



Case Study: A Depiction of Blood Pressure Following Hatha Yoga Practice

Siti Munawarah¹, Riri Segita²

Universitas Fort De Kock, Indonesia | sitimunawarah@fdk.ac.id¹

Universitas Fort De Kock, Indonesia | ririsegita@fdk.ac.id²

Received: 20-09-2023

Reviewed: 21-09-2023

Accepted: 28-09-2023

Abstract

Hatha Yoga, characterized by body posture formation techniques and controlled breathing exercises, seeks to maintain the body's natural equilibrium. Conversely, hypertension, marked by elevated blood pressure within the vascular system, is a persistent medical condition. Its prevalence increases with age, particularly in low and middle-income nations. This study explores the effect of Hatha Yoga exercises on blood pressure in elderly hypertensive patients at the Biaro Public Health Center in 2023. Employing a Quasi-Experimental One Group Pretest-Posttest Design, this research engaged a study population comprising individuals aged 45-59 years. Purposive sampling identified a sample of 12 participants. Over a 2-week period, data was collected utilizing an aneroid sphygmomanometer and observation sheets. Data analysis encompassed univariate and bivariate analyses, employing the paired t-test. The results revealed that the mean blood pressure in hypertensive patients prior to participating in Hatha Yoga was 155.50, whereas following the intervention, it reduced to 150.08. These outcomes indicated a substantial impact, as evidenced by a p-value of 0.030, surpassing the significance level α (0.05). In conclusion, Hatha Yoga exercises significantly influenced blood pressure in elderly hypertensive patients at the Biaro Public Health Center in 2023. Consequently, it is recommended that hypertensive elderly individuals incorporate regular and disciplined Hatha Yoga exercises into their routine to effectively manage their blood pressure.

Keywords: Hatha Yoga Exercise, Blood Pressure, Elderly

Introduction

Hypertension, commonly known as high blood pressure, is a medical disorder defined by excessive blood pressure in the body's arteries. This is a widespread health problem that affects millions of individuals.(WHO, 2021).

Hypertension (or high blood pressure) is defined by the World Health Organization (WHO) as a condition in which the systolic blood pressure is 140 mmHg or higher, or the diastolic blood pressure is 90 mmHg or higher. This indicates that a person is regarded to have

hypertension if one or both of his or her blood pressure values (systolic and diastolic) are at or above certain limits. Hypertension is the most common noncommunicable condition, affecting 60% to 80% of the older population.(Maya Sari et al., 2018)

According to World Health Organization (WHO) data from 2019, hypertension killed roughly 8 million individuals worldwide and 1.5 million people in Southeast Asia per year. Hypertension affects around 1.13 billion individuals globally, or one out of every three people. The prevalence of hypertension is predicted to climb further, with an estimated 1.5 billion people suffering from it by 2025, resulting in 9.4 million deaths from hypertension and its sequelae. Hypertension prevalence rises with age, with rates of 7.5% among those aged 18-39, 33.2% among those aged 40-59, and 63.1% among those aged 60 and above, with considerable increases noted in low and middle-income nations.(Kemenkes RI, 2021)

Based on measurements of the population aged 18 years and older, the prevalence of hypertension in Indonesia is 34.1%, with the highest prevalence in South Kalimantan (44.1%) and the lowest in Papua (22.2%). The estimated number of hypertension cases in Indonesia is 63.3 million people, with hypertension most prevalent among those aged 45-55 years (45.3%) and 55-64 years (55.2%).(Wolff et al., 2013)

The number of older people with hypertension in West Sumatra reached 73,639 in 2020. (BPS Sumbar, 2020)

From January to October 2022, 258 elderly were diagnosed with hypertension, according to a survey done at the Biaro Health Center's working region. There were 90 older people with hypertension in the Parik Putuih sub-district, with 13% having mild to moderate hypertension.

Yoga is one method for achieving both physical and spiritual wellbeing. Yoga was discovered in ancient civilizations, specifically in the cities of Harappa and Mohenjo-Daro, where it is believed to have been practiced. This can be seen in a statue of Lord Shiva and Goddess Parvati performing various asanas (postures). According to Hindu mythology, Lord Shiva is the instructor of yoga, while Goddess Parvati is his disciple (Yuli Hilda Sari et al., 2019).

One strategy to hypertension management and prevention is to provide both pharmaceutical and non-pharmacological interventions that can assist patients control their blood pressure. Yoga, which combines physical exercise and relaxation, is one of the non-pharmacological therapy that can be used.(Pareira et al., 2022)

Yoga is extremely helpful in lowering blood pressure in the elderly, owing to an increase in endorphin hormone production in the brain. Endorphins relax constricted blood arteries, allowing them to widen and improve blood flow throughout the body (Subekti et al., 2022)

Literature Review

The force exerted by the flow of blood against the walls of blood arteries is known as blood pressure. Blood pressure is measured in two parts: systolic pressure (the first number) and diastolic pressure (the second). The pressure when the heart contracts and pumps blood is

Case Study: A Depiction of Blood Pressure Following Hatha Yoga Practice

known as systolic pressure, whereas the pressure when the heart is at rest between two beats is known as diastolic pressure. Millimeters of mercury (mmHg) are used to measure blood pressure. A device called as a sphygmomanometer is used to measure blood pressure. The mercury sphygmomanometer and the digital sphygmomanometer are the two most prevalent types of sphygmomanometers.(Triyanto, 2014)

Physical activity lowers the risk of hypertension by decreasing blood pressure resistance while also suppressing activity in both the sympathetic nervous system and the renin-angiotensin system. Engaging in aerobic exercises for 30-45 minutes per day can lead to a 19-30% reduction in hypertension risk. The most effective exercise type for lowering hypertension is moderate-intensity aerobic exercise (60-75%), which should be performed daily.(da Rosa-Santos et al., 2019)

Discovered that yoga can help with the treatment of cardiovascular illnesses by lowering both systolic and diastolic blood pressure as well as heart rate. Yoga treatment can help hypertension individuals lower their blood pressure while also giving extra benefits, such as improving lumbar flexibility in the elderly (Jumain, 2020)

Yoga also stimulates the release of endorphin chemicals. Endorphins are neuropeptides that the body produces during relaxation and calm conditions. They are produced by the neurological systems of the brain and the spinal cord. This hormone can serve as a natural tranquilizer created by the brain, causing a sensation of well-being and increasing endorphin levels in the body, so lowering blood pressure. Exercise has been shown to raise endorphin levels in the blood four to five times. As a result, the more yoga activities performed, the higher the beta-endorphin levels (Munawarah, 2019)

Research Methode

This study falls under the category of Quasi-Experimental research with a design known as the One-Group Pretest-Posttest Design. The research population consists of 258 elderly individuals suffering from hypertension. The sample for this study comprises 12 individuals who meet the inclusion and exclusion criteria set by the researcher. The sampling technique employed in this research is Purposive Sampling, selecting respondents who meet the specified inclusion and exclusion criteria. Data analysis involves both Univariate and Bivariate Analysis, including a Dependent T-Test.

Result and discussion

1. The Average Blood Pressure Of Elderly Individuals With Hypertension Before Being Given Hatha Yoga Exercises.

Based on the table above, it is evident that the average blood pressure of the respondents before the intervention is 155.50 mmHg, with a standard deviation of 8.939. The lowest recorded blood pressure is 142 mmHg, while the highest recorded blood pressure is 170 mmHg.

Table 1: The Average Blood Pressure of Elderly Individuals with Hypertension Before Being Given Hatha Yoga Exercises

Variable	N	Mean	Std. deviation	Min	Max
Pretest	12	155.5	8.939	142	170

The aged, or elderly population, represent a God-ordained phase that is defined by an increase in weakness, increased susceptibility to numerous illnesses, ever-changing environmental conditions, a loss of agility, diminished mobility, and physiological changes. The elderly's physical health deteriorates, particularly in terms of energy, activity levels, employment capacity, disease, and reliance on medical care. As a result, the elderly are less likely to lead optimal lives (Iswahyuni, 2017).

In general, blood pressure rises gradually with age, and the body's functions decrease in the aged, rendering individuals more vulnerable to disease. Hypertension in the elderly is caused by changes such as decreased flexibility of the aorta wall and thickening and stiffening of heart valves. This is related to decreased peripheral blood vessel efficiency for oxygen and increased peripheral blood vessel resistance. (Adam, 2019)

Hypertension is a circulatory system illness that causes blood pressure to rise over normal limits. The Indonesian Ministry of Health proposes blood pressure categories that include ideal blood pressure with systolic pressure of 120 mmHg and diastolic pressure of 80 mmHg. Prehypertension has a systolic pressure of 120-139 mmHg and a diastolic pressure of 80-90 mmHg. Systolic 140-150 mmHg and diastolic 90-99 mmHg are considered Stage 1 hypertension, while systolic > 160 mmHg and diastolic > 100 mmHg are considered Stage 2 hypertension (Syah, 2019)

Most cases of hypertension are asymptomatic, while some symptoms may appear coincidentally and are thought to be associated to high blood pressure (even if they are not). Headaches, nosebleeds, dizziness, flushed face, and weariness are some of the symptoms that can occur in both hypertension and non-hypertensive people. It can also cause palpitations, impaired vision, and fainting in specific cases (Azhari, 2019).

This result is consistent with (Hopkins et al., 2021) study on the Application of Hatha Yoga in Reducing Blood Pressure in Elderly Individuals with Hypertension. According to the findings of this study, the average blood pressure of the respondents prior to the intervention was in the range of stage I hypertension (mild), with a reading of 156/92.8 mmHg.

(Davoudi-Kiakalayeh et al., 2017) conducted a study on the Effect of Yoga Intervention in the Management of Hypertension: According to a Preventive Trial, the average systolic blood pressure before Hatha yoga intervention was 132.3 mmHg, and the diastolic blood pressure was 86.1 mmHg, putting them in the stage I hypertension category.

The researcher assumes that before to the intervention, the respondents had high blood pressure conditions (hypertension), with an average blood pressure of more than 140/90

Case Study: A Depiction of Blood Pressure Following Hatha Yoga Practice

mmHg. Many variables can contribute to an increase in blood pressure or the development of hypertension, with lifestyle being the most important. This includes food habits, rest, lifestyle, and physical activity.

Before the intervention, overall, the respondents were elderly individuals with mild and moderate hypertension. Complaints reported by the respondents also indicated symptoms of hypertension, including fatigue, dizziness, headaches, palpitations, and difficulty sleeping.

The primary cause of hypertension in the elderly is the aging process, which leads to a decrease in blood vessel elasticity and, as a result, increases the workload on the heart to circulate blood throughout the body, ultimately resulting in increased blood pressure. Furthermore, lifestyle factors and habits among the elderly can contribute to high blood pressure. It is worth noting that biological variables, such as estrogen and progesterone imbalances caused by menopause, can cause high blood pressure in older women.

Psychological factors contribute significantly to high blood pressure in the elderly. Anxiety and restlessness caused by psychological changes in the elderly can result in an elevated heart rate and blood pressure.

2. The Average Blood Pressure Of Elderly Individuals With Hypertension After Being Given Hatha Yoga Exercises.

Based on the following table, it indicates that the average blood pressure of the respondents after the intervention is 151.92 mmHg, with a standard deviation of 8.733. The lowest recorded blood pressure is 136 mmHg, while the highest recorded blood pressure is 165 mmHg.

Table 2. The Average Blood Pressure of Elderly Individuals with Hypertension After Being Given Hatha Yoga Exercises

Variable	N	Mean	Std. deviation	Min	Max
Posttest	12	150.0	8.733	136	165

The intervention in this study consisted of six sessions of Hatha Yoga exercises spread out over a two-week period. Hatha Yoga is a practice that combines various techniques for shaping body posture with breathing techniques to achieve a balance between various forces within the body, such as the upper and lower body, the left and right sides of the body, inhalation and exhalation, positive and negative energy, and so on (Pujiastuti et al., 2019)

Endorphin hormones are also released during yoga movements. Endorphins are neuropeptides that the body produces during relaxation and tranquillity. They are produced by the neurological systems of the brain and the spinal cord. This hormone can function as a natural tranquilizer created by the brain, providing a sensation of comfort and raising endorphin levels in the body, so lowering blood pressure. Exercise has been shown to raise endorphin

levels in the blood four to five times. As a result, the more yoga activities one does, the higher one's -endorphin levels (Andarwulan, 2021)

This study's findings are congruent with those of Subekti et al.'s (2022) study on the Influence of Hatha Yoga Exercises on Blood Pressure Reduction in Elderly Hypertensive Patients in the Kendalsari Health Center Area of Malang City. The average systolic blood pressure before and after yoga practice was 156.66 mmHg and 151.66 mmHg, respectively, according to this study. Meanwhile, before and after yoga practice, the average diastolic blood pressure was 93.91 mmHg and 86.08 mmHg, respectively.

Another study, The Effect of Hatha Yoga Therapy on Blood Pressure of Primary Hypertension Patients of Productive Age, by (Dharmajaya & Sitohang, 2021) found that the average systolic and diastolic blood pressure before therapy in the intervention group was 161.84/93.25 mmHg, while it was 161.66/93.37 mmHg in the control group. The intervention group's average systolic and diastolic blood pressure following therapy was 122.87/71.69 mmHg, while the control group's was 127.66/73.13 mmHg.

The paired t-test statistical test indicates that the p-value is less than the (significance level) of 0.05. As a result, it is possible to infer that Hatha Yoga therapy has a considerable effect on blood pressure reduction in productive-age patients with primary hypertension.

The research hypothesis is based on data collected from 12 respondents who observed changes in blood pressure after participating in six sessions of yoga activities over a two-week period. This occurred as a result of the respondents' adherence to the researcher's instructions during Hatha Yoga practice. It should be mentioned, however, that two respondents (Mrs. A and Mrs. M) reported a rise in blood pressure. This could be attributable to their lack of relaxation and unwillingness to completely engage in Hatha Yoga activities.

This study is consistent with the goals and benefits of yoga, which include increasing physical activity, inducing relaxation, offering comfort, and assisting in blood circulation improvement. As a result, the idea that yoga can assist control blood pressure in senior hypertensive persons is plausible and supported by the findings of this study.

3. The Effect of Before and After Hatha Yoga Exercise on Blood Pressure in Hypertensive Elderly Patients at Biaro Health Center in 2023

Based on the table, it is evident that the mean difference before (155.50) and after (150.08) six sessions of Hatha Yoga intervention is 5.42. Using the Paired Sample T-test, a p-value of 0.030 was obtained, which is less than α (0.05). Therefore, the null hypothesis (H_0) is rejected, indicating that there is an influence of Hatha Yoga Exercise on Blood Pressure in Hypertensive Elderly Patients at Biaro Health Center in 2023.

Table 3. The Effect of Before and After Hatha Yoga Exercise on Blood Pressure in Hypertensive Elderly Patients at Biaro Health Center in 2023

Variable	N	Mean	Std. deviation	pValue
Prettest	12	155,5	8,939	0,030

Case Study: A Depiction of Blood Pressure Following Hatha Yoga Practice

posttest	150.0	8.733
-----------------	-------	-------

Yoga is advised for people who have high blood pressure since it has a relaxing impact that helps increase blood circulation throughout the body. Smooth blood circulation suggests that the heart is in good working order (Sinarsari, 2020)). In essence, all yoga poses promote relaxation. In a relaxed condition, breathing is regular, the heart pumps blood efficiently, and blood pressure is normal (Munawarah, 2019)

Yoga motions are designed to help with stress management, which is one of the risk factors for hypertension. This is accomplished by combining good breathing exercises with modest muscle activities that create relaxation. Deep breathing and gentle motions can boost oxygen levels in the blood, improve smooth blood flow, and lower heart rate (Sinarsari, 2020).

This aligns with research conducted by (Pareira et al., 2022)) on Hatha Yoga and Tai Chi Decrease Blood Pressure in Pre-Elderly individuals, which showed an average decrease in systolic blood pressure of 5.60 ± 1.43 mmHg and diastolic blood pressure of 4.00 ± 1.94 mmHg, with a p-value of 0.00, indicating that Hatha Yoga has an effect in lowering blood pressure in pre-elderly individuals with grade I hypertension.

According to a study conducted by Subekti et al. (2022), the mean systolic and diastolic blood pressure after yoga exercise was 151.70 mmHg and 86.08 mmHg, respectively. There was a 4.94 mmHg decrease in systolic blood pressure and a 7.83 mmHg decrease in diastolic blood pressure. Based on the findings of these research, it is possible to conclude that yoga activities have an effect on lowering blood pressure in elderly people with hypertension.

According to the researcher's assumptions, consistent Hatha Yoga practice increases heart efficiency by strengthening the heart muscles, allowing for deeper contractions to pump the same volume of blood. The decrease in peripheral resistance is also contributed to the decrease in blood pressure because regular exercise promotes blood vessel flexibility, causing blood vessels to dilate and relax and lowering the likelihood of fat deposition on vessel walls.

Conclusion

This study can be described based on the overall research findings as follows; 1) before beginning Hatha Yoga exercises, the average blood pressure in senior people with hypertension was 155.50 mmHg, with a standard deviation of 8.939 mmHg, 2) the average blood pressure in senior hypertensive persons following Hatha Yoga workouts was 150.08 mmHg, with a standard deviation of 8.733 mmHg, 3) the effect of Hatha Yoga exercise on the blood pressure of older hypertensive persons before and after the yoga sessions resulted in an average difference of 5.42 mmHg, with a p-value of 0.030.

These findings indicate that there is a significant influence of Hatha Yoga exercise on reducing blood pressure in elderly individuals with hypertension.

Reference

- Adam, L. (2019). DETERMINAN HIPERTENSI PADA LANJUT USIA. *Jambura Health and Sport Journal*, 1(2). <https://doi.org/10.37311/jhsj.v1i2.2558>
- Andarwulan, S. (2021). Hubungan Terapi Senam Yoga terhadap Hipertensi pada Lansia. *Jurnal Kebidanan Harapan Ibu Pekalongan*, 8(2). <https://doi.org/10.37402/jurbidhip.vol8.iss2.112>
- Azhari, R. (2019). Pengaruh Slow Deep Breathing Terhadap Tekanan Darah Pada Penderita Hipertensi Di Puskesmas Simpang IV Sipin Kota Jambi. *Riset Informasi Kesehatan*, 7(2). <https://doi.org/10.30644/rik.v7i2.178>
- BPS Sumbar. (2020). Profil Kesehatan Provinsi Sumatera Barat Tahun 2020. *Badan Pusat Statistik*.
- da Rosa-Santos, L., Aidar, F. J., dos Santos Vieira, E. F., Bessa Lima, F., dos Santos Estevam, C., Lopes dos Santos, J., Silva de Araújo, S., & Carlos Marçal, A. (2019). The Morphofunctional Adaptations of Resistance Exercise on Reducing Cardiovascular Risk Factors in Adolescents: A Systematic Review (2012 to 2018). *Journal of Exercise Physiology Online*, 22(7).
- Davoudi-Kiakalayeh, A., Mohammadi, R., Pourfathollah, A. A., Siery, Z., & Davoudi-Kiakalayeh, S. (2017). Alloimmunization in thalassemia patients: New insight for healthcare. *International Journal of Preventive Medicine*, 8. <https://doi.org/10.4103/ijpvm.IJPVM>
- Dharmajaya, R., & Sitohang, N. A. (2021). The Effect of Hatha Yoga Therapy on the Blood Pressure of Primary Hypertension Patients of Productive Age. *Jurnal Keperawatan Soedirman*, 16(1). <https://doi.org/10.20884/1.jks.2021.16.1.1543>
- Hopkins, S. R., Dominelli, P. B., Davis, C. K., Guenette, J. A., Luks, A. M., Molgat-Seon, Y., Sá, R. C., Sheel, A. W., Swenson, E. R., & Stickland, M. K. (2021). Face Masks and the Cardiorespiratory Response to Physical Activity in Health and Disease. In *Annals of the American Thoracic Society* (Vol. 18, Issue 3). <https://doi.org/10.1513/AnnalsATS.202008-990CME>
- Jumain, J. (2020). Efek Yoga Terhadap Tekanan Darah Pada Pasien Hipertensi: a Systematic Review. *Pustaka Katulistiwa: Karya Tulis Ilmiah Keperawatan*, 1(02).
- Kemenkes RI. (2021). Hipertensi menurut WHO, faktor risiko, dan pencegahannya. *Kementerian Kesehatan Republik Indonesia*.
- Maya Sari, K., Herawati, N., & Keperawatan YPTK Solok, A. (2018). Pengaruh Senam Yoga Terhadap Penurunan Tekanan Darah Pada Lansia Di Kelurahan Kampung Jawa Wilayah Kerja Puskesmas Tanjung Paku Kota Solok Tahun 2017. *Menara Ilmu*, XII(3).
- Munawarah, S. (2019). PENGARUH PEMBERIAN SENAM YOGA TERHADAP KESEIMBANGAN STATIS PADA LANSIA 2019. *Human Care Journal*, 4(2). <https://doi.org/10.32883/hcj.v4i2.465>

Case Study: A Depiction of Blood Pressure Following Hatha Yoga Practice

- Pareira, E. M. S., Sutjana, I. D. P., Wahyuddin, W., Adiputra, N., Dinata, I. M. K., & Widiyanti, I. G. A. (2022). HATHA YOGA TRAINING HAS SIMILAR EFFECTS WITH TAI CHI TRAINING IN DECREASING BLOOD PRESSURE IN PRE-ELDERLY WITH GRADE I HYPERTENSION. *Sport and Fitness Journal*, 10(1). <https://doi.org/10.24843/spj.2022.v10.i01.p02>
- Pujiastuti, R. S. E., Sawab, S., & Afyati, S. Z. (2019). PENGARUH TERAPI YOGA TERHADAP PENURUNAN TEKANAN DARAH PADA PENDERITA HIPERTENSI. *Jurnal Perawat Indonesia*, 3(1). <https://doi.org/10.32584/jpi.v3i1.181>
- Sinarsari, N. M. (2020). Yoga Gembira Bagi Lansia Hipertensi. *JURNAL YOGA DAN KESEHATAN*, 3(1). <https://doi.org/10.25078/jyk.v3i1.1518>
- Subekti, I., Saragih, L., Ajeng Pertiwi, D., & Kesehatan Kemenkes Malang, P. (2022). Pengaruh Latihan Hatha Yoga Terhadap Penurunan Tekanan Dadah Pada Hipertensi , Malang City. In *Jurnal Keperawatan Terapan (e-Journal)* (Vol. 08, Issue 01).
- Syah. (2019). Faktor-Faktor Yang Berhubungan Dengan Kejadian Hipertensi Di Puskesmas Kabupaten Magelang. *Universitas Muhammadiyah Magelang*.
- Triyanto, E. (2014). Pelayanan Keperawatan Bagi Penderita Hipertensi Secara Terpadu. In *Graha Ilmu* (Vol. 13, Issue 1).
- WHO. (2021). *Hipertensi Menurut WHO, Faktor Risiko, dan Pencegahannya*. Kementerian Kesehatan Republik Indonesia.
- Wolff, M., Sundquist, K., Larsson Lönn, S., & Midlöv, P. (2013). Impact of yoga on blood pressure and quality of life in patients with hypertension - a controlled trial in primary care, matched for systolic blood pressure. *BMC Cardiovascular Disorders*, 13. <https://doi.org/10.1186/1471-2261-13-111>
- Yuli Hilda Sari, Usman, & Makhrajani Majid. (2019). FAKTOR-FAKTOR YANG BERPENGARUH TERHADAP KEJADIAN HIPERTENSI PADA LANSIA DI WILAYAH KERJA PUSKESMAS MAIWA KAB.ENREKANG. *Jurnal Ilmiah Manusia Dan Kesehatan*, 2(1). <https://doi.org/10.31850/makes.v2i1.125>