa verse 23 and measured the duration of memorization. This verse was chosen because of the trickiness and complexity level of the words; there are several similar words/sentences repeated (words ending in تُكُمْ) in the verse. The average VO2 max before and after intervention was 40.97 ± 9.87 and 42.68 ± 5.00, while memorization ability was 2,496.21 ± 1,654.53 seconds and 1,162.62 ± 726.33 seconds. There was no significant difference in VO2max before and after training with p 0.508, greater than 0.05. Conclusion: No significant correlation exists between memorization time and VO2max, either before or after training. The interventions need to be extended to get more optimal results, and the number of participants needs to be increased, besides the involvement of a control group.

Keywords: Aerobic exercise, UNIRES, VO2max, students' memorization ability

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INTRODUCTION

Exercise has been related to overall human well-being, as demonstrated by better cognitive and psychological functioning (1) (2). People who exercise regularly have a better fitness level than those who do not. A meta-analysis showed that providing fitness interventions to adults for 45 to 60 minutes at least moderate intensity in one session has improved cognitive function (3). The functions analyzed are executive function, attention, general cognitive function, memory, and working memory. It also affects parents and children. In children, sports have been shown to increase self-perception of ability (self-efficacy) (4).

The ability to memorize is one form of human cognitive ability. Differentiated based on brain areas that play a role in processing various kinds of incoming information, there are five memory systems (5): procedural memory, perceptual representational systems, working memory, semantic memory, and episodic memory. Procedural memory is one or several systems that mediate the process of retrieving information and the ability of cognitive and motor performance in terms of memory processes (6). The perceptual representational system is a memory system that recognizes objects and words, making it easier to recognize stimuli that have already been encountered quickly. Both types of memory exist implicitly; they do not require more memorization ability and usually persist with age (5).

The working memory system stores small amounts of information in full awareness (5). This memory system can be divided into primary and actual, accurate working memory. The primary memory system is related to the ability to store information quickly, while the accurate working memory is the ability to store and manipulate information in the mind. The ability to store and repeat numbers decreases slightly with age. Furthermore, if someone is asked to manipulate information, such as sorting a series of words based on alphabetical order, this ability will appear to decline with age.

Semantic memory is related to general knowledge about the world and usually persists with age, although the ability to memorize names usually decreases (5). Episodic memory is related to the ability to memorize events and experiences that have happened to someone. A person will be asked to memorize information and convey their memorization ability to test episodic memory abilities.

Memorizing the Qur'an is every Muslim's identity and need. The Messenger of Allah said, "A person who does not have even the slightest memory of the Qur'an is like a slum house that is about to collapse. (HR Tirmidhi)". Through this program, it is hoped that residents can make "memorizing the Al-Qur'an" a habit in their daily lives. Memorizing Juz 30 will motivate them to keep learning even after they leave UNIRES; the residents will know the importance and necessity of memorizing the entire Al-Qur'an.

Several factors can play a role in a person's general memorization ability. Apart from the human factors involved (students or santri and guardians), the rote implementation and evaluation system plays a role in the success of this program (7). The physical and mental condition of the students plays a role in how much they try, while the guardians influence the evaluation of the program's success. A precise evaluation system and the readiness of guardians to receive and evaluate students' memorization can

hinder the success of students' memorization if it is not optimal (8). Awareness of individuals' benefits will provide more motivation to carry out these activities. The ability to memorize the Qur'an well has been linked to discipline and academic achievement (9).

Universitas Muhammadiyah Yogyakarta believes that in developing students' abilities to excel in science and technology, they must remain based on Islamic values and create progressive student personalities (10). The University Residence (UNIRES) program was built primarily to "Provide personality education for students by increasing understanding and experience of advanced Islam and improving students' skills in communicating in English and Arabic" (11). The UMY UNIRES program requires good student conditions physically, psychologically, socially, and spiritually, but in a healthy approach based on eco-systemic concepts to achieve the goals. It must have a holistic concept of health (12) and can influence each other. Good psychological conditions will affect how a person looks after themselves, maintains a good quality of life, and interacts with friends and the environment around them (13).

Fitness levels have been related to better cognitive abilities and memorization. Visual-spatial perception and attention are positively influenced by low-intensity aerobic exercise. However, general cognitive ability, working memory and attention, verbal memory and attention, and vice versa, are positively influenced by moderate physical activity (14,15). Thus, efforts to maintain a good quality of life among students are particularly significant to support their performance while studying. In the long term, it can support their careers and lives. By seeing the benefits, it is necessary to analyze the effect of aerobic physical fitness intervention on the memorization abilities of UMY UNIRES students.

METHOD

This research used pre and post-test quasi-experimental research methods without a control group. Twenty-nine participants who were UMY students at UNIRES, consisting of 15 men and 14 women, were taken as samples using convenience sampling and carried out the entire fitness and memorization program. The intervention is an instructor-guided aerobic exercise fitness program, carried out every two days for 30 minutes, and can be followed independently via YouTube. Participants will follow the exercise guide via the device they own. The fitness test is carried out using the 6-minute walk test method, given before and after students are given aerobic treatment for 20 days and determined by measuring VO2 max. Various studies have shown variations in the timing of fitness interventions between 4 weeks and 12 months (1, 16,17). The timing of the intervention was based on the limited time that UNIRES residents had to stay in Jogja because the research was carried out between August and September 2020 during the increasing COVID-19 pandemic. The university management, supported by the campus, asked the residents to return to their respective areas before they could continue the research program, which was initially planned to be carried out for four weeks. The limited time for implementing this program is one of the limitations of this research.

The 6-minute walk test measurements (18) were carried out by research members who were students after receiving training. This training includes giving a signal to start a movement, giving a signal to participants to reach the final destination, monitoring that participants do not jog but walk as fast as possible, and using a stopwatch on their respective devices. Before the test was carried out, the test distance was measured on the futsal field on the UMY campus. This field measures 20 x 40 meters, and for this fitness test, the width of the field was used. The student was asked to walk as quickly as possible across the width of the field, and the research assistant measured the distance using a measuring device at the place where he or she stopped when time ran out. In addition, participants will be asked to count their pulse before the fitness test and after completion. The assistant will give a signal before taking the pulse measurement. Previously, participants were trained to find the pulse on the wrist and measure it for 60 seconds using signals. The difference in heart rate between after and before treatment will be used to determine fitness level by calculating the VO2max value.

The fitness program provided was obtained from YouTube by choosing a type of aerobics exercise for beginners assisted by an instructor for 30 minutes (19). This selection was based on the need to provide a program suited for untrained young adults; this can be confirmed by considering that the instructors for this training (seen in Figure 1) consist of individuals with unideal (very overweight) conditions. The assumption is that it will be sufficient for people with normal or slightly overweight body weight.

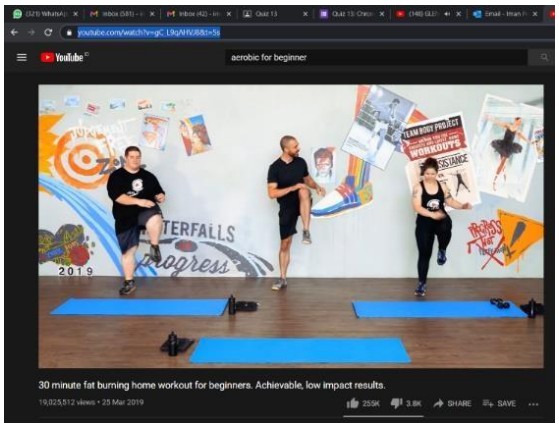
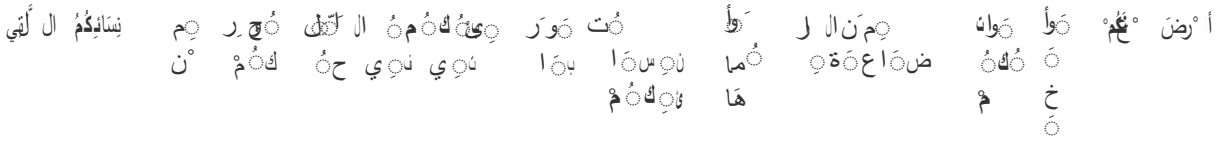


Figure 1. YouTube link to an aerobic fitness program for beginners

Memorizing the Qur'an was assessed before and after the treatment by assessing the time needed to memorize 1 verse, namely An Nisaa verse 23. It was chosen after consulting with one of the research members, M, who is a lecturer in Islamic religion by considering the level of complexity of words is relatively tricky as there are several similar words/sentences repeated (words ending in ـُكُمْ) in the verse below:

حُرِّمَتْ عَلَيْكُمْ أُمَّهَاتُكُمْ وَبَنَاتُكُمْ وَأَخَوَاتُكُمْ وَعَمَّاتُكُمْ وَخَالَاتُكُمْ وَبَنَاتُ الْأَخِ وَبَنَاتُ الْأُخْتِ وَأُمَّهَاتُكُمُ اللَّاتِي



The research instrument used was a stopwatch; it was used to measure the travel time of the 6 -minute walk test, the length of time participants recited their verses by heart, and a measuring instrument to determine the distance traveled on the test.

All participants agreed to be involved in the study by signing written informed consent after explaining the study protocol. They also understand the right to withdraw from the research whenever they deem it unnecessary to continue the process without explaining. Based on letter number 550/PEN-LP3M/II/2020, research permission has been granted.

RESULTS

Characteristics of Research Participants

The following is a description of the characteristics of the participants in this research.

Table 1. Participant Characteristics

Participant Characteristics	n	%
Male	14	48,28
Female	15	51,72
	Average	St dev
Age	20,73	1,34
Body Mass Index	22,86	3,21

Among the 29 samples, men and women were nearly equal in number, with a mean body mass index in the normal range (Table 1). There were differences in memorization duration and VO2 max before and after treatment. After the aerobic session, all samples showed a decrease in the duration of memorization, which means they had a better memorization ability. A similar nuance can also be seen in VO2 max, where there is an increase in fitness levels after treatment.

Univariate Analysis

The following is an illustration of the average memorization and fitness level. The average memorization time is seconds, while fitness is in VO2 max. VO2 max is a physical fitness parameter that assesses the ability of the circulatory and respiratory systems to supply oxygen during sustained physical activity (20).

Table 2. The average length of memorization and VO2max pre and post-intervention

		Average	St dev
Average memorization time (seconds)	Pre	2.496,21	1.654,53
	Post	1.162,62	726,33
VO2max	Pre	40,97	9,87
	Post	42,68	5,00

Table 2 shows the change in the average length of memorization between before and after the intervention, leading to a faster memorization time. The increasing number of VO2 max showed that fitness levels improved after the intervention.

Bivariate Test

A different test was carried out to see the significance of the difference in mean length of memorization and VO2 max before and after the intervention to determine whether the difference in means occurs due to chance or whether the intervention results are meaningful.

Table 3. The difference in mean length of memorization and VO2max before and after intervention

Paired Samples Test	Mean ± stdv	Std. Error Mean	95% Confidence Interval	t	df	Sig. (2-tailed)
Long Time to Memorize PRE – Long Time to Memorize POST	1532.9 ± 1578.6	293.1	932.4 - 2133.4	5.229	28	.000
VO2maxPRE - VO2maxPOST	-1.4 ± 8.7	1.6	-4.8 - 1.9	-.877	28	.388

Providing intervention could significantly improve the memorization ability of participants in this study, while there was no significant difference in fitness level (Table 3).

A correlation test was carried out to see whether there is a relationship between fitness level and memorization ability.

Table 4. Relationship between VO2max and memorization time

Correlations		Long to memorize	VO2max
Long to memorize	Pearson Correlation	1	-.128
	Sig. (2-tailed)		.508
	N	29	29
VO2max	Pearson Correlation	-.128	1
	Sig. (2-tailed)	.508	
	N	29	29

The correlation test showed no relationship between fitness level, as indicated by the VO2max value, and memorization ability, as indicated by the length of memorization.

DISCUSSION

Providing aerobic interventions has been associated with improvements in fitness through various means of measurement. Providing aerobic exercise to students during the pandemic has improved their quality of life in general (21). Other research shows that regular aerobic physical activity can help lower blood pressure and pulse rate (22). Furthermore, providing structured aerobic exercise in schools through the establishment of appropriate policies followed by the establishment of appropriate curricula and teacher training has been proven to increase student fitness (23).

The intervention provided could not show differences in fitness levels, which were not found in this study. The need for more timing of exercise intervention could influence these results. Several studies show that an increase in fitness levels will appear after aerobic exercises for four to eight weeks (24), ten weeks for children who have cerebral palsy (25) to be able to increase their physiological abilities, even up to 8 months (23) or 12 months of intervention (1).

A good fitness level has been linked to improving a person's memory. Various types of memory can be affected well by providing aerobic fitness interventions. Persistent long-term memory or long-term memory ability depends on successfully stabilizing and integrating new memories after initial encoding (26). This consolidation process requires neuromodulatory factors such as dopamine, noradrenaline, and brain-derived neurotrophic factors. Exercise has been linked to increasing dopamine levels (27).

Providing aerobic exercise has been linked to increasing episodic memory abilities(28) , namely the capacity to remember past experiences and events (5). Another study on adults showed that doing aerobics for four weeks improved memory (16). Episodic memory ability is when someone is asked to memorize a series of facts and recall their memories; in this research, students are asked to memorize 1 verse from a letter of the Qur'an. Different results were obtained from this research, where providing aerobic exercise was not related to increasing students' memorization abilities; this could happen because the intervention was not optimal and the number of research participants was insufficient.

On the other hand, the duration and intensity of physical activity have also been associated with reduced memory capacity (29). Excessive physical activity over a long period is associated with decreased memory ability; this can be caused by extreme fatigue or fatigue where there is a decrease in blood and oxygen intake to the brain (30).

The limitation of this research is that no control group can be used to compare the effects of providing the intervention. In addition, the duration of the intervention is less than in previous research; this happened because the COVID-19 pandemic was in a stage where it was showing improvement when this research was carried out, so lectures were conducted online as many UNIRES residents have returned to their homes. In addition, the fitness intervention was carried out individually without supervision as it could not be carried out to determine whether participants did as the instructor instructed.

CONCLUSION AND SUGGESTION

Providing aerobic intervention was associated with an increase in participants' memorization abilities. However, it does not increase fitness levels. There is no significant relationship (p 0.508 greater than p 0.05) between VO2 max as an embodiment of fitness level and the length of memorization time, both before and after training. Suggestions for further research are to increase the duration of the intervention, increase the number of participants, and create a control group as a comparison.

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REFERENCE

1. Zubala A, MacGillivray S, Frost H, Kroll T, Skelton DA, Gavine A, et al. Promotion of physical activity interventions for community dwelling older adults: A systematic review of reviews. Vol. 12, PLoS ONE. 2017. 1–36 p.
2. Mandolesi L, Polverino A, Montuori S, Foti F, Ferraioli G, Sorrentino P, et al. Effects of Physical Exercise on Cognitive Functioning and Wellbeing: Biological and Psychological Benefits. Front Psychol [Internet]. 2018 Apr 27;9:509. Available from: https://www.ncbi.nlm.nih.gov/pubmed/29755380
3. Michael Northey J, Cherbuin N, Louise Pumpa K, Jane Smee D, Rattray B. Exercise interventions for cognitive function in adults older than 50: a systematic review with meta-analysis. Br J Sports Med [Internet]. 2018 [cited 2019 Dec 2];52:154–60. Available from: http://dx.doi.org/10.1136/bjsports-2016-096587
4. Biddle SJH, Atkin AJ, Cavill N, Foster C. Correlates of physical activity in youth: a review of quantitative systematic reviews. Int Rev Sport Exerc Psychol [Internet]. 2011 Mar 1;4(1):25–49. Available from: https://doi.org/10.1080/1750984X.2010.548528
5. Luo L, Fergus ;, Craik IM. Aging and Memory: A Cognitive Approach. 2008.
6. Martin J, Li C. Normal Cognitive Aging. In: Brocklehurst's Textbook of Geriatric Medicine and Gerontology. 8th ed. Elsevier; 2017. p. 171–8.
7. Aulia F. MANAJEMEN PROGRAM TAHFIDH AL-QURAN DI PONDOK PESANTREN YANBU'UL QUR'AN KUDUS JAWA TENGAH. [Semarang]: UNIVERSITAS ISLAM NEGERI WALISONGO SEMARANG; 2020.
8. Saputra F. Evaluasi Program Tahfidz Al Qur'an di Pondok Pesantren Miftahul Jannah Bandar Lampung. [Lampung]: UIN Raden Intan Lampung; 2021.
9. Sarwanto M, Iman N, Saputro AD. Pengaruh Aktivitas Menghafal Al-Qur'an terhadap Kedisiplinan dan Prestasi Belajar Santri Pondok Pesantren Tahfidz Al-Qur'an Aisyiyah Ponorogo. Jurnal Mahasiswa Paskasarjana [Internet]. 2020 [cited 2022 Oct 7];1(1). Available from: https://studentjournal.umpo.ac.id/index.php/JMP/article/view/745
10. UMY. Visi & Misi | Universitas Muhammadiyah Yogyakarta [Internet]. 2019 [cited 2020 Jan 4]. Available from: http://www.umy.ac.id/profil/visimisi

11. Unires. Unires Asrama Mahasiswa UMY [Internet]. 2021 [cited 2023 Oct 25]. Available from: https://unires.umy.ac.id/about/
12. WHO. People-Centred Health Care. 2007.
13. Ohrnberger J, Fichera E, Sutton M. The relationship between physical and mental health: A mediation analysis. Soc Sci Med. 2017 Dec 1;195:42–9.
14. Anguera JA, Volponi JJ, Simon AJ, Gallen CL, Rolle CE, Anguera-Singla R, et al. Integrated cognitive and physical fitness training enhances attention abilities in older adults. npj Aging. 2022 Aug 30;8(1).
15. Koščak Tivadar B. Physical activity improves cognition: possible explanations. Biogerontology. 2017 Aug 10;18(4):477–83.
16. McEwen SC, Siddarth P, Abedelsater B, Kim Y, Mui W, Wu P, et al. Simultaneous Aerobic Exercise and Memory Training Program in Older Adults with Subjective Memory Impairments. Journal of Alzheimer's Disease. 2018;62(2):795–806.
17. Donnelly JE, Hillman CH, Castelli D, Etnier JL, Lee S, Tomporowski P, et al. Physical activity, fitness, cognitive function, and academic achievement in children: A systematic review. Med Sci Sports Exerc. 2016;48(6):1197–222.
18. Kemala RT. Gambaran Kemampuan Jalan 6 menit dan Skala Borg pada Pasien Gagal Jantung yang Mendapat Program Rehabilitasi Jantung di Divisi Jantung RS Kariadi. [Semarang]: Universitas Diponegoro; 2003.
19. Body Project. 30 minute fat burning home workout for beginners. Achievable, low impact results [Internet]. 2019 [cited 2023 Oct 25]. Available from: https://www.youtube.com/watch?v=gC_L9qAHVJ8
20. World Health Organization. Global recommendations on physical activity for health. 2010.
21. Sharma J, Kumari M, Singh S, Yadav megha, sharma Y, Kumari mangalam. The Role of Digitalized Aerobic Exercise Training on Quality Of Life among Collegiates during Pandemic Covid Lockdown. Vol. 9, International Journal of All Research Education and Scientific Methods (IJARESM). 2021.
22. Nogueira De Souza PV, Olegário RL, Lima A, Ribeiro A, Nogueira De Souza[1] PV, Lopes Olegário[1] R, et al. Aerobic Exercise and Health Benefits Opinion J Phy Fit Treatment & Sports Aerobic Exercise and Health Benefits. J Phy Fit Treatment & Sportsl [Internet]. 2020;7(4). Available from: https://www.researchgate.net/publication/339040549
23. Zhou Z, Li S, Yin J, Fu Q, Ren H, Jin T, et al. Impact on physical fitness of the chinese champs: A clustered randomized controlled trial. Int J Environ Res Public Health. 2019 Nov 2;16(22).
24. Morente-Oria H, Ruiz-Montero PJ, Chiva-Bartoll Ó, González-Fernández FT. Effects of 8-weeks concurrent strength and Aerobic training on body composition, physiological and cognitive performance in older adult women. Sustainability (Switzerland). 2020 Mar 1;12(5).
25. Rogers A, Furler BL, Brinks S, Darrah J. A systematic review of the effectiveness of aerobic exercise interventions for children with cerebral palsy: an AACPDM evidence report. Dev Med Child Neurol [Internet]. 2008 Nov 1;50(11):808–14. Available from: https://doi.org/10.1111/j.1469-8749.2008.03134.x
26. van Dongen E V., Kersten IHP, Wagner IC, Morris RGM, Fernández G. Physical Exercise Performed Four Hours after Learning Improves Memory Retention and Increases Hippocampal Pattern Similarity during Retrieval. Current Biology. 2016 Jul 11;26(13):1722–7.
27. Gorrell S, Shott ME, Frank GKW. Associations between aerobic exercise and dopamine-related reward-processing: Informing a model of human exercise engagement. Biol Psychol. 2022 May 1;171.

28. Weinberg L, Hasni A, Shinohara M, Duarte A. A single bout of resistance exercise can enhance episodic memory performance. Acta Psychol (Amst). 2014 Oct 1;153:13–9.
29. Phan D Van, Chan CL, Pan RH, Yang NP, Hsu HC, Ting HW, et al. A study of the effects of daily physical activity on memory and attention capacities in college students. J Healthc Eng. 2018;2018.
30. Vanhelst J, Béghin L, Duhamel A, Manios Y, Molnar D, De Henauw S, et al. Physical Activity Is Associated with Attention Capacity in Adolescents. Journal of Pediatrics. 2016 Jan 1;168:126-131.e2.