STRADA : Jurnal Ilmiah Kesehatan
DOI: https://doi.org/10.30994/sjik.v14i2.1261
ISSN: 2252-3847 (print); 2614-350X (online) Vol.14 No.2 November 2025 Page. 293-301

The Effect of Elderly Exercise on Independence in Performing Daily Activities and Reducing Blood Pressure in Elderly in the Working Area of Riaraja Community Health Center

Zulkifli[1*], Yuly Peristiowati[2], Prima Dewi Kusumawati[3]
[1,2,3] Universitas Strada Indonesia, Kediri, Indonesia
*Corresponding author: zulkifli198303@gmail.com

ABSTRACT

An increase in blood pressure will give continuing symptoms to a target organ in the body, lack of activity causes the heart to become untrained, blood vessels become stiff, blood circulation does not flow smoothly, in cases of hypertension the highest in Indonesia is 39.6% and in NTT it is 30.8%. One of the factors that influences hypertension is physical activity. Lack of physical activity can increase the risk of hypertension. The purpose of this study was to determine the effect of elderly gymnastics on independence in carrying out daily activities and reducing blood pressure in the elderly with hypertension. This type of research is Quasi Experimental with a one group pre test-post test design with a population of 146 and a sample of 34 people was taken using a non-probability sampling technique with a Purposive sampling type. Data were collected and analyzed using the Wilcoxon Sign Rank statistical test. The results of the study showed that the Wilcoxon Test obtained a p value of 0.001 (p <0.05) with a significance level of 5%, which means that there is an effect of elderly gymnastics on independence in carrying out daily activities and also a p value of 0.000 (p <0.05) with a significance level of 5%, which means that there is an effect of elderly gymnastics on decreasing blood pressure in the elderly. This study concludes that elderly gymnastics improves independence in daily activities and reduces blood pressure among older adults at the Riaraja health center posyandu.

Keywords: ADL independence, blood pressure, elderly gymnastics, hypertension

Received September 7, 2025; Revised October 12, 2025; Accepted November 14, 2025

DOI: https://doi.org/10.30994/sjik.v14i2.1261
ISSN: 2252-3847 (print); 2614-350X (online) Vol.14 No.2 November 2025 Page. 293-301

BACKGROUND

According to WHO, an elderly person is someone who has reached the age of 60 years and over. World Population Prospects data in 2015 showed that there were 901 million people aged 60 years or over, which constituted 12% of the global population. In 2015 and 2030, the number of people aged 60 years or older is projected to grow by around 56%, from 901 million to 1.4 billion, and by 2050 the elderly population is projected to more than double that of 2015, reaching 2.1 billion (United Nations, 2015). Data from the March 2023 National Socio-Economic Survey (Susenas) shows that 11.75 percent of the population is elderly and from the results of population projections, the elderly dependency ratio is 17.08. Based on data from the East Nusa Tenggara Central Statistics Agency, the percentage of the elderly population in 2021 is 9.4 percent. This figure has increased compared to 2020 which was 7.5 percent. According to the 2021 Census results, the elderly population in Ende Regency is quite high because the number of elderly people aged 60 years in Ende Regency reached 12.7 percent. The elderly are an age group of humans who have passed the final stages of their life, one of the diseases associated with a person's aging process is hypertension. The prevalence of people suffering from hypertension according to the World Health Organization (WHO) 2021 is around 1.28 billion adults aged 30-79 years suffering from hypertension. Based on the results of the Ministry of Health of the Republic of Indonesia (2018), the prevalence of hypertension in Indonesia reached 34.11%, while among residents of East Nusa Tenggara province (2018), the prevalence of hypertension cases was 11,505 (27.72%), whereas in 2020 it was 17,666 (28.01%) and in 2022 it was 19.32 (30.8%). Based on the report on the number of 10 largest non-communicable diseases, the Ende District Health Service in 2018, the proportion of hypertension cases was 5,127 cases (49.86%), then in 2020 it was 7,990 cases (51.47%) and in 2022 it was 12,654 cases (97.2%). Of the number of health centers in Ende Regency, Riaraja Health Center is one of the health centers with the highest cases of hypertension. Based on reports on the number of visits for 10 diseases at the Riaraja Community Health Center in 2018, hypertension was in 3rd place with a proportion of hypertension cases of 500 cases (15.41%), then in 2020 it became 580 cases (16.09%), and in 2022 it became 845 cases (69.5%) (Ende Health Department Profile, 2022). There are many efforts that can be made to reduce blood pressure, namely with pharmacological and non-pharmacological therapy. Pharmacological therapy can be carried out by taking medication regularly as recommended by a doctor. Meanwhile, one of the non-pharmacological therapies that can be carried out by hypertension sufferers is by practicing physical activities such as gymnastics. Physical activity such as exercise that is done regularly can reduce high blood pressure. Daily life activities that are usually carried out without the help of other people, called ADL, are activities of carrying out daily routine work, including; going to the toilet, eating, dressing (dressing up), showering, and moving around. The physical benefits of exercise for the elderly are maintaining stable blood pressure, flexing body muscles, strengthening bones, maintaining ideal body weight, and improving fitness (Nisak, 2012).

METHODS

The research method used is the Quasy Experimental method, it is said to be Quasy Experimental because this method is an experimental activity, which aims to determine a symptom or influence that arises, as a result of certain treatments, using a One Group Pretest-Posttest without Control Design. This research was conducted from March to April 2025 at the posyandu in the working area of the Riaraja Community Health Center. The focus of this research is elderly people who experience hypertension. The instruments used in the research were the Elderly Gymnastics variables, namely the Elderly Gymnastics SOP, sound system,

DOI: https://doi.org/10.30994/sjik.v14i2.1261
ISSN: 2252-3847 (print); 2614-350X (online) Vol.14 No.2 November 2025 Page. 293-301

and laptop. In the Elderly Independence variable, a questionnaire was used with several appropriate answer criteria. To determine independence, researchers made questions using a rating scale, namely the Katz Index Observation Sheet, while for the change in blood pressure variable, an observation sheet was used based on the results of blood pressure measurements using a Tensimeter and Stethoscope. This tool will be used to determine the patient's systolic and diastolic blood pressure and listen to the pulse with the help of a stethoscope. This research has been ethically tested with certificate number No: 0523421/EC/KEPK/I/03/2025.

RESULTS

1. General data

Table 1. Characteristics of respondents based on gender at Riaraja Community Health Center in 2025

Gender	Total	Frequemcy
Male	8	23,5
Female	26	76,5
Total	34	100.0

Based on table 1, the number of female respondents is more dominant, namely 26 people (76.5%), compared to only 8 men (23.5%).

Table 2. Characteristics of respondents based on age at Riaraja Community Health Center in 2025

Age Range	Total	Frequency
60-70 thn	28	82,4
>70 thn	6	17,6
Total	34	100.0

Based on table 2 above, it can be seen that of the 34 respondents, the majority of respondents were elderly aged 60-70 years, namely 28 people (82.4%). Meanwhile, there were 6 elderly people aged >70 years (17.6%).

Table 3. Characteristics of respondents based on the independence of the elderly before being given Elderly Gymnastics at the Riaraja Community Health Center in 2025

Level of Independence	Total	Frequency
Mandiri	16	47,1
Sedang	18	52,9
Total	34	100.0

Based on table 3 above, it can be seen that there are 18 elderly people with a moderate level of independence (52.9%) and the number of independent elderly people is 16 people (47.1%).

Table 4. Characteristics of respondents based on the independence of the elderly after being given Gymnastics for the Elderly at the Riaraja Community Health Center in 2025

Level of Independence	Total	Frequency
Mandiri	28	82,4
Sedang	6	17,6
Total	34	100.0

Based on table 4 above, it can be seen that of the 34 respondents, the majority of respondents who have been given elderly exercise are independent in carrying out daily

DOI: https://doi.org/10.30994/sjik.v14i2.1261
ISSN: 2252-3847 (print); 2614-350X (online) Vol.14 No.2 November 2025 Page. 293-301

activities, namely 28 people (82.4%). Meanwhile, the number of elderly with a moderate level of independence was 6 people (17.6%).

Table 5. Characteristics of respondents based on elderly blood pressure before being given Elderly Exercise at the Riaraja Health Center in 2025

Blood Pressure	Total	Frequency
Normal	2	5,9
Hipertensi	6	17,6
Hipertensi Stage 1	22	64,7
Hipertensi Stage 2	4	11,8
Total	34	100.0

Based on table 5 above, the majority of respondents were elderly with Stage 1 Hypertension, namely 22 people (64.7%). Meanwhile, the number of elderly people with normal blood pressure is only 2 people (5.9%).

Table 6. Characteristics of respondents based on elderly blood pressure after being given Elderly Exercise at the Riaraja Health Center in 2025

Blood Pressure	Total	Frequency
Normal	4	11,8
Hipertensi	18	52,9
Hipertensi Stage 1	8	23,5
Hipertensi Stage 2	4	11,8
Total	34	100.0

Based on table 6 above, it can be seen that of the 34 respondents, the majority of respondents who had been given elderly exercise, experienced a decrease in blood pressure, namely 8 people (23.5%) with Stage 1 Hypertension and 18 people (52.9%) with Hypertension. Meanwhile, there were 4 elderly people with normal blood pressure (11.8%).

2. Special Data

1. The influence of elderly exercise on independence in carrying out daily activities in the elderly

Table 7. Effect of Elderly Exercise on Independence for the Elderly at the Riaraja Health Center in 2025

Effect of Elderly Exercise	Frequency	Z Hitung	p-Value
Negative Ranks	12	-3,464	0,001
Positive Ranks	0		
Ties	22		
Total	34		

Based on table 7 above, from the Wilcoxon test, it can be seen that the statistical test results have a p value of 0.001 ($p < 0.05$) with a significance level of 5%, so H0 is rejected and Ha is accepted, which means that there is an influence of elderly exercise on the independence of carrying out daily activities for elderly people in the Riaraja health center working area.

2. The effect of elderly exercise on reducing blood pressure in the elderly

Table 8. Effect of Elderly Exercise on Independence for the Elderly at Riaraja Community Health Center in 2025

DOI: https://doi.org/10.30994/sjik.v14i2.1261
ISSN: 2252-3847 (print); 2614-350X (online) Vol.14 No.2 November 2025 Page. 293-301

Effect of Elderly	Frequency	Z Hitung	p-Value
Negative Ranks	16	-4,000	0,000
Positive Ranks	0		
Ties	18		
Total	34		

Based on table 8 above from the Wilcoxon test, it can be seen that the statistical test results have a p value of 0.000 ($p < 0.05$) with a significance level of 5%, so H0 is rejected and Ha is accepted, which means that there is an influence of elderly exercise on reducing blood pressure in the elderly in the Riaraja health center working area.

DISCUSSION

1. The influence of elderly exercise on the independence of carrying out daily activities in the elderly

The results of this research show that doing elderly exercise regularly can increase the independence of the elderly, seen from the increase in an elderly person's independence to carry out daily activities after doing elderly exercise. The results of this study show that there was an increase in independence in the katz index between before the elderly exercise was carried out and after the elderly exercise was carried out. This was proven before the elderly exercise was carried out, there were several elderly people who experienced problems in carrying out activities such as mobilizing/moving and going up and down stairs.

Based on the results of statistical data processing, the Wilcoxon Sign Rank test obtained a significant value of 0.001 ($p < 0.05$). Thus, it is concluded that there is an influence of elderly exercise on the independence of carrying out daily activities in the elderly in the Riaraja Community Health Center working area. This research is in line with research conducted by Darsini and M. Zainul Arifin (2019) with the title "The Effect of Elderly Exercise on Independent Activity Daily Living (ADL) among the Elderly at the Mojopahit Home, Mojokerto", that elderly exercise helps improve blood flow and nutritional supply, makes the muscles stretch, and can reduce pain in the joints.

Elderly exercise is physical exercise that includes breathing exercises. Elderly gymnastics is a sport that is suitable for the elderly because the movements in it avoid low impact movements, jumping, crossing legs, going back and forth, jerking but still stimulate the work of the heart and lungs with light-moderate intensity. Apart from having a positive impact on improving the function of the body's organs, exercise for the elderly also has an effect on increasing immunity in the human body after regular exercise.

Elderly exercise is safe for seniors over 60 years old. In fact, elderly people have chronic diseases such as diabetes, heart disease or arthritis. Many elderly people practice exercise movements using music. This movement must also be in accordance with the three phases of gymnastics, namely warm-up, core and cool-down. By doing senior exercise regularly, it is hoped that seniors aged 60 years and over can gain a number of benefits from this activity, including increasing body muscle strength, improving balance, increasing energy, improving cognitive function or brain function as well as preventing and delaying diseases such as heart disease, diabetes and osteoporosis.

Gymnastic movements make the quadriceps and hamstring muscles work, thus facilitating pumping action movements which make circulation and metabolic processes run well and optimally. Smooth blood flow means the removal of metabolic waste (substance P) and acetabolic which is produced through the inflammatory process can be caught with the blood flow so that pain can be reduced (Marlina, 2015).

DOI: https://doi.org/10.30994/sjik.v14i2.1261
ISSN: 2252-3847 (print); 2614-350X (online) Vol.14 No.2 November 2025 Page. 293-301

Based on the general research results, researchers are of the opinion that basically elderly exercise has an influence on increasing the independence of elderly people if it is done regularly every week and adjusted to an elderly person's ability to do the exercise.

This is proven through research results where overall respondents experienced increased independence in carrying out daily activities in the elderly. Indirectly, researchers believe that if this exercise is done regularly, it can help elderly people to increase their independence in carrying out daily activities.

2. The effect of elderly exercise on reducing blood pressure in the elderly

Based on the statistical data processing results of the Wilcoxon Sign Rank test, a significant value of 0.000 was obtained ($p < 0.05$). Thus, it is concluded that there is an influence of elderly exercise on reducing blood pressure in the elderly in the Riaraja Community Health Center working area. Similar results were obtained in previous research conducted by Totok & Rosyid (2017), the results of the Wilcoxon Signed Rank Test, with a significance value (p-value) of 0.001. The test significance value (p-value) is smaller than 0.05 ($0.001 < 0.05$) so it is decided that H0 is rejected, which means that there is a significant difference in the average pre-test and post-test systolic and diastolic blood pressure.

Elderly exercise is light exercise that is easy to do and not burdensome, which can be applied to the elderly. This sports activity will help the elderly's body to stay fit and fresh because this elderly exercise is able to train the bones to stay strong, encourage the heart to work optimally and help eliminate free radicals roaming around in the body. Iansia exercise is very useful for inhibiting degenerative processes or the aging process (Widianti & Proverawati, 2020). Exercise aims to improve body health, but not all exercise is good for the elderly. There are several types of movements that are considered dangerous when exercising, namely sit-ups with straight legs, reaching for the big toes, lifting the legs, arching the back (Maryam, et al., 2018).

Meanwhile, research from Lestari and Febi Ayu (2021), "The Effect of Elderly Exercise on the Blood Pressure of Elderly People with Hypertension in the Elderly Exercise Group in Banjar Kaja Sesetan, South Denpasar". The statistical calculation results have a value of $p = 0.000$, meaning there is a difference between the pre-test and post-test results. The p value < 0.05 which means the difference is significant. This is also supported by research conducted by Sidiq (2019), the results of the analysis of blood pressure before and after treatment obtained a P value = 0.001 with a significance level of 0.05, meaning that H0 was rejected and Ha was accepted on systolic and diastolic blood pressure or there was an effect of prolanis exercise on the respondent's blood pressure. It can be concluded that prolanis exercise treatment can reduce systolic and diastolic blood pressure in hypertensive patients.

Physical activity such as exercise in old age which is carried out regularly will increase physical fitness, so that exercise can indirectly improve heart function and reduce blood pressure and reduce the risk of fat accumulation on the walls of blood vessels thereby maintaining their elasticity (Sartika et al., 2020). The impact of elderly exercise is that it has a relaxing effect on the elderly's body. Elderly exercise has a relaxing effect on the sympathetic nerve fibers and also relaxes the blood vessel walls, so that the body feels calm and comfortable (Udjianti, 2018).

Feeling calm and comfortable during therapy can have a positive impact on feeling calm, comfortable, relaxed and reducing stress. Exercise can stimulate a decrease in sympathetic nerve activity and an increase in parasympathetic nerve activity which has an effect on reducing the hormones adrenaline, norepinephrine and catecholamines, as well as vasodilation or widening of blood vessels which results in smooth oxygen transport throughout the body, especially the brain, so that blood pressure can be reduced and the pulse becomes normal. Regular exercise activities burn glucose through muscle activity which will

DOI: https://doi.org/10.30994/sjik.v14i2.1261
ISSN: 2252-3847 (print); 2614-350X (online) Vol.14 No.2 November 2025 Page. 293-301

produce ATP so that endorphins will appear and bring a feeling of comfort, joy and happiness. Elderly exercise in old age that is carried out regularly will increase physical fitness, so that exercise can indirectly improve heart function and lower blood pressure and reduce the risk of fat accumulation on the walls of blood vessels, thus maintaining their elasticity (Windri & Sanubari, 2019).

According to researchers, exercise for the elderly in old age that is done regularly will improve physical fitness, so that exercise can indirectly improve heart function and lower blood pressure and reduce the risk of fat accumulation on the walls of blood vessels, thus maintaining their elasticity.

CONCLUSION

1. There is an influence of elderly exercise on the independence of carrying out daily activities for elderly people in the Riaraja Health Center work area, with the results of statistical testing using the Wilcoxon Sign Rank test, a significant value of 0.001 ($p < 0.05$) was obtained. So it can be concluded that Ha is accepted, namely that there is an influence of elderly exercise on the independence of the elderly.
2. There is an influence of elderly exercise on reducing blood pressure in the elderly in the Riaraja Health Center working area, with the results of statistical testing using the Wilcoxon Sign Rank test, a significant value of 0.000 was obtained ($p < 0.05$). Thus, it can be concluded that Ha is accepted, namely that there is an influence of elderly exercise on reducing blood pressure in the elderly.

REFERENCES

Agung I. (2016). *Uji Keandalan dan Kesahihan Indeks Activity ƒ Daily Living untuk Mengukur Status Fungsinal Dasar pada Usia Lanjut di RSCM*. Tesis. Jakarta.

Ardiyanti. N (2019). *Hubungan senam lansia terhadap activity of daily living (ADL) pada lansia di panti sosial tresna wredha unit budi luhur kasongan bantul yogyakarta*. Artikel diakses tanggal 25 Februari 2025. dari http://one.indoskripsi.com.

Badan Pusat Statistik (2020) Proyeksi Penduduk 2005-2015 (Hasil SUPAS) Population Projection 2005-2015 (Based on Intercencal Population Survey), BPS-Statistics Indonesia di akases pada tanggal 9 Juni 2024.

Boedhi, Darmojo, R. (2016). *Buku Ajar Geriatic (Ilmu Kesehatan Lanjut Usia) edisi ke – 4*. Jakarta: Balai Penerbit FKUI.

Chaplin, J.P. (2016). *Kamus Lengkap Psikologi*. Jakarta: PT Raja Grafindo Persada.

Corwin Elizabeth J. (2019). *Buku Saku Patofi.siologi.* Edisi 4. Jakarta : EGC.

Dalimartha, S., (2018) " *Vare Your Sel[Hipert,ensi"* .Cetakan 1 Jakarta : Penebar Plus.

Data Survei Sosial Ekonomi Nasional (Susenas) Maret 2023 Survei Sosial Ekonomi Nasional 2023 Maret (KOR). diakses 08 Juni 2024.

Depkes RI. (2019). Departemen Kesehatan. [Online] Available at: https://www.depkes.go.id [Accessed 12 5 2024].

DinKes Ende. (2022). *Profil Kesehatan Kabupaten Ende.*

Direktorat Pencegahan dan Pengendalian Penyakit Tidak Menular (P2PTM). Kemenkes RI (2022). Aktivitas Fisik, Kegiatan Harian yang Baik untuk Tubuh dan Jiwa. Diakses 28 Februari 2025, dari https://hellosehat.com/kebugaran/minimal-aktivitas-fisik-bagi-orang-dewasa/.

Efendi Ferry dan Makhfudi (2019). Keperawatan Kesehatan Komunitas (Teori dan Praktik dalam Keperawatan). Jakarta : Salemba Medika.

Eka Ediawati (2020). Tingkat kemandirian dalam ADL dan risiko jatuh pada lansia. Diakses 28 Februari 2025, dari https://www.stikesmukla.ac.id/downloads.

Harber, P.M., & Scoot, T. (2019). Aerobic Exercise Training Improves Whole Muscle And Single Myofiber Size And Function In Older Woman. Journal Physical Regular Integral Company Physical,10, 11-42.

Hardywinoto S. Panduan Gerontologi. (Utama P, ed.).; 2017.

Hidayat (2018) *Metade Penelitiori Keseh‹itari Pttt'aJi$•ma Kualit‹ttif.* Surabaya Health Books Publishing.https://silastik.bps.go.id/v3/index.php/mikrodata/detail/ZnZSZms4aStzN2JUSVY1QklqZ08rdz09.

Intan D. (2017). Pengaruh Senam Lansia terhadap Aktivitas Sehari-hari pada Lansia. Pontianak.

Kabo, P. (2018). Penyakit jantung koroner. Jakarta : Gramedia.

Kementrian Kesehatan Republik Indonesia (2018). Kemenkes RI, 2018. Hasil Utama Riskesdas. [Online] Available at: https://www.depkes.go.id [Accessed 5 12 2019].

Lestari, Febi Ayu. (2021). Penerapan Senam Hipertensi Untuk Menurunkan Curah Jantung Pada Penderita Hipertensi. Other thesis, Karya Ilmiah, Universitas Muhammadiyah Magelang.

Maryam. (2018). *Hubungan Tingkat Pendidikan dan Activity Daily Living dengan Demensia pada Lanjut Usia Di Panti Werdha*.

Nisak, K. (2012). *Pengaruh Senam Lansia terhadap Perubahan Tingkat Nyeri Sendi Pada Lansia Di Lingkugan Suromurukan Kelurahan Surodinawan Kecamatan Prajurit Kulon Kota Mojokerto*. Sekolah Tinggi Ilmu Kesehatan Dian Husada.

Notoatmodjo. (2018). *Metodologi Penelitian Kesehatan*. Jakarta: Rineka Cipta.

Nursalam. (2017). *Metode Penelitian Ilmu Keperawatan* (Edisi 4). Salemba Medika.

Piko, S.O. and Elyta, T. (2021) 'Pelaksanaan Senam Hipertensi Pada Lansia Di Panti Sosial Lanjut Usia (Pslu) Harapan Kita Palembang', Jpkm, 1(1).

Provinsi Nusa Tenggara Timur (2018). *Hasil Utama Riskesdas 2018*. 61. https://doi.org/prop.ntt.id. Diakses 1 Februari 2024.

Pusat Data dan Informasi Kemenkes RI (2023). Gambaran Kesehatan Lanjut Usia di Indonesia. Jakarta: Buletin Jendela Data dan Informasi Kesehatan. 2023, di akases pada tanggal 19 Juli 2024.

Rahmiati, C., & Zurijah, T. I. (2020). Pengaruh senam lansia terhadap tekanan darah pada lansia dengan hipertensi. *Jurnal Penjaskesrek*, *7*(1), 15–27.

Rima Berliana Purbaningrum (2020) pengaruh senam hipertensi terhadap penurunan tekanan darah pada lansia dengan hipertensi. Literatur review. Universitas Bhakti Kencana Bandung.

Rully Dhestian (2023). Detik Health, "Mengenal Senam Lansia, Jenis, dan Contoh Gerakannya" selengkapnya https://health.detik.com/kebugaran/d-6508331/mengenal-senam-lansia-jenis-dan-contoh-gerakannya.

Setiati, Siti. (2000). Pedoman, Pengelolaan Kesehatan Pasien Geriatri, untuk Doker dan Perawat. Jakarta: Fakultas Kedokteran Universitas Inddonesia.

Setiawan dkk. (2014). *Hubungan Frekuensi Senam Lansia Terhadap Tekanan Darah dan Nadi Pada Lansia Hipertensi*, Proseding Konferensi Nasional II PPNI Jawa Tengah.

Sugiyono. (2016). *Metode Penelitian Kuantitatif, Kualitatif dan RD*. Bandung. Alfabeta.

Sutanto. (2015). *Cekal Penyakit ModCFn Hipertensi, Stroke, Janttıng, Kolesterol, Diabetes.* Yogyakarta.

Totok Hernawan (2017). Pengaruh Senam Hipertensi lansia terhadap penurunan tekanan darah lansia dengan hipertensi di Panti Werdha Dhara Bakti kelurahan Pajang Surakarta, Jurnal Kesehatan, ISSN 1979-7621, Vol.10 No.1 Juni 2017.

Udjianti Wajan Juni. (2018). Klasifikasi Hipertensi. Dikases 28 Februari 2025, dari https://p2ptm.kemkes.go.id/infographic-p2ptm/hipertensi-penyakit-jantung-dan-

DOI: https://doi.org/10.30994/sjik.v14i2.1261
ISSN: 2252-3847 (print); 2614-350X (online) Vol.14 No.2 November 2025 Page. 293-301

pembuluh-darah/page/28/klasifikasi-hipertensi.

Uliyandri, A. (2019). *Pengaruh Latihan Fisik Terprogram Terhadap Perubahan Nilai Konsumsi Oksigen Maksimal (VO2Max) Pada Sekolah Bola Voli Tugu Muda Semarang Usia 11-13 Tahun*: Meta – Analisi, Universitas Diponogoro, P.12.

Wardani, Ratna (2023). Statistika dan Analisa Data. Cetakan Pertama. Yogyakarta: Deepublish CV. Budi Utama.

WHO. (2019). *A global brief on hypertension: silent killer, global public health crisis.*

Windri, T.M., Sanubari, A.K. and Sanubari, T.P.E. (2019) 'PENGARUH AKTIVITAS FISIK DENGAN KUALITAS HIDUP LANSIA HIPERTENSI DI PANTI WREDHA MARIA SUDARSIH AMBARAWA', Jurnal Mitra Pendidikan, 3(11), pp. 1063–1077.