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RESEARCH ARTICLES

The Effect of the Number of Dhuha Prayer Rakaat on the Heart Rate of Elderly Muslim Women in UPTD. Binjai Elderly Social Services in 2023

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Abstract: Dhuha prayer is a physical activity with light-moderate intensity that can induce the activity of the parasympathetic nerve and suppress the activity of the sympathetic nerve through the release of alpha waves of the brain. The intensity of exercise or physical activity with heart rate has a linear relationship. This study aims to determine the effect of the number of prayers on the heart rate of elderly Muslim women in the 2023 Binjai Senior Social Service UPTD. This type of research is experimental in *one group community* on all elderly Muslim women aged 60-80 years at UPTD. Social Services for the Elderly. The sample will perform dhuha prayers of 2-8 rak'ahs, and after completing 2 rak'ahs, will be measured by heart rate using *a Pulse Oximeter*. The results of the Pearson *Correlation* test showed a significant influence or correlation between the number of rak'ahs of dhuha prayer on heart rate (p=0.76). The results of *the One-Way ANOVA* test showed significant changes in heart rate in each number of rak'ahs of dhuha prayer with a p<0.001 value. There is an influence of the number of rak'ahs of dhuha prayer on the heart rate of the elderly, and meaningful changes in heart rate in each number of rak'ahs of dhuha prayer.

Keywords: Physical activity, heart rate, number of rak'ahs, elderly, dhuha prayer

INTRODUCTION

Elderly (elderly) is an early stage in the development of individuals with an age limit of 60 years and above. Elderly is a condition characterised by a person's failure to maintain balance against physiological stress conditions. The elderly are divided into several groups. WHO divides the age group of the elderly as follows: 45-59 (*middle age*), 60-74 years (elderly), 75-90 years (very *old*), >90 years (*very old*).[2,6]

The heart rate originates from the heart's special conduction system and spreads through this system to all parts of the myocardium. The structures that make up the conducting system are the sinoatrial node (SA node), the internode trajectory in the atrium, the atrioventricular node (AV

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node), the His bundle and its branches, and the Purkinje system [2,3]

Pulse is a wave felt in the arteries that results from the pumping of blood by the heart to the blood vessels. The frequency of the pulse rate for a normal person is the same as the heart rate. This pulse is easily palpable somewhere where the artery passes in front of the wrist. Blood pushed towards the aorta not only moves forward in the blood vessels, but also creates pressure waves that travel along the arteries. The pressurised wave stretches the artery wall throughout its journey, and the strain can be felt as a pulse at any given time. The heart rate is mainly determined by the balance between inhibition of the SA node by the vagus nerve and stimulation by the sympathetic nerve of the heart. The heart rate can be altered to be faster or slower than this resting state by altering the balance of autonomic nerve stimulation.[4,5]

In a normal human heart, each beat originates from the sinoatrial node, which is the normal sinus rhythm. The greater the metabolism in an organ, the greater the blood flow. This causes the heart to compensate by speeding up its pulse and increasing the amount of blood flow pumped from the heart to the rest of the body. Normal pulse rate can be categorised according to age, namely: adults 60-80 times per minute, children 80-100 times per minute and infants 100-140 times per minute.[2]

Prayer is an obligation for all Muslims to pray five times a day. Allah SWT said in Surah Al Baqarah, namely

وَأَقِيمُوا الصَّلَاةَ وَآتُوا الزَّكَاةَ ۚ وَمَا تُقَدِّمُوا لِأَنْفُسِكُمْ مِنْ خَيْرٍ تَجِدُوهُ عِنْدَ اللَّهِ ۗ إِنَّ اللَّهَ بِمَا تَعْمَلُونَ بَصِيرٌ

Means: *"And establish prayers and pay zakat. And whatever good you do for yourself, you will certainly be rewarded with Allah. Indeed, Allah is All-Seeing of what you do."* (QS. Al Baqarah: 110)[1]

Prayer is comparable to doing light-intensity exercises, as most joints and muscles experience movement during different positions and movements while praying. Prayer is one of the religious activities that can cause a relaxation response through faith. Prayer has great virtues and benefits to create health and peace of mind. When praying, spirituality moves towards the Almighty. The mind is detached from the real state, and the five senses are detached from all sorts of complexities of events around it, including its attachment to its bodily sensations such as sadness, anxiety, anxiety, and fatigue. On a simple level, prayer can mean a *coping mechanism*. This mechanism will increase a person's immunity to stress, which in the medical world is called *stress tolerance,* where the high and low *stress tolerance* in a person is determined by the *coping mechanism* [7,8]

Sunnah prayers or also known as *tathawwu'* prayers, are prayers outside of the five obligatory prayers that are recommended to be performed. This prayer is required both that accompany the obligatory prayer (*rawatib*), such as *the qabliah* and *ba'diyah* prayers, and those that do not accompany the obligatory prayers, such as the tahajjud, dhuha and tarawih

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prayers. Dhuha prayer activities are carried out in the morning, namely when the sun is rising as high as a spear or around between seven, eight, and nine o'clock, until the time of the Dhuhr prayer. Dhuha prayer is performed in the amount of 2, 4, 8, or 12 rak'ahs. And it is done in units of 2 raka'at once salam.[9]

Based on Doufesh's research conducted in 2013, which aimed to compare the effect of dhuha prayer on heart rate and blood pressure after praying and imitating prayer movements (standing, prostrating, prostrating, and sitting tahiyat). The results obtained after praying and imitating the prayer movements revealed that the prostration position had recorded the lowest heart rate, while the standing position had recorded the highest heart rate. This states that the heart rate in the prostrate position is lower than in the standing position.[10]

Meanwhile, based on the research of Moch. Arief Prasetya in 2021 stated that the maximum heart rate at the intensity of prayer was 40% at 2 rakaat, 43% at 4 rakaat, 43% at 6 rakaat, 45% at 8 rakaat, 45% at 10 rakaat, and 46% at 12 rakaat. Based on the average value, prayers with categories of 2,4,6,8,10, and 12 rak'ahs include *light or low intensity physical activity* [7]

METHOD

This type of research is an experimental research on *one group of the community* of all elderly Muslim women at UPTD. Binjai Elderly Social Services in 2023. The inclusion criteria in this study are the elderly with an age range of 60-80 years who carry out dhuha prayers in a perfect position and have effective communication skills. The exclusion criteria are the elderly who do not want to perform the dhuha prayer with balance disorders and who have dementia. The elderly will perform dhuha prayers of 8 rak'ahs, where every time they perform 2 rak'ahs, the heart rate of elderly Muslim women is measured using *the Pulse Oximeter*. After completing the dhuha prayer of 8 rak'ahs, the respondents rested by lying down for 5 minutes.

In this study, the Shapiro-Wilk normality test was used and then continued with the Spearman *Correlation* test to determine the influence between the free variable and the bound variable while to see the comparison of heart rate changes in each rak'ah of dhuha prayer using *the One Way ANOVA* test if the data was normally distributed, while the data that was not normally distributed used the *Kruskal-Wallis* test and continued with *post hoc tests.*

RESULT

This research has been carried out based on the approval of the Ethics Committee with the number involving 34 elderly people aged 60-80 years, with an average sample age of 68.94 ± 4.12 years. The results of the respondent's heart rate measurement.

Table 1. Heart Rate Measurement Results

The Number of Rakaat Dhuha Prayers	Mean ± SD (Times per minute)	Trust Index 95% (Min-Maks)	p* Value
2 Rakaat	83,26 ± 4,61	70-91	0,07

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4 Rakaat	87,76 ± 4,20	77-97	0,74
6 Rakaat	92,59 ± 3,98	84-101	0,72
8 Rakaat	97,15 ± 4,80	87-105	0,22

Normality test: Shapiro-Wilk*

Based on Table 1, it can be seen that the heart rate increases along with the increase in the number of rak'ahs of dhuha prayer, with a maximum heart rate of 105 times per minute in the 8-rak'ah dhuha prayer.

Furthermore, a normality test was carried out using *the Shapiro-Wilk* test, and all data showed normal distribution results, so that analysis could be carried out using *the Spearman Correlation test* to determine the effect of the number of rak'ahs of dhuha prayer on heart rate and the following results were obtained:

Table 2. Pearson Correlation Test Results

	Heartbeat
The Number of Rakaat Dhuha Prayers	r = 0,767 p<0,001 n=34

Based on Table 2, the results of bivariate analysis using *the Pearson Correlation test* obtained a value of p<0.001 (p<0.05), which means that there is a significant influence or correlation between the number of rak'ahs of dhuha prayer on the respondent's heart rate. The Pearson *Correlation value* (r) of 0.767 shows that the correlation strength is strong and the direction of the correlation is positive, which means that the greater the number of rak'ahs of dhuha prayer, the higher the respondent's heart rate.

Next, the One-Way ANOVA *test was carried out* to see a comparison of heart rate changes in each rak'ah of dhuha prayer and the results were obtained as follows:

Table 3. Results of *the One-Way ANOVA Test*

The Number of Rakaat Dhuha Prayers	N	Mean ± SD (Times per minute)	P Value
2 Rakaat	34	83,26 ± 4,61	<0,001
4 Rakaat		87,76 ± 4,20	
6 Rakaat		92,59 ± 3,98	
8 Rakaat		97,15 ± 4,80	

Based on Table 3, the results of the analysis using *the One-Way ANOVA* test showed a value of p<0.001 (p<0.05), which means that there is a comparison of meaningful changes in heart rate in each number of rak'ahs of dhuha prayer.

Based on Table 4, the comparison of the average heart rate in each group is said to be meaningful if p<0.05. Thus, the comparison of the average heart rate was obtained in the group of 4 rakaat with 2 rakaat, 6 rakaat with 2 rakaat, 8 rakaat with 2 rakaat, 6 rakaat with 4 rakaat, 8 rakaat with 4 rakaat and 8 rakaat with 6 rakaat.

Table 4. *Bonferroni's Post Hoc Results*

The Number of Rakaat Dhuha Prayers	Average Difference Heart Rate	Trust Index 95%		P Value
		Border Below	Border Above	
4 Rakaat vs 2 Rakaat	4,50	1,63	7,37	<0,001
6 Rakaat vs 2 Rakaat	9,32	6,46	12,19	<0,001
8 Rakaat vs 2 Rakaat	13,88	11,01	16,75	<0,001
6 Rakaat vs 4 Rakaat	4,82	1,96	7,69	<0,001

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8 Rakaat vs 4 Rakaat	9,38	6,51	12,25	<0,001
8 Rakaat vs 6 Rakaat	4,55	1,69	7,43	<0,001

DISCUSSION

The results of this study show that there is an influence between the number of rak'ahs of dhuha prayer on the heart rate of the respondents (p<0.001) with a strong correlation (r=0.767) and a positive value where the higher the number of rak'ahs of dhuha prayer, the higher the respondent's heart rate where the maximum heart rate at the number of 8 rak'ahs is 105 times per minute. Previous research on the relationship between the number of rak'ahs of dhuha prayer and increased heart rate in 42 respondents aged 18-24 years in East Java found a strong relationship (r=0.637) between the intensity of prayer and the increase in heart rate, with a value of p=0.000 (p<0.05).[7] Another study on the effect of the position of the 8 rakaat dhuha prayer movement on blood pressure and heart rate in 37 elderly Muslim women in Binjai found that the average heart rate of patients after performing the dhuha prayer was 75.83 times per minute with a maximum value of 90 times per minute and the effect before and after 8 rak'ahs of dhuha prayer was obtained on heart rate with a value of p=0.003 (p<0.05).[11]

Prayer, as a spiritual activity and physical activity, is carried out with movement and reading. The prayer movement involves almost all the muscles and joints of the body, such as the shoulders, wrists, elbows, fingers, spine, pelvis, feet, ankles, toes and others. Prayer is similar to light exercise that causes muscle contractions, isometric and isotonic.[12] The body's response to muscle contractions leads to the compression of blood vessels involving local and systemic mechanisms. To maintain blood flow, the body will respond with local mechanisms such as decreased tissue PO2, increased tissue PCO2, and the accumulation of K+ and other vasodilator metabolites. The systemic cardiovascular response is affected by isometric and isotonic types of muscle contractions that can increase heart rate. The heart rate is produced by the action potential in the sinus node that runs from the lateral wall of the atrium to the ventricles. This makes the ventricles pump blood to the vascular system [7]

In general, cardiovascular physiology in older adults is affected by: (1) endothelial dysfunction, (2) increased arterial stiffness, (3) increased stiffness of the left ventricle, (4) changes in the relationship between the left ventricle and the stiffness of arterial function, (5) weakening of baroreflexes and autonomic reflexes, and (6) degenerative changes of the conduction system. These changes result in a cardiovascular system that experiences a decrease in maximum function compared to younger people and less reserve capacity, and can fail to meet needs when stressed.[13]

It is important to know that the pulse is a reflection of ventricular contraction, but not in patients with tachyarrhythmia. The heart rate is a reflection of sympathetic and parasympathetic control. In general, the

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maximum heart rate decreases with age due to the increase in interstitial sympathetic neurotransmitters and the resulting regulation of beta-1 receptor activity, which decreases the signals and intracellular responsiveness of the sympathetic nervous system. Resting heart rate, on the other hand, is often seen to increase with age due to deconditioning and autonomic dysregulation.[14]

The prayer movement is called *Namaz,* according to Haque and Ghosh, which is a form of physical exercise of mild intensity and good exercise for the heart. The prayer movement involves all parts of the body, which are done 5 times a day for the obligatory prayer, with the addition of the sunnah prayer, so that it is able to maintain the body at all times without causing stiffness or fatigue.[15] In addition, according to other studies, prayer includes *low-intensity* physical activity that can help with relaxation, reduce stress, improve blood flow, and strengthen muscles and joints.[16]

A study explains that when a person performs the dhuha prayer, he will feel and acknowledge the Almighty Allah, who is worthy of worship. By performing the dhuha prayer, the heart becomes calm, in accordance with the word of Allah which means: " Those who believe and their hearts become at peace with the remembrance of Allah. Remember, it is only by remembering Allah that the heart becomes at peace." (Qs. Ar-ra'du: 28). Dhuha prayers that are done with sincere intentions and hearts will improve positive emotions that will be reflected in a healthy life. Dhuha prayer affects the physiology of blood pressure and pulse because the relaxation felt when performing the dhuha prayer can activate the parasympathetic nervous system. When the body is relaxed, the body will affect the pituitary gland, which will produce endorphin hormones. Endorphin hormones are neuromodulators that work indirectly by lowering the specific effects of catecholamine neurotransmitters. Decreased catecholamine levels in blood vessels can result in a reduced heart rate and lower blood pressure.[17]

Based on the results of this study, it was found that there was a comparison of heart rate in each number of rak'ahs of dhuha prayer with a value of $p<0.001$ ($p<0.05$). Previous research on the relationship between the number of rak'ahs of dhuha prayer and the increase in heart rate explained that there was a significant difference in heart rate in each intensity or number of rak'ahs of dhuha prayer, with a value of $p=0.001$ ($p<0.05$).[7]

Another study found that prayer manoeuvres are equivalent to light exercise in terms of the value of physical exercise. Prayer also contributes to improving the ability of the cardiovascular system. Low heart rate values in the prostrate position lower systolic blood pressure both in the actual prayer and in imitation of prayer movements. Prayer, in this case, can be used as therapy for patients who have heart problems such as hypertension or problems with the musculoskeletal system. The heart rate in the actual prayer is slightly higher than that of the imitation of prayer movements, due to its recitation activity,

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providing additional physiological benefits that are good for the body.[10]

The intensity of exercise or appropriate physical activity can be beneficial for physical fitness, namely cardiorespiratory endurance, as a function of the ability of the heart and lungs when resting or doing activities to take oxygen and distribute it throughout the body. The body's adaptation to physical fitness exercises can affect the efficiency of the heart's work, an increase in the contents of the blood and stronger heart contractions. So that the heart rate during the respiratory system decreases or is below the normal rate.[18] The benefits of light-intensity physical exercise were proven in several studies by applying 3 months of low-intensity exercise to older adult participants, showing improved results in all physical domains as well as improved sense of well-being and improved physical performance. In addition, other studies on physical exercise interventions for depression in older adults showed a significant reduction in depression after the 6-month intervention, as well as follow-up check-ups at 12 and 60 months.[7] Prayer as a light-intensity physical activity can improve coordination, circulation, balance, aerobic capacity, and reduce the risk of hemorrhagic stroke.[14]

Previous studies have explained that the intensity of exercise or physical activity has a linear relationship with heart rate. If the intensity is increased, there will be an increase in heart rate, and vice versa. However, under certain conditions, the heart rate has a threshold point, so there is no linear increase, or it becomes curved, which means that when the physical activity reaches its maximum point, the change in heart rate does not follow the increase in intensity.[7]

A study found that prayer, as a physical activity with light-moderate intensity, can reduce elastin fragmentation in the aortic wall through the expression of matrix metalloproteins (MMP) 2 and 9, which are responsible for the degradation of elastic fibres in blood vessels.[19] Other studies have also explained that blood speed is related to vascular remodelling. The functional and structural adaptation of the human artery due to the movement of blood resulting from repeated episodic exposure to physical activity can improve the human hemodynamics formed from blood flow, luminal shear pressure, arterial pressure and tangential wall pressure, which all alter the function of the arteries, the diameter and thickness of the walls of the blood vessels.[20,21]

Dhuha prayer is a physical activity that is very light in intensity and can improve circulation, coordination and aerobic capacity. When performing prayer movements that begin with takbir and will end with salam. In some studies, the highest HR is obtained during prayer when performing standing movements, and the lowest HR is when prostrating.[7] The implementation of the dhuha prayer on a person will get the spirit given by Allah SWT and feel that there is closeness to the creator. When a person relies on Allah SWT, his soul will be able to live a life full of tests and trials. A person who often prays

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will have a strong soul despite many challenges in life. The time to perform dhuha prayer is at the beginning of every day before activities.[22]

When the sun begins to rise, the hormone cortisol begins to be produced and functions to trigger the body's organs to be active. This is in accordance with the hadith, which means: “In the morning, it is required for all joints among you to give alms. Every recitation of the rosary (subhanallah) can be as almsgiving, every tahmid (alhamdulillah) recitation can be as almsgiving, every tahlil recitation (laa ilaha illallah) can be as almsgiving, and every takbir recitation (Allahu akbar) can also be as almsgiving. Likewise, amar ma'ruf (inviting obedience) and nahi mungkar (forbidding evil) are alms. All of this can be satisfied (replaced) by performing the Dhuha prayer as many as 2 rak'ahs" *(*HR. Muslim no. 720.).[11]

Dhuha prayer will affect the performance of the glands in our body because at the time of prayer, Allah has determined movements that are indeed adjusted to the human body. When doing rukuk functions to increase three glands, namely the sexual glands, digestive glands and coccyx glands. When prostrating will function in three glands as well, namely the thyroid gland in the neck, the pituitary gland and the hypothalamic gland. In these three glands, there will be blood intake at the time of prostration, because in prostration, it is located higher than the heart; therefore, the blood flow is difficult to reach, so in this prostration, it is a very glorified movement because of the form of prostration of gratitude to the creator, namely Allah SWT. [11,23]

Dhuha prayer has many benefits, namely, it can motivate a person to complete work, Dhuha prayer can reduce fortune and has the value of charity. A person who performs the dhuha prayer will grow physical strength. Allah SWT has promised that when performing the dhuha prayer, he will make a quick profit and reward a beautiful house made of gold in the hereafter, and will forgive sins even if his sins are as much as foam in the sea. The dhuha prayer will be a protector from the heat of hellfire. Allah SWT also promises that people who pray dhuha regularly will be made a special door in paradise in the future, namely the dhuha door.[24] Regular prayers can have a positive effect on the quality of life and physical freshness, such as strength, resilience, flexibility, balance and coordination in the elderly.[22]

CONCLUSION

The conclusion is that there is an effect of the number of rak'ahs of dhuha prayer on the maximum heart rate of the elderly by ($p<0.001$, $r=0.767$) and a significant change in heart rate was found in each number of rak'ahs of dhuha prayer ($p<0.001$).

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