Jurnal Kesehatan Budi Luhur, Vol. 18, No. 2 (2025), July 2025
p-ISSN 1978-8479
e-ISSN 2581-0111

THE EFFECTS OF AEROBICS AND SOY MILK ON TRIGLYCERIDES AND MENOPAUSAL SYMPTOMS

Dhea Novita[1], Rr Sri Endang Pujiastuti[1], M Choiroel Anwar[1], Septiwiyarsi[1]

[1)]STIKes Bhakti Husada Cikarang

ABSTRACT

The decrease in estrogen production during menopause affects the quality of life with the emergence of menopausal symptoms and increases the risk of cardiovascular disease. After the menopause transition, when estrogen levels in a woman's body decrease, the risk of cardiovascular disease increases rapidly, and at older ages, women have the same or even slightly higher risk of cardiovascular events as men. Low-impact aerobic exercise for 20-30 minutes, three times a week for two weeks, will have a positive effect on quality of life. The administration of soy has the potential to reduce menopausal symptoms and complaints due to its phytoestrogen content. Phytoestrogens have a structure and function similar to estrogen. Phytoestrogens are also known to have potential as an alternative hormone replacement therapy to alleviate premenopausal symptoms such as hot flushes caused by the decrease in estrogen hormone levels in the body. The objective of this study is to specifically determine the effects of low-impact aerobic exercise and soybean milk on triglyceride levels and menopausal symptoms in menopausal groups. This research was a Quasi-Experiment with a pretest-posttest design with a control group. The result shows that low-impact aerobic exercise and soy milk have an effect on reducing triglyceride levels with a p-value of 0.000 <0.05 and a mean delta reduction of 72.0. It can be concluded that there is an effect of low-impact aerobic exercise and soy milk on triglyceride levels and reduce menopausal symptoms in the menopausal group.

Keywords: Low impact aerobic, soy milk , triglycerides, menopausal symptoms

Correspondence:

Dhea Novita
Bhakti Husada Health College Cikarang
Jl. RE. Martadinata , Karangbaru , North Cikarang , Bekasi Regency , West Java
deanovita957@gmail.com

INTRODUCTION

Menopause is the cessation of ovarian follicle activity that leads to the permanent end of menstruation at the end of the reproductive life. Menopause is a period when women will experience changes, necessitating optimal healthcare services to address these issues. The problems that often arise and are experienced by menopausal women, especially physical, psychological, and social changes, will have negative effects that will impact their quality of life (Chaudhari et al., 2022).

Indonesian women generally experience the pre-menopause phase at the age of 40-50 years. Each year, the population of menopausal women increases by about three percent. Rough estimates suggest that there will be around 30-40 million elderly women out of the total Indonesian population, which ranges from 240-250 million. The population in Indonesia in 2021 was 273,879,750 people, consisting of 138,303,472 male residents and 135,576,278 female residents. (Kementerian Kesehatan Republik Indonesia, 2017)

The end of the menstrual period (menopause) is often accompanied by a number of symptoms. The typical symptom of menopause is hot flushes experienced by most women during the transition period. Some may experience them one or two years before menopause, while others may have symptoms for a decade, and a small percentage do not experience hot flushes. Other symptoms include depressed mood and increased anxiety. About 66.7% of women have moderate symptoms, 20% complain of severe symptoms, and 13.3% report mild symptoms. The prevalence of severe symptoms in menopausal women during the transition period is: sleep disturbances (26.66%), anxiety (23.33%), irritability (20%), and vaginal dryness (20%). Moderate symptoms include heart disturbances (46.66%), depressive mood (43.33%), sexual problems (40%), joint and muscle problems (46.66%), and hot flushes (26.66%). Menopausal symptoms and the quality of life of menopausal women are closely related. The severity of menopausal symptoms experienced by menopausal women will impact their quality of life. (Thuwaibah Raabia & Augustina, 2022)

Confounding factors that can affect Menopause Quality Of Life (MENQOL) include income, parity, and education. A low income level is related to a person's education, and the level of education greatly influences a person's knowledge. Although the significance of these two factors in influencing the age of menopause still varies, menopause tends to occur earlier in women with lower-middle socioeconomic status and lower levels of education. Socioeconomic status affects physical, health, and educational factors. If these factors are sufficiently good, where someone with adequate socioeconomic status can usually meet their health needs, and someone with higher education will have good knowledge of the physical changes that occur in menopausal women, because it is a physiological matter that can reduce physiological and psychological burdens. In terms of parity, women with four or more children are associated with an increased number of hot flushes. (Chaudhari et al., 2022)

Based on the results of previous researchers, it was shown that the group of menopausal women who regularly performed low-impact aerobic exercises were better than the group of menopausal women who did not exercise. One of the physical activities that can be performed is aerobic exercise. Low-impact aerobic exercise for 20-30 minutes with a frequency of 3 times a week for 2 weeks will have a positive effect on quality of life. The movements performed in aerobic exercise can be of low intensity. Aerobic exercise can increase the production of hypothalamic β-endorphins, which can stabilize temperature, thereby reducing the frequency of hot flashes and improving quality of life. (Pujiastuti & Novita, 2023)

The decrease in estrogen production during menopause affects the quality of life with the emergence of menopausal symptoms and increases the risk of cardiovascular disease. Women are protected from vascular diseases for approximately the first five decades of their lives, an effect largely attributed to female sex hormones, particularly estrogen. After the

menopause transition, when estrogen levels in a woman's body decrease, the risk of cardiovascular disease rises rapidly, and in older age, women have the same or even slightly higher risk of cardiovascular events as men. (Hoier et al., 2021)

The administration of soy has the potential to reduce menopausal symptoms and complaints due to its phytoestrogen content. Phytoestrogens have a structure and function similar to estrogen. Phytoestrogens can bind to estrogen receptors, allowing them to alleviate hot flashes, thicken the endometrium, increase elasticity and lower vaginal pH, enhance bone density, inhibit atherosclerosis, and improve brain function. The content found in soy milk is phytoestrogens, which are a group of plants such as legumes, grains, vegetables, and fruits that have properties similar to the hormone estrogen. Phytoestrogens are also known to have potential as an alternative hormone replacement therapy to reduce premenopausal symptoms such as hot flashes caused by the decrease in estrogen levels in the body. Thus, when menopausal symptoms are alleviated, the quality of life for menopausal women will improve. (Ahmadieh & Jradi, 2021)

Based on previous researchers' findings, there is an effect of soy milk consumption, namely the reduction of cholesterol and triglyceride levels in patients with hypercholesterolemia and hypertriglyceridemia (Hamid et al., 2022). Although the results were not significant, there was an average decrease in triglyceride levels of 6.3 mg/dL. Soy milk is one of the processed products that is the result of extracting from soybeans. Soy milk protein has an amino acid composition that is almost identical to cow's milk, so soy milk is often used as a substitute for cow's milk for those who are allergic to animal proteins. In 1 gram of soybeans, there are 3.5 mg of isoflavones. Every day, menopausal women need 15 grams to meet the deficiency of estrogen hormones in their bodies, which can be fulfilled by consuming 250 ml of soy milk daily. Consume soy milk every day for 2 weeks so that the body can adapt to the soy milk content, which is almost similar to estrogen hormones, for better results. (Ritonga et al., 2021)

Soy milk is a highly nutritious beverage, especially in terms of its protein content. In addition, soy milk also contains fats, carbohydrates, calcium, phosphorus, iron, provitamin A, vitamin B1, vitamin B2, and isoflavones, and it does not contain cholesterol. The nutrients contained in soy milk can provide energy and keep the body functioning optimally, minimize cholesterol levels in the blood, and reduce hot flush symptoms that can improve the quality of life during menopause. (Chen & Chen, 2021)

Although isoflavones do not have a direct effect on lowering cholesterol and triglyceride levels, isoflavones have an anti-atherogenic effect by preventing LDL oxidation through interaction with apo A1 and accumulating in lipoproteins in vitro. The accumulation of genistein (an isoflavone aglycone) in lipoproteins may explain the increased resistance of LDL to oxidation during soy isoflavone intake. There is research on the intake of isoflavones combined with physical exercise being more effective than either isoflavone supplementation or physical exercise alone in improving lipid profiles and inhibiting factors that contribute to the development of cardiovascular disease risk. The experiment was conducted on ovariectomized rats divided into several groups. That is a group that only given food regular, the group given foods that contain isoflavones, group given exercise physical, and the group given combination foods that contain Isoflavones and exercise physical . The data obtained in repair lipid profile namely group mouse ovariectomy with combination food contain Isoflavones and exercise physique own level total cholesterol, triglycerides, LDL cholesterol more low and have level higher HDL cholesterol tall from group that only given food contain Isoflavones or exercise physical. Deficiencies estrogen cause addition weight and dyslipidemia, which are factor risk for disease cardiovascular.(Chen & Chen, 2021)

METHOD

This study employed a quasi-experimental design with a pretest-posttest control group. The research involved two groups: an intervention group and a control group. Both groups underwent pretest and posttest assessments. The intervention group participated in low-impact aerobic exercise three times per week for two weeks and received 250 ml of soy milk daily during the same period. The aerobic exercise routines were modified based on existing literature and expert consultation to suit menopausal women. The control group received only 250 ml of soy milk daily for two weeks without the exercise component.

The study was conducted in two community health centers: Padangsari Health Center, which oversees 16 elderly integrated health service posts with a total of 331 members, and Pudakpayung Health Center, which oversees 15 similar posts with a total of 312 members. Each posyandu group consists of approximately 20–30 members. From this population, 66 women met the initial target criteria. After applying inclusion and exclusion criteria, 30 participants were allocated to the intervention group and 30 to the control group.

Before the intervention, a pretest was conducted to measure triglyceride levels and administer the Menstrual Symptom Questionnaire (MSQ). Following the two-week intervention period, a posttest was conducted using the same measurements and tools for both groups.

The inclusion criteria for this study were as follows: participants were menopausal women aged 45 to 55 years who were registered members of elderly integrated health service posts (posyandu lansia) within the working areas of the Padangsari and Pudakpayung Health Centers in Semarang City, Central Java. Eligible participants were those who were willing to participate in the study and committed to attending six sessions of elderly gymnastics over a two-week period. In addition, only those who were not currently taking medications aimed at reducing triglyceride levels were included.

The exclusion criteria included menopausal women within the same age range who had serious health conditions, such as heart failure, arrhythmias, or severe aortic stenosis, as well as those experiencing acute illnesses like fever, flu, or dizziness at the time of recruitment. Furthermore, participants who failed to complete the six scheduled elderly gymnastics sessions during the intervention period were also excluded from the study.

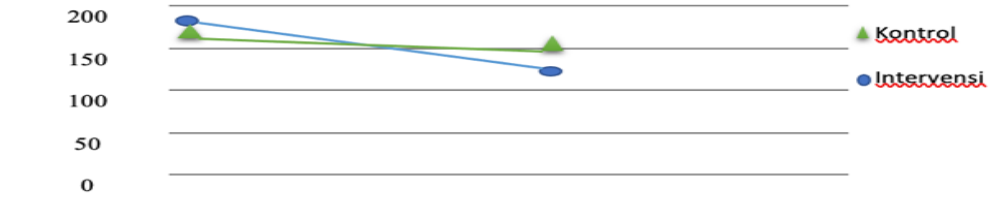
RESULTS

This section presents the effects of low-impact aerobic exercise combined with soy milk consumption on triglyceride levels in menopausal women. The comparison between pre-test and post-test results in both the intervention and control groups is shown in Table 1. Table 1 shows the effect of low-impact aerobic exercise and soy milk on triglyceride levels. In the intervention group, there was a significant decrease in triglyceride levels, with a Sig. (2-tailed) value of 0.000, which is less than 0.05, indicating a statistically significant difference before and after the intervention. The standard deviation of triglyceride levels in this group was 89.7. In contrast, the control group showed no statistically significant change in triglyceride levels, with a Sig. (2-tailed) value of 0.204, which is greater than 0.05. The standard deviation in this group was 66.3.

Table 1. Statistics Triglyceride Level Measurement

Triglyceride Level Measurement	Mean	SD	Sig.(2-tailed)
Intervention	*72.0*	*89.7*	*p- 0.000*
Control	*15.4*	*66.3*	*p- 0.204*

Graph 1. Triglycerides level (pre test and post test)



	Pretest	Posttest
Kontrol	184,9	169,4
Intervensi	198,2	126,2

Graph 1 shows that the average triglyceride level in the intervention group decreased by 72.0, from a pre-intervention mean of 198.2 to a post-intervention mean of 126.2.

Menopausal symptoms in the intervention group before being given low-impact aerobic exercise intervention and soy milk administration (N=30) and soy milk administration (N=30) in the control group.

Table 2. Menopausal symptoms before being given low-impact aerobic exercise intervention and soy milk administration (N=30) in the intervention group, and soy milk administration (N=30) in the control group.

Category Symptoms	Pretest Intervensi		Posttest Intervensi		Pretest Control		Posttest Control	
	Frequency (f)	%	Frequency (f)	%	Frequency (f)	%	Frequency (f)	%
None	-	-	14	46,7	-	-	-	-
Mild	4	13,3	9	30,0	8	26,7	10	33,3
Moderate	17	56,7	6	20,0	14	46,6	12	40,0
Severe	9	17,6	1	3,3	8	26,7	8	26,7
Total	30	100,0	30	100,0	30	100,0	30	100,0

Based on the distribution data, frequency, and percentage of the treatment group before the low-impact aerobic exercise intervention, the highest menopause symptoms were moderate symptoms in 17 respondents (56.7%), severe symptoms in 9 respondents (17.6%), and mild symptoms in 4 respondents (13.3%). Based on the distribution data, frequency, and percentage of the treatment group after the low-impact aerobic exercise and soy milk intervention, the highest menopause symptoms were no symptoms in 14 respondents (46.7%), mild symptoms in 9 respondents (30%), moderate symptoms in 6 respondents (20%), and severe symptoms in 1 respondent (3.3%).

In the control group distribution data, frequency, and percentage before the soy milk intervention, the highest menopause symptoms were moderate symptoms in 14 respondents (46.6%), severe symptoms in 8 respondents (26.7%), and mild symptoms in 8 respondents (26.7%).

In the control group based on the distribution data, frequency, and percentage of the control group after the soy milk intervention, the highest menopause symptoms were moderate symptoms in 12 respondents (40%), mild symptoms in 10 respondents (33.3%), and severe symptoms in 8 respondents (26.7%).

Table 3. The effect of low-impact aerobic exercise and soy milk on the reduction of menopause symptoms in the intervention group and the effect of soy milk on the reduction of menopause symptoms in the control group (N=60).

	N	*Mean*	*P Value*
Intervensi			
Pre/Post	30	2.17/0,80	*P=0,001*
Control			
Pre/Post	30	2,00/1,97	*P=0,480*
Total	**60**		

Wilcoxon statistical test for menopausal symptoms in the intervention group after being given Low Impact Aerobic Exercise and soy milk, where in the intervention group, respondents who experienced a decrease included 14 respondents (46.7%) who did not experience symptoms, 9 (30.0%) respondents who experienced mild symptoms, 6 (20.0%) who experienced moderate symptoms, and 1 (3.3%) respondent who experienced severe symptoms. With a p-value (asymp.sig. (2-tailed)) of 0.001<0.05, this means H_o is accepted and H_a is rejected. H_o is accepted, meaning there is a significant difference before and after being given low-impact aerobic exercise and soy milk in reducing menopause symptoms. Meanwhile, in the control group that was only given soy milk, after rechecking and conducting the Wilcoxon Statistical Test on 30 respondents who experienced symptoms, there were 10 (33.3%) with mild symptoms, 12 (40.0%) with moderate symptoms, and 8 (26.7%) with severe symptoms. With a p-Value (asymp.sig. (2-tailed)) of 0.480>0.05, this means H_o is accepted and H_a is rejected. H_o accepted means there is no significant difference before and after in the control group that was not given any treatment at all.

DISCUSSIONS

The results of this study show that low impact aerobic exercise and soy milk have an effect on triglyceride levels, indicating that low impact aerobic exercise and soy milk can lower triglyceride levels in menopausal women. This can be seen from the p-value of 0.000 (<0.05), which means there is a significant change in the intervention group after being treated with low impact aerobic exercise and soy milk, with an average decrease in triglyceride levels of 72.0. This means that the treatment given has a significant effect, namely it can lower triglyceride levels. Meanwhile, in the control group, the research results showed a p-value of 0.204 (>0.05), which means there was no significant change in the control group after being treated with soy milk, with an average decrease in triglyceride levels of 15.4. This can be explained by the fact that physical exercise uses increased energy to meet the body's needs due to metabolism. The higher the intensity of the physical activity performed and the longer its duration, the greater the energy expenditure. If the body experiences an excess of energy, especially from carbohydrates and fats, the excess energy in the body will be stored in the form of glycogen in the muscles and liver, as well as in the form of fat. When there is an increase in the body's metabolism, this stored energy will be used to meet the body's needs. Physical activity can lead to a decrease in triglyceride levels and an increase in high-density lipoprotein cholesterol (HDL-C) levels, making it very beneficial for patients with hypertriglyceridemia.(Ayu,2017)

Based on Andika's (2019) research, soy milk is one of the processed products derived from the extraction of soybeans. The protein in soy milk has an amino acid composition that is almost identical to cow's milk, making soy milk often used as a substitute for cow's milk for those allergic to animal proteins. In 1 gram of soybeans, there are 3.5 mg of isoflavones. Every

day, menopausal women need 15 grams to meet the deficiency of estrogen in their bodies, which can be fulfilled by consuming 250 ml of soy milk daily. (Andika,2017)

Some literature indicates that consuming natural foods is better than using hormone replacement therapy during menopause. Hormone replacement therapy is often used to alleviate menopause symptoms such as hot flashes, night sweats, and osteoporosis, but this therapy can also increase the risk of cardiovascular disease and cancer. The research conducted by Jaya Mehta in 2021 in the United States on the Risks, Benefits, and Management of Menopausal Hormone Therapy was carried out over 4 years with a sample of 729 women aged 42-58 years. The findings indicated that the risk of hormone therapy is low for healthy women under 60 years old or within ten years since menopause. For those who experience bothersome vasomotor symptoms, the benefits tend to outweigh the risks considering the efficacy of hormone therapy for symptom management. Hormone therapy also plays a role in preventing osteoporosis in appropriate candidates for treatment. Hormone therapy is generally accepted as an appropriate and safe treatment for menopausal symptoms, as well as for the prevention of chronic diseases including cardiovascular disease prevention. Estrogen therapy reduces the risk of coronary artery atherosclerosis in primates by 50-70% when started at the time of ovariectomy versus no benefit when started equivalent to humans years after surgical menopause. The protective effects of hormone therapy on cardiovascular health stem from beneficial lipid modulation as well as the favorable actions of estrogen on the endothelium and blood vessels. Hormone therapy has a beneficial or neutral effect on the risk of coronary heart disease when started in women under 60 years of age or within 10 years of menopause, without any contraindications. Hormone therapy reduces the risk of all fractures. No difference in preventing fractures has been found between bisphosphonates and estrogen. The results of this study indicate that hormone therapy is 95% significant as the most effective treatment for menopausal vasomotor symptoms, which are common and can adversely affect women's lives. (Mehta,2021)

The research conducted by Xinrong Zuo (2023) on soy milk consumption and the risk of type 2 diabetes and cardiovascular diseases through a systematic review and meta-analysis published in the journal Nutrition shows that soy intake is negatively associated with including coronary heart disease and stroke. A daily intake of 26.7 g of tofu reduces the risk of cardiovascular disease by 18%. A daily intake of 11.1 g of natto lowers the risk of cardiovascular disease by 17%, especially stroke. Our findings can support the specific intake of tofu and natto to prevent cardiovascular disease and promote longevity. More prospective and multi-center studies should be conducted to find the protective relationship between the analysis of soy food dosage.

One of the studies conducted by Wang (2021) and published in the journal Nutrition & Metabolism shows that regular consumption of soy milk can lower blood triglyceride levels in individuals suffering from type 2 diabetes. This study involved 120 participants who were randomly divided into two groups: the control group and the intervention group. The intervention group was given 300 ml of soy milk daily for 12 weeks, while the control group was given non-fat cow's milk. The results showed that the intervention group experienced an average decrease in triglyceride levels of 21.8 mg/dL, while the control group experienced an average decrease of 4.4 mg/dL. (Wang,2021)

Another study conducted by Liu (2020) in China and published in the journal Nutrients showed similar results. This study involved 47 participants divided into two groups: a control group and an intervention group. The intervention group was given 300 ml of soy milk daily for 6 weeks, while the control group was given cow's milk. The results showed that the intervention group experienced an average decrease in triglyceride levels of 13.9 mg/dL, while the control group experienced an average increase of 3.9 mg/dL. Soy contains isoflavones called genistein and daidzein. These isoflavones are believed to have an effect on reducing cholesterol and triglyceride levels in the blood. Soybeans also contain high fiber and low saturated fat, which can help lower cholesterol and triglyceride levels. Soybeans are also rich in omega-3 and omega-6 fatty acids, which are good for heart health. In addition, soy milk is

also low in calories and saturated fat, so consuming soy milk can help with weight loss and improve lipid profiles in the blood. Soy milk is a highly nutritious beverage, especially in terms of its protein content. Additionally, soy milk also contains fats, carbohydrates, calcium, phosphorus, iron, provitamin A, vitamin B1, vitamin B2, and isoflavones, and it does not contain cholesterol. The nutrients found in soy milk can provide energy and keep the body functioning optimally, minimize cholesterol levels in the blood, and reduce hot flush symptoms, which can improve the quality of life menopause.(Chen,2020)

Research conducted by Zeinab Momenti (2021) on aerobic exercise in postmenopausal women with type 1 diabetes in Canada shows that women who are deficient in estrogen postmenopause have a significantly higher cardiovascular risk compared to those who are not deficient in estrogen. Because estrogen deficiency can also accelerate age-related bone and muscle loss, the risk of frailty may be quite high for women deficient in estrogen. Exercise and physical activity may be the optimal preventive therapy to maintain health and prevent complications in this population: They are associated with improvements, or maintenance, of heart health, bone mineral density, and muscle mass in older adults. Resistance exercise, in particular, can provide significant protection against age-related frailty due to its specific effects on bones and muscles. Fear of hypoglycemia can be a barrier to exercising for those with estrogen hormone deficiency, and resistance training can cause less hypoglycemia than aerobic exercise. (Momenti,2021)

The author presented the use of the normality test using the Kolmogorov-Smirnov test and the statistical test using the Wilcoxon test, which showed that the p-value (asymp.sig. (2-tailed) for menopause symptoms = 0.001<0.05. The results indicate that there is an effect of low-impact aerobic exercise and soy milk on the reduction of menopause symptoms in the intervention group. However, for the control group that was only given soy milk, there was no change in the reduction of symptoms experienced, with results obtained using the Wilcoxon test showing a p-value (asymp.sig. (2-tailed)) of 0.480 > 0.05, which means H_o is accepted and H_a is rejected. This means that there is no significant difference before and after in the control group.

This is in line with the research conducted by Dwi & Nurhayani (2023) on the effectiveness of low-impact aerobic exercise in reducing anxiety symptoms in menopausal women after the intervention of low-impact aerobic exercise at the Soropia Health Center in Kendari City, with a p-value of 0.000<0.05. According to Sasnitiari & Mulyati (2023), brain happiness hormones such as endorphins and serotonin can be increased with aerobic exercise, and exercise can also stop the increase of cortisol and epinephrine hormones, which are depressant hormones that cause stress and anxiety.

This study is in line with Wibowo & Yustiana (2023). The normality test used the Kolmogorov-Smirnov test, and the statistical test used the Wilcoxon and Mann Whitney tests. Results: The difference in the average menopause symptom scores of the intervention group was 1.88 (p=0.001), with a decrease in the level of menopause symptoms from moderate to mild. The research results indicate an effect of low-impact aerobic exercise on the reduction of menopause symptoms.

This research is in line with Nurlina, Emilia & Fitriani Kurniawati (2018), where the analyses used are the independent t-test and paired sample t-test with a significance level of 95%. The research results show an increase in the quality of life scores of menopausal women who perform low-impact aerobic exercises compared to those who do not perform low-impact aerobic exercises, as evidenced by a p-value < 0.05.

CONCLUSION

Low-impact aerobic exercise combined with soy milk consumption had a significant effect on reducing triglyceride levels, as indicated by a p-value of 0.004 ($p < 0.05$) and a mean decrease (Δ) of 72.0. In contrast, soy milk alone, as given to the control group, did not significantly affect triglyceride levels, with a p-value of 0.632 ($p > 0.05$) and an average

decrease of only 15.4. In addition, the intervention group also showed a significant reduction in menopausal symptoms after participating in low-impact aerobic exercise and consuming soy milk, with a p-value of 0.001. Meanwhile, the control group did not show any significant change in menopausal symptoms, with a p-value of 0.480.

RECOMMENDATION

Future researchers are expected to expand upon the findings of this study by exploring other variables that may influence triglyceride levels. Additionally, further studies can be developed with more engaging research topics and supported by up-to-date literature.

REFERENCES

Ahmadieh, H., & Jradi, N. (2021). Prevalence of menopausal hot flashes in Lebanon: A cross-sectional study. *International Journal of Reproductive BioMedicine*, *19*(9), 789–800. https://doi.org/10.18502/ijrm.v19i9.9711

Andika, M., 2019. *Pengaruh Komsumsi Susu Kedelai Terhadap Kadar Kolesterol Total Pada Penderita Hiperkoleterolemia Di Wilayah Kerja Puskesmas Lubuk Buaya.* Padang: Universitas Muhammdiyah Sumatera Barat. Vol 13 No.3.

Ayu, I., Widiastuti, E., Irawati, D. & Lestarini, I.A. 2017. Hubungan Nilai Aktivitas Fisik dengan Kadar Trigliserida dan Kolesterol HDL pada Pegawai Fakultas Kedokteran Universitas Mataram. *Jurnal Kedokteran Unram*, 6(4): 18–21. Tersedia di www.carediabetesjournal.org.

Chaudhari, P., Shinde, D., Mahajan, D., Rao, D., & Chaudhari, S. (2022). *Effectiveness Of Aerobic Exercises On Sleep Quality, Cognition And Quality Of Life Among Post-Menopausal Women*. www.ijcrt.org

Chen, L. R., & Chen, K. H. (2021). Utilization of isoflavones in soybeans for women with menopausal syndrome: An overview. *International Journal of Molecular Sciences*, *22*(6), 1–23. https://doi.org/10.3390/ijms22063212

Dwi, H. R., & Nurhayani, Y. (2023). Efektivitas senam Aerobik Low Impact terhadap penurunan kecemasan pada wanita menopause di Puskesmas Soropia Kota Kendari. Faktor-Faktor Yang Mempengaruhi Kekambuhan Asma Bronchial Pada Penderita Asma Bronchial Di Wilayah Kerja Puskesmas Rimbo Tengah Tahun 2021, 3(2), 101–111.

Dzikri Anshori, A. (2016). Pengaruh Senam Tera Terhadap Tingkat Stres Pada Lansia. *Jurnal Kesehatan Olahraga*, *4*(3), 1–7.

Hamid, M. A., Studi, P., Keperawatan, D., Ilmu, F., & Universitas, K. (2022). *Konsumsi Susu Kedelai Dalam Menurunkan Kolestrol Darah Pada Klien Dengan Hiperkolesterolemia Consumption of Soy Milk in Lowering Blood Cholesterol in Clients with Hypercholesterolemia melaporkan sebanyak 71 % dari 57 juta kematian pada tahun PTM Hiperkole*. *13*, 97–105.

Hoier, B., Olsen, L. N., Leinum, M., Jørgensen, T. S., Carter, H. H., Hellsten, Y., & Bangsbo, J. (2021). Aerobic High-Intensity Exercise Training Improves Cardiovascular Health in Older Post-menopausal Women. *Frontiers in Aging*, *2*. https://doi.org/10.3389/fragi.2021.667519

Ina, N., Emilia, O., & Kurniawati, H. F. (2018). Pengaruh senam aerobik low impact

terhadap peningkatan kualitas hidup perempuan menopause. Jurnal Kebidanan Dan Keperawatan Aisyiyah, 13(1), 7–12. https://doi.org/10.31101/jkk.206

Indonesia, P. K. (2017). *Profil Kesehatan Indonesia. Kementerian Kesehatan Republik Indonesia, Jakarta*.

Li-Ru Chen., Kuo-Hu Chen. 2021. *Utilization Of Isoflavones in Soybeans for Women With Menopausal Syndrome: An Overview.* Taiwan: International Journal of Molecular Sciences.

Mehta J., King J.,& Manson J. (2021). *Risks, Benefit, and Treatment Modalities of Menopausal Hormone Therapy: Current Concept.* Frontier In Endocrinology. Doi: 10.3389/fendo.2021.564781

Momenti, Z., Atashak, S., Ziaee, A., & Chaman, R. (2021). The effect of aerobic exercise on quality of life in menopausal women with type 2 diabetes in Canada. Diabetes & Metabolic Syndrome: Clinical Research & Reviews, 15(2), 335-338. doi: 10.1016/j.dsx.2021.01.032

Mulyani, N. S. (2021). Menopause Akhir Siklus Menstruasi Pada Wanita di Usia Petengahan (p. 8).

Pujiastuti, R. S. E., & Novita, D. (2023). Literature Study of the Influence of Low Impact Aerobic Gysms Against Menopause. *International Conference on Interprofessional Health Collaboration and Community Empowerment*, *4*(2), 183–205. https://doi.org/10.34011/icihcce.v4i2.239

Ritonga, N. J., Limbong, Y. S., Anuhgera, D. E., & Saroh, D. M. A. I. (2021). *Keluhan Pada Masa Pre Menopouse Di Klinik Bidan Maiharti Kisaran Barat Tahun 2020*. *3*(2). https://doi.org/10.35451/jkk.v3i2.590

Thuwaibah Raabia, A. K., & Augustina, J. (2022). Efficacy of Deep Breathing Exercise and Aerobic Exercise on Perimenopausal Women. *Original Research Article*, *10*(2). https://doi.org/10.16965/ijpr.2022.113

Wang, Y., Ma, J., Yang, Y., Liu, Y., Chen, J., Zhang, X., & Yang, L. (2021). *Soy milk consumption and serum lipid profiles among type 2 diabetes patients: A randomized controlled trial.* Nutrition & Metabolism, 18(1), 1-9. https://doi.org/10.1186/s12986-020-00513-2