



## Chronic Disease Management Program Exercise on Blood Pressure in Hypertensive Patients

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### ABSTRACT

The management of hypertension can be done by using drugs or modifying lifestyle. Sports that are recommended for people with hypertension include gymnastics. One of the government programs is a form of aerobic physical exercise, namely chronic disease management program. The purpose of this study was to determine the effect of chronic disease management program exercise on blood pressure in hypertensive patients. This study used one group pretest posttest design which was conducted in May-July 2018 at the Batua Raya Makassar Health Center. Data collection using purposive sampling technique on 40 hypertensive patients using an observation sheet and mercury sphygmomanometer. Blood pressure measurements were taken once a week for four weeks. The statistical test used repeated ANOVA with a significance level of  $\leq 0.05$  and the result was  $p= 0.000$ . The results showed that most hypertensive patients who followed chronic disease management program exercise experienced a decrease in blood pressure. The conclusion of this study is there is an effect of chronic disease management program exercise on blood pressure in hypertensive patients. Hypertension patients are expected to be able to do chronic disease management program exercise regularly by following chronic disease management program exercise instructor to reduce blood pressure.

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### INTRODUCTION

Hypertension be diagnosed when repeated examinations have been carried out and the results of the measurement of systolic blood pressure  $\geq 140$  mmHg and/or diastolic blood pressure is  $\geq 90$  mmHg (Unger et al., 2020). 1.13 billion people worldwide have hypertension and its prevalence 25% in the South-East Asia (World Health Organization, 2021). Based on basic health research in 2018, the prevalence of hypertension increases with age, where at the age of 55-64 years is 55.2%, 45-54 years is 45.3%, and 31-44 years is 31.6% (Ministry of Health of Republic of Indonesia, 2019).

The effects of hypertension include headaches, aches, a feeling of discomfort in the neck, a feeling of spinning/wanting to fall, palpitations, rapid heartbeat, ringing in the ears, heart failure, because the heart is working harder, causing the heart muscle to expand, development of fatty plaques in the walls of blood vessels (atherosclerosis) and salt-salt plaques (arteriosclerosis) which can block blood flow, thereby increasing the potential for leakage of blood vessels. Along with hypertension, you

will experience diabetes (diabetes mellitus), hyperfunction of the thyroid gland (hyperthyroid), rheumatism, and increased levels of fat (hyperlipidemia) (Sudarsono et al., 2017).

In general, the causes of hypertension are divided into two groups, namely factors that can be changed and cannot be changed. Obesity, lack of exercise, smoking habits, stress, excessive consumption of salt, alcohol and caffeine are factors that can be changed (Nuraini, 2015).

Management of hypertension can be done by using drugs or by modifying lifestyle. Lifestyle modification can be done by limiting salt intake to no more than 6 grams/day, losing weight, avoiding caffeinated drinks, cigarettes and alcoholic drinks. Exercise is also recommended for people with hypertension, such as walking, running, jogging, cycling, exercising for 20-25 minutes with a frequency of 3-5 times per week (Muljadi, 2010).

Regular exercise and movement exercises can overcome problems caused by changes in body function, so regular

exercise is recommended from young to old age. Several recent studies have shown that the combination of drug-free therapy (non-pharmacotherapy) and drugs (pharmacotherapy) not only lowers blood pressure, but also reduces the risk of stroke and ischemic heart disease (Ramdani et al., 2017).

One of the government programs, namely the chronic disease management program, is a form of aerobic exercise. Gymnastics is also a government program run by the Health Social Security Administration. The chronic disease management program is expected to improve the quality of life of gymnastics participants in an efficient and cost-effective manner (Lumempouw et al., 2016).

Physical exercise such as regular exercise also helps prevent chronic conditions or diseases, such as high blood pressure. Gymnastics can increase the body's metabolic activity and oxygen needs. Chronic disease management program gymnastics is very important for people with hypertension in maintaining a healthy body. This exercise is done with a series of tone movements that are regular, directed and planned in the form of physical exercises that affect physical abilities. In addition, exercise helps the body to stay fit and fresh because it can train bones to be strong, encourage the heart to work optimally and help eliminate free radicals that roam the body (Pratiwi et al., 2017).

In middle-aged and older adults, it is well accepted that physical activity is associated with a reduced risk for developing hypertension. It has been observed that exercise from 3 to 5 times per week for 30 to 60 minutes per session at moderate intensity lowers blood pressure in people. normotensive and hypertensive adults, although the decrease is greater in hypertension (Prasetyo, 2015).

According to the data obtained, data on hypertension sufferers in the Batua Raya Makassar Public Health Center in 2015 amounted to 2,299 people suffering from hypertension, in 2016 there were 2,333 people, and in 2017 there were 2,402 people. This data shows an increase in the number of hypertension sufferers in the working area of Batua Raya Makassar Public Health Center per year (Medical Record Data of Batua Raya Makassar Public Health Center, 2017). Therefore, researchers are interested in conducting research on hypertensive patients to determine the effect of chronic disease management program exercise on blood pressure in hypertensive patients at Batua Raya Makassar Health Center.

## METHOD

### Research participants

This study used a one group pretest posttest design which was conducted in May-July 2018 at the Batua Raya Makassar Public Health Center. Data collection using purposive sampling technique on 40 hypertensive

patients. Respondents consumed anti-hypertensive drugs provided by health workers at public health center. The exclusion criteria were hypertensive patients who had secondary diseases (diabetes mellitus, heart disease or stroke, mental limitations, and physical disabilities).

### Research procedure

Blood pressure measurements were carried out before and after the chronic disease management program exercise which was carried out every week at the Batua Raya Makassar Health Center for four weeks. The patient sits calmly and relaxes about five minutes before blood pressure measurement (Bakri, 2014).

### Instrument

The data collection instrument used in this study was a questionnaire sheet containing demographic data consisting of name, age, and gender. The questionnaire sheet also contains observation sheets for measuring blood pressure in hypertensive patients. Blood pressure measurement tools are mercury sphygmomanometer and blood pressure cuff (Sudibyo, 2013).

### Data analysis

Data processing using Statistical Product and Service Solutions (SPSS) software. Univariate analysis included systolic and diastolic blood pressure before and after exercise. Bivariate analysis using repeated ANOVA with a significance level of  $\leq 0.05$ .

## RESULTS AND DISCUSSION

**Table 1**  
**Characteristics of Hypertensive Patients**

Characteristics	Amount	
	n (40)	%(100)
Age		
< 60 years	26	65
≥ 60 years	14	35
Sex		
Male	15	37,5
Female	25	62,5

Based on table 1, the age distribution of respondents was more than 60 years old (65%) and more female (62.5%). The results of this study are in line with research conducted by Lumempouw (2016) which shows that of 25 respondents with hypertension, the number of female respondents (76%) is more than men (24%).

**Table 2**  
**Systolic and Diastolic Blood Pressure Before and After Chronic Disease Management Program Exercise In Hypertensive Patients**

Time (Week)	Mean (SD)			
	Systolic		Diastolic	
	Pretest	Posttest	Pretest	Posttest
1	153.0 (10,1)	153.0 (10,1)	99.2 (2.6)	99.0 (3.8)
2	145.7 (10.0)	145.5 (5.4)	95.7 (5.4)	93.7 (6.2)
3	136.2 (8.0)	136.0 (7.6)	89.7 (7.6)	88.2 (7.4)
4	127.0 (6.8)	126.5 (6.2)	83.5 (6.2)	82.2 (4.7)

Table 2 shows the weekly drop in blood pressure, both systolic and diastolic. The systolic blood pressure in the first week before exercise was 153 mmHg and at the fourth week it was 127 mmHg and the systolic blood pressure also decreased after exercise, 153 mmHg to 125.5 mmHg. The diastolic blood pressure in the first week before exercise, which was 99.2 mmHg, fell to 83.5 at the fourth week, as well as the diastolic blood pressure after exercise decreased from 99 mmHg to 82.2 mmHg at week four. These results are

in line with research conducted by Astari (2013) which showed the results of the study showed an average systolic blood pressure of 127.50 mmHg and an average diastolic blood pressure of 78.75 mmHg with a decrease in an average systolic blood pressure of 21.67 mmHg and decrease in diastolic blood pressure 12.50 mmHg. Decrease in systolic and diastolic blood pressure in the treatment group that was given exercise showed a significant difference between before and after exercise with  $p < 0.05$ .

**Table 3**  
**Comparison of Systolic and Diastolic Pretest and Posttest Blood Pressure Measurements at Four Measurement Times**

Time (Week)	p-value			
	Systolic		Diastolic	
	Pretest	Posttest	Pretest	Posttest
1 vs 2	0.001	0.003	0.003	0.001
1 vs 3	0.001	0.001	0.001	0.001
1 vs 4	0.001	0.001	0.001	0.001
2 vs 3	0.001	0.001	0.001	0.001
2 vs 4	0.001	0.001	0.001	0.001
3 vs 4	0.001	0.001	0.001	0.001

Table 3 shows the comparison of blood pressure measurements between times 1, 2, 3, and 4, both systolic and diastolic before and after a chronic disease management program exercise. Statistically there is a significant difference between the pretest and posttest systolic and diastolic blood pressures between time/week 1,2,3, and 4. The results of the RepeteadAnova test show that there is an effect of chronic disease management exercise program on blood pressure in hypertensive patients. This can be seen from the p-value  $< \alpha$  value (0.005).

The result are in line with research conducted by Wahyuni (2017) which shows that there is a significant difference between pretest and posttest systolic and diastolic pressures. Exercise can lower blood pressure. When blood pressure rises, the way to lower it is to increase your level of physical activity. Exercise can cause the growth of new capillary blood vessels so that it can reduce blockages in the blood vessels which means that it can lower blood pressure. Although the ability of the heart to do its job increases through exercise, the effect of this reduced resistance results in a significant reduction in blood pressure. With sports such as gymnastics, tissue cells need an increase in oxygen and glucose to form ATP. In relation to the number of blood vessels, it can be illustrated that the blood vessels are dilated (vasodilation), and blood vessels that are not open will open so that blood flow to tissue cells increases (Sartika, 2013).

The way to lower blood pressure can be by doing a chronic disease management program exercise at least once a week for 30–40 minutes. This exercise will help the body to stay fit and healthy because it is able to train bones to stay strong, encouraging the heart to work optimally. In addition, it can improve blood circulation and increase the amount of blood volume, so that it can affect blood pressure and body imbalances can be corrected, including a decrease in blood pressure in people with hypertension.

**Limitation of The Study**

Treatment of respondents must be carried out by people who are competent in the field of chronic disease management program gymnastics so that researchers must ask for help from a gymnastics instructor. In addition, it is

necessary to strictly control the patient's diet to avoid bias in the results of the study

**CONCLUSIONS AND RECOMMENDATION**

The conclusion of this study is that there is a significant effect on changes in blood pressure in patients with hypertension before and after exercise in the chronic disease management program at the Batua Makassar Public Health Center. Patients who follow a chronic disease management exercise program have decreased blood pressure.

**Recommendation**

Give attention to the patient's diet and the accuracy of movements when exercising in a chronic disease management program.

**Conflict of Interest Statement**

There is no conflict of interest of this study.

**REFERENCES**

Astari, P. D., Adiatmika, I. P. G., Swedarma, K. E. (2013). Pengaruh senam lansia terhadap tekanan darah lansia dengan hipertensi pada kelompok senam lansia di Banjar Kaja Sesetan Denpasar Selatan. *Coping Ners*. 1(1): 1-7.

Bakri, S. (2014). SOP mengukur tekanan darah. *Jurnal Keperawatan (e-KP)*.

Budiarto, M. (2015). Pencegahan dan pengobatan hipertensi usia dewasa. *Jurnal keperawatan (e-KP)*.

Lumempouw, D. O., Wungouw, H. I. ., & Polii, H. . (2016). Pengaruh senam Prolanis terhadap penyandang hipertensi. *Jurnal E-Biomedik*, 4(1). <https://doi.org/10.35790/ebm.4.1.2016.11697>

Medical Record Data of Batua Raya Makassar Public Health Center. (2017).

Ministry of Health of Republic of Indonesia. (2019). Hypertension is the most common disease among people.

- [https://www.kemkes.go.id/article/view/19051700002/hipertensi-penyakit-paling-banyak-diidap-masyarakat.html#:~:text=Berdasarkan%20Risikesdas%202018%20prevalensi%20hipertensi,tahun%20\(55%2C2%25\)](https://www.kemkes.go.id/article/view/19051700002/hipertensi-penyakit-paling-banyak-diidap-masyarakat.html#:~:text=Berdasarkan%20Risikesdas%202018%20prevalensi%20hipertensi,tahun%20(55%2C2%25))
- Nuraini, B. (2015). Risk Factors of Hypertension. *J Majority*, 4(5), 10–19.  
<https://juke.kedokteran.unila.ac.id/index.php/majority/article/viewFile/602/606>
- Prasetyo, Y. (2015). Olahraga Bagi Penderita Hipertensi. *Medikora*, 1. <https://doi.org/10.21831/medikora.v0i1.4721>
- Pratiwi, A. (2017). Pengaruh Senam Lansia Terhadap Tekanan Darah Pada Lansia Dengan Hipertensi Di Panti Sosial Tresna Werdha Wargatama Ogan Ilir Tahun 2016. *Jmm.ikestmp.Ac.Id*, 5(1).  
<https://jmm.ikestmp.ac.id/index.php/maskermedika/article/view/166>
- Ramdani, H. T., Rilla, E. V., & Yuningsih, W. (2017). Volume 4 | Nomor 1 | Juni 2017. *Jurnal Keperawatan 'Aisyiyah*, 4(1), 37–45.  
<http://journal.stikes-aisyiyahbandung.ac.id/index.php/jka/article/view/5>
- Sartika, W. (2013). Terkontrolnya Tekanan Darah Penderita Hipertensi Berdasarkan Pola Diet Dan Kebiasaan Olah Raga Dipadang Tahun 2011. 8(1), 8–14.  
<http://jurnal.fkm.unand.ac.id/index.php/jkma/article/view/118>
- Sudarsono, E. K. R., Sasmita, J. F. A., Handyasto, A. B., Kuswantiningsih, N., & Arissaputra, S. S. (2017). Peningkatan Pengetahuan Terkait Hipertensi Guna Perbaikan Tekanan Darah pada Pemuda di Dusun Japanan, Margodadi, Seyegan, Sleman, Yogyakarta. *Jurnal Pengabdian Kepada Masyarakat (Indonesian Journal of Community Engagement)*, 3(1), 26.  
<https://doi.org/10.22146/jpkm.25944>
- Sudibyo, S. (2013). buku ajar metodologi riset keperawatan. jakarta: CV trans info medika.
- Unger, T., Borghi, C., Charchar, F., Khan, N. A., Poulter, N. R., Prabhakaran, D., Ramirez, A., Schlaich, M., Stergiou, G. S., Tomaszewski, M., Wainford, R. D., Williams, B., & Schutte, A. E. (2020). 2020 International Society of Hypertension Global Hypertension Practice Guidelines. *Hypertension*, 75(6), 1334–1357  
<https://doi.org/10.1161/HYPERTENSIONAHA.120.15026>
- Wahyuni, R. (2017). Pengaruh senam prolanis (program pengelolaan penyakit kronis) terhadap penurunan tekanan darah pada pasien hipertensi di wilayah kerja puskesmas Ibul Paya kumbuh tahun 2017. Skripsi thesis, STIKes Perintis Padang.  
<http://repo.stikesperintis.ac.id/id/eprint/280>
- World Health Organization. (2021). Hypertension. [https://www.who.int/health-topics/hypertension/#tab=tab\\_1](https://www.who.int/health-topics/hypertension/#tab=tab_1)