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THE EFFECT OF LOW IMPACT AEROBIC EXERCISE ON BLOOD PRESSURE IN HYPERTENSION PATIENTS AT SEKUPANG HEALTH CENTER IN 2024

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Abstract

Based on the data in the Puskesmas of Shrews, that's 405 in January, 372 in February, 374 in March, and 406 in April. The number of hypertensive patients has increased from the previous month. The aim of this study is to find out if there is any effect of low-impact aerobic exercise on blood pressure in hypertensive patients in the 2024 Puskesmas of Batam City. The independent variable in this study is low impact aerobic exercise and the dependent variable is blood pressure. The research design used in this research is quantitative with pre-experimental design with one group pretest-posttest approach. The population in this poll is hypertensive in the Puskesmas of Sekupang. This sample is hypertensive. The total sample in this study is 34 hypertensive patients with purposive sampling techniques. The data collection tool uses the observation sheet. Data analysis using a paired T-Test test. The results of the study showed that the average blood pressure of respondents prior to low impact aerobic exercise was 144.5 systols and 92.5 diastols, whereas the mean blood pressure after low-impact aerobics was 134.1 and 89.8 diastoles. There is an effect of low-impact aerobic exercise on blood pressure reduction by a p-value of 0.001. It is recommended for research sites to perform low impact aerobic exercises twice a week routinely with the aim of helping people with hypertension to maintain their health and also as a prevention of hypertensive disease.

Keywords : *Aerobic Low Impact, blood pressure, hypertension*

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PENGARUH SENAM AEROBIK *LOW IMPACT* TERHADAP TEKANAN DARAH PADA PENDERITA HIPERTENSI DI PUSKESMAS SEKUPANG KOTA BATAM TAHUN 2024

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Abstrak

Berdasarkan data di puskesmas Sekupang, yaitu sebanyak 405 di bulan Januari, 372 di bulan Februari, 374 di bulan Maret, dan 406 di bulan April. Jumlah penderita hipertensi mengalami peningkatan dari bulan sebelumnya.. Tujuan dalam penelitian ini diketahui pengaruh senam aerobik *low impact* terhadap tekanan darah pada penderita hipertensi di puskesmas Sekupang Kota Batam Tahun 2024. Variabel independen dalam penelitian ini adalah senam aerobik low impact dan variabel dependen dalam penelitian ini adalah tekanan darah. Desain penelitian yang digunakan pada penelitian ini yaitu kuantitatif dengan rancangan pre eksperimen dengan pendeketan *one group pretest-posttest*. Populasi dalam penelitain ini adalah penderita hipertensi di puskesmas Sekupang. Sampel ini adalah penderita hipertensi. Jumlah sampel pada penelitian ini adalah 34 penderita hipertensi dengan teknik *purposive sampling*. Alat pengumpulan data menggunakan lembar observasi. Analisa data menggunakan uji *paired T-Test.* Hasil penelitian menunjukan rata-rata tekanan darah responden sebelum dilakukan senam aerobik *low impact* adalah sistol 144,5 dan diastol 92,5. Sedangkan rata-rata tekanan darah responden sesudah dilakukan senam aerobik *low impact* adalah sistol 134,1 dan 89,8 diastol. Terdapat pengaruh senam aerobik *low impact* terhadap penurunan tekanan darah dengan p-*value* 0,001. Terdapat pengaruh senam aerobik *low impact* terhadap tekanan darah pada penderita hipertensi. Disarankan bagi tempat penelitian tetap melaksanakan senam aerobik *low impact* 2 kali dalam seminggu secara rutin dengan tujuan membantu para penderita hipertensi menjaga kesehatan tubuh dan juga sebagai pencegahan penyakit hipertensi.

Kata kunci : Aerobik *Low Impact*, Tekanan Darah, Hipertensi

INTRODUCTION

Normal blood pressure is less than (120/80 mmHg). Those with blood pressure of 120-139/80-89 mmHg are said to have a condition called prehypertension, which over time increases the risk of developing hypertension. Hypertension is characterized by blood pressure of 140/90 mmHg. If a person's blood pressure repeatedly remains above 140/90 mmHg, that person may be suffering from hypertension. (Kemenkes, 2023).

According to the World Health Organization (2023), an estimated 1.28 billion adults aged 30-79 worldwide suffer from hypertension, with the majority (two-thirds) living in low- and middle-income countries. It is estimated that 46% of adults with hypertension are unaware that they have the disease. Less than half of adults (42%) with hypertension are diagnosed and treated. About 1 in 5 adults (21%) with hypertension can control it. Hypertension is the leading cause of premature death worldwide. (WHO, 2023).

Before someone suffers from hypertension, there are risk factors that cause hypertension, including an unhealthy diet, usually a diet with sugar, salt, and fat content exceeding the normal limits every day. (Kemenkes, 2023). One of the physical exercises that can control blood pressure is low-impact aerobics. Low-impact aerobics is a type of aerobic physical activity that is particularly beneficial for improving and maintaining the health and endurance of the heart, lungs, circulation, muscles, and joints. (Damayanti dkk, 2022).

Low-impact aerobic exercise is a hypertension exercise that is beneficial for maintaining pulse balance and can lower hypertension if done regularly and correctly. (Ermawati Ulkhasanah & Widiastuti, 2022). According to Wahyu Rahayu (2015), a significant factor in lowering blood pressure in hypertensive patients, while enhancing antihypertensive effects, is one of them being moderate-intensity aerobic exercise. (Wahyu Rahayu, 2015).

Aerobic exercise is an aerobic workout that involves the optimal use of oxygen. There are many types of aerobics, including chair aerobics, low impact aerobics, medium impact aerobics, high impact aerobics, chuck aerobics, and jump aerobics. (Hasbi et al., 2023). This exercise has the advantage of being done with a regular and constant rhythm. Aerobic exercise is performed to improve the efficiency of heart function. It is advisable to set the exercise at a moderate intensity, which is a heart rate of 150-170 beats per minute. (Magria, 2021).

Hypertension is also a major factor in stroke and heart failure, which can lead to death if not properly managed. Management of hypertension can also be carried out through various efforts, namely pharmacological therapy with the administration of medication starting with a low dose and then gradually increasing, and non-pharmacological therapy, one of which is engaging in physical activity such as low-impact aerobic exercise. (Ermawati Ulkhasanah & Widiastuti, 2022).

Based on the data results in the Riau Islands Province in 2022, which is 25.8%, this figure is lower than the national figure of 28.1%. However, it still remains a health issue because if not controlled, it will lead to complications, resulting in an increase in morbidity and mortality rates from non-communicable diseases. The prevalence of hypertension in 2022 was 18.7%, exceeding the 2022 target of 27.8%. Compared to the prevalence of hypertension in 2021, there was a decrease of 7.6%. In 2022, the highest number, totaling 122,872, was in Batam City, while the lowest was in the Anambas Islands.

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(Dinas Kesehatan Provinsi Kepulauan Riau, 2022).

Based on the preliminary survey results conducted by the researcher at the Sekupang health center, there were 405 in January, 372 in February, 374 in March, and 406 in April. The number of hypertension patients has increased compared to the previous month. This health center is one of the health centers that has an exercise program. The exercise program is conducted twice a week. This is because many hypertension sufferers still have unhealthy lifestyles. Because of the lack of information obtained by the patient, the patient does not know that this technique can lower blood pressure. Based on the theory of Wahyu Rahayu (2015), engaging in moderate aerobic exercise can lower blood pressure.

RESEARCH METHOD

This research was conducted at the Sekupang Health Center in Batam City in 2024 on July 23, 2024. This research uses a pre-experimental research design with a one group pretest-posttest design. The population in this study consists of all hypertension patients in April 2024 at the Sekupang Health Center in Batam City in 2024. The sample was taken using purposive sampling technique, and the sample size was calculated using the Lameshow formula, resulting in a total of 34 samples.

The independent variable in this study is low-impact aerobic exercise, while the dependent variable in this study is blood pressure. The instrument in this study uses an observation sheet.

Data analysis uses univariate analysis to determine the frequency distribution of independent or dependent variables and bivariate analysis to examine the relationship between independent and dependent variables. Data analysis was processed using SPSS version 27 with the Pired T-Test. This study used a data collection technique that included 3 stages: preparation, implementation, and the final stage.

RESULTS AND DISCUSSION

1. Research Results
   Based on the research conducted in July 2024 involving 34 respondents about the effect of low-impact aerobic exercise on blood pressure in hypertensive patients. The results obtained are as follows:
   A. Univariate Analysis

Table 4.1
Average Before Low Impact Aerobic Exercise on Blood Pressure in Hypertensive Patients (Pretest)

Variable Blood pressure	N	*Mean*	SD
Pretest systolic	**34**	**144,2**	**9,675**
Pretest diastolic	**34**	**92,3**	**6,874**

Based on Table 4.1, it shows the average results before blood pressure was measured after low-impact aerobic exercise on 34 respondents with hypertension at the Sekupang health center. The mean systolic value before low-impact aerobic exercise was 144.2 mmHg with a Standard Deviation (SD) of 9.675, and the mean diastolic value was 92.3 mmHg. This means the average value of the diastolic blood pressure data before low-impact aerobic exercise, where the mean value can be obtained by dividing the total data by the number of data points. The SD (Standard Deviation) of 6.874 indicates the standard deviation/general measure of data spread in a sample to see how far or how close the data values are to the average.

Table 4.2
Average After Low Impact Aerobic Exercise on Blood Pressure in Hypertensive Patients (Posttest)

Variable Blood pressure	N	*Mean*	SD
Post test systolic	**34**	**133,7**	**5,891**
Post test diastolic	**34**	**89,6**	**5,596**

Based on Table 4.2, it shows the average results after blood pressure was measured following low-impact aerobic exercise on 34 hypertensive respondents at the Sekupang health center. The mean value, which represents the average systolic data after low-impact aerobic exercise, was 133.7 mmHg with a Standard Deviation (SD) of 5.891. The mean value for the average diastolic data after low-impact aerobic exercise was 89.6 mmHg with an SD of 5.596, which indicates the standard deviation/data spread measurement in general within a sample to see how far or close the data values are to the average.

B. Bivariate Analysis

Bivariate analysis in this study aims to determine the effect of low-impact aerobic exercise on blood pressure in hypertension patients at Sekupang Health Center, BatamCity,in2024.

Table 4.3
The Effect of Blood Pressure Before and After Low Impact Aerobic Exercise on Hypertensive Patients at Sekupang Health Center

Paired Samples Test

		Mean	***Std.Deviation***	**P-*Value***
Blood Pressure	Pretest Systolic – Posttest Systolic	10.411	6.199	0.001
	Pretest Diastolic – Posttest Diastolic	2.676	3.178	0.001

Based on table 4.3, the average value of 34 respondents studied, namely systolic blood pressure before and after being given an intervention in the form of low-impact aerobic exercise, had a mean value of 10.411. Similarly, the average diastolic blood pressure before and after the intervention had a mean value of 2.676, resulting in a decrease in blood pressure value of 7.735. Based on the significance values obtained from the paired sample t-test, the p-value for pretest-posttest systolic blood pressure is $0.001 < \alpha = 0.05$ and the p-value for pretest-posttest diastolic blood pressure is $0.001 < \alpha = 0.05$. If the results of this study show a p-value < 0.05, then Ho is rejected, which means there is a significant difference and effect on the average blood pressure of hypertensive patients before and after low-impact aerobic exercise.

DISCUSSION

A. Blood Pressure in Hypertensive Patients Before Low Impact Aerobic Exercise

Based on the research conducted on 34 hypertension patients, it can be explained that the mean score of systolic blood pressure before exercise was 144.2 with a Standard Deviation (SD) of 9.578, and the mean score of diastolic blood pressure before exercise was 92.3 with a Standard Deviation (SD) of 6.856. By regularly doing low-impact aerobic exercises, it can lead to a decrease in heart rate, which will lower cardiac output, and the heart will pump more blood to deliver oxygen to the working muscles. (Maryuni et al., 2023)

This decrease in blood pressure occurs because the blood vessels undergo dilation and relaxation. Over time, exercise can relax blood vessels,

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causing blood pressure to decrease, just as the widening of a water pipe will lower water pressure. In this case, low-impact aerobic exercise can reduce peripheral resistance. According to Sri Maryuni (2023), the type of exercise that effectively lowers blood pressure is moderate-intensity aerobic exercise. Aerobic exercise is a type of exercise aimed at improving heart health.

According to Ela Putri Hasmika et al. (2023), lack of exercise increases the risk of suffering from hypertension due to being overweight. Inactive people also tend to have a higher heart rate, so their heart muscles have to work harder with each contraction. The harder and more frequently the heart muscles have to pump, the greater the pressure exerted on the arteries.

Factors that increase the risk of developing high blood pressure include older age, genetics, being overweight or obese, physical inactivity, a high-salt diet, and drinking too much alcohol. In this study, high blood pressure was found because after interviewing respondents before low-impact aerobic exercise, it was discovered that some respondents had high blood pressure due to genetics and infrequent physical activity.

This is in line with the theory of Wahyu Rahayu (2015) which states that hypertensive patients who are overweight are advised to lose weight to an ideal level, change their diet for diabetes, obesity, or high cholesterol, reduce salt intake to less than 2.3 grams of sodium or 6 grams of sodium chloride per day and reduce alcohol, engage in light aerobic exercise, quit smoking, and avoid certain activities such as saunas or steam rooms, steam baths, warm water pools, hot baths, and warm swimming pools.

B. Blood Pressure in Hypertensive Patients After Performing Low Impact Aerobic Exercise

Based on the research conducted on 34 hypertension patients, it can be explained that the average systolic blood pressure score after exercise had a mean of 133.7 mmHg with a Standard Deviation (SD) of 5.891, and the diastolic blood pressure after exercise had a mean of 89.6 mmHg with a Standard Deviation (SD) of 5.596. Aerobic exercise can lower blood pressure if done regularly. Heart rate and blood pressure increase during aerobic exercise to meet the increased oxygen demand. The rise in heart rate, as well as stroke volume, or the amount of blood pumped each second, causes an increase in blood pressure.

According to Muzaroah Ermawati Ulkhasanah (2021), the improvement in the heart's ability to pump blood to meet the body's oxygen needs causes the heart not to need to beat faster to pump a certain amount of blood as it did before regular exercise. Thus, it will cause a decrease in heart rate, a decrease in stroke volume, venous arteriolar vasodilation, due to a decrease in cardiac output and a decrease in resistance.

Low impact aerobic exercise can cause a decrease in heart rate, which will lower cardiac output, ultimately leading to a decrease in blood pressure. The increase in cardiac work efficiency is reflected by a decrease in systolic pressure, while the decrease in peripheral resistance is reflected by a decrease in diastolic pressure. (Fetriwahyuni et al., 2018).

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This is in line with the theory (Wahyu Rahayu, 2015), which states that engaging in light aerobic exercise, quitting smoking, and avoiding certain activities such as saunas or steam rooms, steam baths, warm water pools, hot baths, and warm swimming pools.

According to Safariyah (2018), one of the factors that influence hypertension is a lack of exercise; this exercise can cause blood vessel dilation, thereby lowering blood pressure. People who exercise twice a week with a duration of 30 minutes will experience an increase in cardiorespiratory endurance, and regular exercise can reduce the risk of heart disease, because aerobic exercise is beneficial for improving and maintaining the health of heart, lung, blood circulation, muscles, and joints. Additionally, low-impact aerobic exercise has a significant effect on the body, especially on lung and heart endurance. (Safariyah et al., 2018).

C. The Effect of Blood Pressure on Hypertensive Patients Before and After Low-Impact Aerobic Exercise

Based on the research results conducted, the average value of 34 respondents studied, namely the systolic blood pressure of respondents before and after being given an intervention in the form of low-impact aerobic exercise, experienced a decrease with a mean value of 10.411, the average systolic value before 144.2 mmHg and diastolic 92.3 mmHg, and similarly, the average diastolic blood pressure of respondents before and after being given the intervention also experienced a decrease with a mean value of 2.676, the average systolic value after 133.7 mmHg, and diastolic 89.6 mmHg. Based on the significance values obtained from the paired sample t-test, the p-value of pre-test – post-test systolic blood pressure is $0.001 < \alpha = 0.05$ and the p-value of pretest-posttest diastolic blood pressure is $0.001 < \alpha = 0.05$. If the results of this study show a p-value < 0.05, then Ho is rejected, which can be interpreted that there is a significant difference and effect on the average blood pressure of hypertensive patients before and after the exercise.

Factors that increase the risk of developing high blood pressure include older age, genetics, being overweight or obese, physical inactivity, a high-salt diet, and drinking too much alcohol. The results of the study after performing low-impact aerobic exercises showed an average systolic value of 133.7 mmHg and a diastolic value of 89.6 mmHg. According to Triyanto (2017), a decrease in blood pressure can occur, and engaging in exercise activities is very beneficial for the management of hypertension.

Membrane permeability increases in contracting muscles, so regular exercise can improve blood pressure regulation. Exercise can help improve blood lipid profiles, lower total cholesterol, Low-Density Lipoprotein (LDL), triglycerides, and raise High-Density Lipoprotein (HDL) as well as improve the hemostatic system and blood pressure. That condition can inhibit the occurrence of arteriosclerosis.

The research also shows that the majority of respondents are female. According to Magria (2021), gender factors also influence hypertension, in this case, men are more prone to suffer from hypertension compared to women, especially for the increase in

systolic blood pressure. The reason is that men are believed to have lifestyles that tend to increase blood pressure compared to women. However, after entering menopause, the prevalence of hypertension in women increases. The research results show that low-impact aerobic exercise affects blood pressure changes in hypertensive patients. This can be seen from the decrease in blood pressure after low-impact aerobic exercise, with an average reduction from 144.2 to 133.7 mmHg.

CONCLUSION AND SUGGESTIONS

1. Conclusion

Based on the research conducted on "The Effect of Low Impact Aerobic Exercise on Blood Pressure in Hypertensive Patients at Sekupang Health Center, Batam City in 2024"

1. The average blood pressure before low-impact aerobic exercise on hypertensive patients at Sekupang Health Center was a systolic value of 144.5 and a diastolic value of 92.5.
2. The average blood pressure after performing low-impact aerobic exercise on hypertensive patients at Sekupang Health Center was 134.1 systolic and 89.8 diastolic.
3. The presence of a significant difference in blood pressure changes before and after low-impact aerobic exercise in hypertensive patients at Puskesmas Sekupang, with a decrease of 7.735. The results of the T-test (Paired test) showed a p-value of 0.001 for systolic and 0.001 for diastolic, both less than 0.005.

2. Saran

1. **For Sekupang Health Center**
   The results of this study are expected to serve as information and evaluation material for healthcare workers in the working area of the community health center, particularly the Sekupang Community Health Center in Batam City, to improve the prevention and management programs for hypertension issues. The researchers also provided an A3 poster titled "Benefits of Low-Impact Aerobic Exercise on Hypertension" and a low-impact aerobic exercise video, with the hope of guiding and maintaining the regular implementation of the exercise program.
2. **For Respondents**
   It is expected to actively participate in the exercise program from the Sekupang health center, and to gain knowledge that physical activity can help control blood pressure. The researchers also provided a leaflet to the respondents about low-impact aerobic exercise, stating that engaging in low-impact aerobic exercise can lower blood pressure if done regularly twice a week.
3. **For Educational Institutions**
   It can add to the library regarding non-pharmacological actions for hypertension sufferers and serve as a source for student research, theory development, and increase readers' knowledge about the importance of physical activities that can be an alternative solution to lower blood pressure in hypertension sufferers.
4. **For Future Research**
   This research is expected to serve as a reference source, and it is hoped that future research can incorporate other factors such as:

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body weight, diet, smoking, age, gender, and heredity.

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