7'TH INTERNATIONAL CONFERENCE
ON HEALTH PRACTISE AND RESEARCH
"Transforming Healtcare with Technology for Better Quality of Life""
Journal homepage: https://ojs.universitastelogorejo.ac.id/index.php/ichpr

Application of the 4R Combination Therapy in Reducing Blood Pressure Among Clients with Hypertension

Margiyati[a]

[a]*Sekolah Tinggi Ilmu Kesehatan Kesdam IV/Diponegoro, Jalan HOS Cokroaminoto No.4 Semarang, 50245, Indonesia*
Corresponding author: margiyati
Email margi@stikeskesdam4dip.ac.id

ARTICLE INFO

Article history:
Received 06 Desember 2025
Accepted 12 Desember 2025

Keywords:
Combination of 4R, blood pressure, hypertension

ABSTRACT

The incidence and mortality rates related to hypertension continue to increase each year. Pharmacological management alone has not yet achieved optimal outcomes, highlighting the need for simple and accessible non-pharmacological interventions such as combination relaxation therapy to enhance overall effectiveness. This study aimed to determine the effect of the 4R combination therapy (autogenic relaxation, classical music relaxation, deep-breathing relaxation, and rose aromatherapy) on the blood pressure of older adults with hypertension. This research employed a pre-experimental one-group pre- and post-test design, with samples selected using purposive sampling. Sample criteria included individuals aged 45–70 years with blood pressure ≥140/90 mmHg. The research instruments consisted of a digital sphygmomanometer and standardized operating procedures for the intervention. Data were analyzed using the paired-sample t-test. The findings showed a reduction in systolic blood pressure by 7.9 mmHg and diastolic pressure by 4.5 mmHg, with a p-value of <0.05. The results indicate that administering the 4R therapy for three consecutive days is effective in lowering both systolic and diastolic blood pressure in clients with hypertension. These findings provide valuable input for healthcare practitioners to adopt the 4R combination therapy as a non-pharmacological intervention for individuals with hypertension.

INTRODUCTION

The World Health Organization (WHO) estimates that two-thirds of the global prevalence of hypertension occurs in low- and middle-income countries (World Health Organization, 2023). As a developing country, Indonesia has a notably high prevalence of hypertension, reaching 36% (Ministry of Health of the Republic of Indonesia, 2023). Hypertension is also the most prevalent non-communicable disease in Central Java, with reported cases reaching 70.28% in the second quarter of 2023 (Central Java Provincial Health Office, 2023). Semarang City ranks first in hypertension cases among the productive-age population, with 510 recorded patients (Mochamad Abdul Hakam et al., 2023). Data recorded at Sekaran Community Health Center from January to February 2025 reported 1,177 individuals with hypertension (Sekaran Community Health Center,

2025).

Hypertension is often referred to as a silent killer because it may lead to fatal complications without presenting early warning symptoms. Considering its steadily rising incidence, hypertension requires prompt and appropriate management (Perry, 2021). Hypertension management includes both pharmacological and non-pharmacological approaches, one of which is relaxation therapy. Various forms of relaxation techniques can be combined—such as autogenic relaxation, Mozart classical music, slow deep breathing, and rose aromatherapy—to improve therapeutic effectiveness (Dimas Pratama et al., 2023).

Autogenic relaxation involves self-suggestion that induces a sense of peace, calmness, lightness, warmth, and comfort. This technique can be performed in combination with classical music therapy (Ismarina Dewi et al., 2015). Music therapy is simple to administer and is known to stimulate the release of endorphins and serotonin, promoting relaxation. Mozart's classical compositions—such as music for relaxation, stress relief, and classical music for sleeping—feature slow rhythmic patterns that help listeners achieve a relaxed state (Herawati et al., 2018). Mozart music has been shown to stimulate the hypothalamus to produce nitric oxide (NO), which influences vascular tone and contributes to blood pressure reduction (Siagian et al., 2022).

Another relaxation technique that can be integrated is slow deep breathing, which involves slow and deep inhalation to reduce cardiac workload and increase oxygenation, thereby lowering heart rate and blood pressure (Azizah et al., 2022). This technique may also be combined with rose aromatherapy, which has calming effects on physical, mental, and spiritual well-being. Rose aromatherapy stimulates the thalamus to release encephalin, a natural analgesic. Aromatherapy works through both circulatory and olfactory pathways to reduce blood pressure (Kune et al., 2022).

The effectiveness of autogenic relaxation, classical music, deep-breathing relaxation, and aromatherapy has been demonstrated in various studies. Research by Sucipto, Wahyudi, and Lia found a significant reduction in blood pressure following autogenic relaxation, showing a systolic decrease of 21.33 mmHg and a diastolic decrease of 10.67 mmHg (Sucipto et al., 2022). Similarly, Siagian et al. reported that Mozart music therapy effectively reduced blood pressure in hypertensive patients (Siagian et al., 2022). A study by Moomina Siauta (2023) demonstrated that combining autogenic relaxation with classical music reduced blood pressure from 144.17/90.56 mmHg to 126.67/82.22 mmHg (Siauta et al., 2023). Research by Virgianti Nur Faridah et al. (2024) also showed decreased blood pressure after administering slow deep breathing and rose aromatherapy for three consecutive days, with the mean systolic pressure decreasing from 163.00 to 154.53 mmHg and mean diastolic pressure from 100.39 to 97.47 (Faridah et al., 2024).

However, no prior studies have examined the combined application of autogenic relaxation, classical music relaxation, deep-breathing relaxation, and rose aromatherapy (4R) to reduce blood pressure. Therefore, this study aims to determine the changes in blood pressure among clients with hypertension before and after the administration of the 4R Combination Therapy. Addressing this issue, the 4R combination therapy is proposed as a potential non-pharmacological solution for reducing blood pressure in clients with hypertension.

METHODS

This study employed a pre-experimental one-group pre–post test design to examine the relationship between the independent variable—4R combination therapy (autogenic relaxation, classical music relaxation, deep-breathing relaxation, and rose aromatherapy)—and the dependent variable, blood pressure. The sample consisted of clients diagnosed with hypertension within the working area of Sekaran Community Health Center, aged 45–70 years, with systolic blood pressure ≥140 mmHg and diastolic blood pressure ≥90 mmHg. Additional inclusion criteria included: ability to communicate effectively, preference for classical music, preference for rose aromatherapy, absence of hearing impairment, absence of respiratory disorders, and no olfactory dysfunction (such as symptoms of a cold). Eligible participants first underwent blood pressure measurement using a calibrated digital sphygmomanometer as the pre-test. The 4R combination therapy was then administered for 15 minutes. During the intervention, participants were positioned comfortably in a seated position with back support and instructed to listen to the provided music through a headset while following the guided relaxation instructions embedded within the audio. Simultaneously, participants were given a cotton pad infused with 2–3 drops of rose aromatherapy to be placed on the chest and inhaled using deep-breathing techniques. Following the 4R therapy session, post-test data were obtained by remeasuring blood pressure 15 minutes after the intervention. This procedure was carried out for three consecutive days. After all data were collected, statistical analysis was performed using

the paired-sample t-test. This study received ethical approval from the Research Ethics Committee of the Tk. II 04.05.01 Dr. Soedjono Hospital, with approval number 1035/EC/XII/2024.

RESULT AND DISCUSSION

Result

The study involved 20 respondents who met the inclusion criteria for participation in the research on the effect of the 4R Combination Therapy on blood pressure among hypertensive clients in the working area of Sekaran Community Health Center.

Table 1. Distribution of Respondents by Age and Gender at Sekaran Community Health Center (n = 20)

Variable	**Frequency (n)**	**Percentage (%)**
Age		
Late adulthood (49–55 years)	16	80.0
Early elderly (56–65 years)	4	20.0
Gender		
Male	7	35.0
Female	13	65.0

Based on the distributed questionnaire, the majority of respondents were aged 49–55 years (16 respondents; 80.0%), and most were female (13 respondents; 65.0%).

Table 2. Distribution of Blood Pressure Measurements Among Hypertensive Clients at Sekaran Community Health Center (n = 20)

Variable	Median	Mean ± SD	*p*
Systolic Pretest Day 1	166.5	167.1 ± 13.5	0.000[a]
Systolic Pretest Day 2	161.0	163.4 ± 13.3	
Systolic Pretest Day 3	154.5	155.4 ± 9.9	
Posttest Systolic Day 1	165.0	164.8 ± 14.0	
Posttest Systolic Day 2	157.0	156.8 ± 12.8	
Posttest Systolic Day 3	148.5	148.3 ± 9.3	
Diastolic Pretest Day 1	95.0	96.5 ± 7.1	0.000[a]
Diastolic Pretest Day 2	88.5	90.7 ± 8.8	
Diastolic Pretest Day 3	79.0	84.0 ± 10.9	
Diastolic Posttest Day 1	90.5	93.3 ± 7.4	
Diastolic Posttest Day 2	82.0	85.3 ± 9.6	
Diastolic Posttest Day 3	76.5	81.2 ± 11.0	

[a] : Friedman test because the results of the normality test < 0.05

The results in Table 2 demonstrate a decrease in blood pressure among hypertensive clients. The mean systolic blood pressure on Day 1 decreased from 169.9 mmHg to 167.5 mmHg on Day 2. The systolic mean further decreased from 167.5 mmHg on Day 2 to 162 mmHg on Day 3. A similar pattern was observed in diastolic pressure, where the mean decreased from 98.3 mmHg on Day 1 to 95.6 mmHg on Day 2, and subsequently decreased from 95.6 mmHg to 93.8 mmHg on Day 3. Friedman test analysis yielded a p-value of 0.000, indicating a statistically significant difference in blood pressure measurements across the three days.

Table 3. Normality Test of Blood Pressure Data

	Shapiro-Wilk		
	Statistic	df	Sig.
Selisih_Sistole_1	0.921	20	0.106
Selisih_Diastole_1	0.930	20	0.158
Selisih_Sistole_2	0.926	20	0.129
Selisih_Diastole_2	0.921	20	0.104
Selisih_Sistole_3	0.892	20	0.029
Selisih_Diastole_3	0.806	20	0.001

According to Table 3, normality was assessed using the Shapiro–Wilk test due to the sample size being fewer than 50. The p-values for systolic and diastolic differences on Days 1 and 2 were greater than 0.05, indicating normally distributed data; therefore, the paired t-test was used. Meanwhile, the p-values for systolic and diastolic differences on Day 3 were below 0.05, indicating non-normal distribution; thus, the Wilcoxon test was applied.

Table 4. Differences in Blood Pressure Before and After 4R Therapy (n = 20)

	Mean Delta	Statistic	*p*
Pretest – Posttest Systolic Day 1	2.3	1.552	0.137
Pretest – Posttest Systolic Day 2	6.6	6.990	0.000
Pretest – Posttest Systolic Day 3	7.1	-3.931	0.000
Pretest – Posttest Diastolic Day 1	3.2	3.618	0.002
Pretest – Posttest Diastolic Day 2	5.4	12.691	0.000
Pretest – Posttest Diastolic Day 3	2.8	-2.573	0.010

Table 4 shows that the p-value for systolic blood pressure on Day 1 was 0.137, indicating no significant difference between pretest and posttest values on the first day. However, significant differences were observed on Days 2 and 3 ($p < 0.05$). Significant reductions were also found in diastolic blood pressure on Days 1, 2, and 3 ($p < 0.05$). Based on these findings, the 4R Combination Therapy was effective in reducing both systolic and diastolic blood pressure among hypertensive clients, particularly after repeated sessions over three consecutive days.

Discussion

Hypertension tends to increase with advancing age. Aging causes structural changes in the large blood vessels, including narrowing of the lumen and stiffening of the vascular walls (Riyada et al., 2024). The age-related findings in this study differ from research indicating that individuals aged 55–65 years have a 0.592-times greater risk of developing hypertension than those aged 45–54 years. This discrepancy may be explained by other demographic factors, particularly gender, as most respondents in this study were female—an influential factor in elevated blood pressure (Fisioterapi dan Pendidikan Profesi Fisioterapis & Yogyakarta, 2023). Women approaching menopause experience hormonal changes that result in weight gain and increased sensitivity to sodium intake, both of which contribute to raised blood pressure. Before entering menopause, estrogen levels gradually decrease, and this hormonal transition generally occurs between the ages of 45–55 years (Ariyani, 2020).

The findings of this study indicate that the 4R Combination Therapy effectively reduced systolic and diastolic blood pressure. This result aligns with the study by Cempaka and Lilyana (2023), which reported a significant reduction in blood pressure following the combined application of autogenic relaxation and classical music ($p = 0.001$). Similarly, research conducted by Faridah, Pramestirini, Nisa, and Sholikah (2024) demonstrated decreases in blood pressure after administering slow deep breathing and rose aromatherapy for 15 minutes over three consecutive days. Their study showed an average systolic reduction of 8.47 mmHg and a diastolic reduction of 2.92 mmHg. The combination of autogenic relaxation, classical music, slow deep breathing, and rose aromatherapy delivered simultaneously in accordance with the SOP has proven to be highly effective in lowering blood pressure among hypertensive clients.

Autogenic relaxation is a form of mind–body therapy that utilizes cognitive influence to promote physical responses through self-healing mechanisms. The positive stimuli generated during autogenic relaxation influence the hypothalamus to suppress HPA axis activity, resulting in decreased CRF production and reduced secretion of ACTH by the anterior pituitary. This reduction triggers the adrenal medulla to lower catecholamine and cortisol levels. Consequently, vasodilation occurs due to increased parasympathetic activity, improving blood circulation. Additionally, reduced stress hormones (cortisol and catecholamines) decrease plasma renin, thereby reducing the formation of angiotensin II, which further promotes vasodilation and decreases blood volume—ultimately stabilizing blood pressure (Siauta et al., 2023).

The second relaxation component combined in this therapy is Mozart classical music. Classical music may reduce blood pressure due to its slow tempo and calming rhythm, typically around 60 beats per minute. When hypertensive individuals listen to continuous, rhythmic classical music, their heart rate tends to synchronize with the music's tempo, supporting improved cardiovascular regulation (Herawati et al., 2018). Classical music with low-frequency tones, a tempo of 60–80 beats per minute, and a volume of around 60 dB stimulates the body to produce nitric oxide (NO), a molecule involved in regulating vascular tone and decreasing blood pressure (Siagian et al., 2022).

The third relaxation technique is slow deep breathing. Taking deep and slow breaths during slow deep breathing increases oxygen saturation and enhances oxygen consumption in the body. Elevated oxygen levels stimulate nitrite oxidation, which enters the brain and lungs, producing a calming effect. This process also enhances vascular elasticity and induces vasodilation, resulting in reduced blood pressure (Azizah et al., 2022).

The fourth technique is rose aromatherapy. Rose essential oil contains highly volatile molecules with aromatic components such as geraniol and linalool (Faridah et al., 2024). These compounds activate the olfactory nerve (nervus olfactorius), sending impulses to the hypothalamus, which influences the central nervous system and produces a relaxation response. This state of calm activates the parasympathetic nervous system, decreasing heart rate and subsequently reducing cardiac output and vascular pressure. The overall relaxation also softens muscle tension, including vascular smooth muscles, promoting vasodilation and lowering blood pressure (Kune et al., 2022).

This study has several limitations. The sample size was relatively small ($n = 20$) for an experimental study due to time constraints and the difficulty of ensuring respondents completed all three consecutive therapy sessions. Additionally, this study did not control for the use of antihypertensive medications, which may have influenced blood pressure outcomes.

CONCLUSION

The characteristics of the respondents showed that most participants were between 49 and 55 years old and were female. The mean blood pressure values indicated a reduction of 7.9 mmHg in systolic pressure and 4.5 mmHg in diastolic pressure. Statistical analysis using the Friedman test on the blood pressure status of hypertensive clients obtained a p-value of 0.000, indicating a significant difference in blood pressure measurements on the first, second, and third days. The statistical results confirm that the 4R therapy administered over three consecutive days is effective in reducing both systolic and diastolic blood pressure. Further research is needed with a larger sample size and better control of factors that may influence blood

pressure, such as the use of antihypertensive medication, which was not controlled in this study.

ACKNOWLEDGEMENT (if any)

The authors would like to express their gratitude to STIKES Kesdam IV/Diponegoro for funding this research in the 2024/2025 academic year. The authors also extend their appreciation to the research partners at Puskesmas Sekaran Semarang for their support in data collection and for facilitating the smooth implementation of this study.

REFERENCES

Ariyani, A. R. (2020). Kejadian Hipertensi Pada Usia 45-65 Tahun. *Higeia Journal Of Public Health Research And Development*, *3*. Https://Doi.Org/10.15294/Higeia.V4ispecial%203/40392

Azizah, W., Hasanah, U., Pakarti, A. T., Dharma, A. K., & Metro, W. (2022). Azizah, Penerapan Slow Deep Breathing 607 Penerapan Slow Deep Breathing Terhadap Tekanan Darah Pada Pasien Hipertensi Implementation Of Slow Deep Breathing On Blood Pressure In Hypertension Patients. *Jurnal Cendikia Muda*, *2*(4).

Cempaka, A. A., & Lilyana, M. T. A. (2023). Pengaruh Kombinasi Terapi Relaksasi Autogenik Dan Musik Terhadap Tekanan Darah Warga Binaan Pemasyarakatan. *Jurnal Kesehatan Medika Udayana*, *9*, 44–52. Https://Repositori.Ukwms.Ac.Id/Id/Eprint/36795/1/4-Pengaruh_Kombinasi_Terapi_.Pdf

Dimas Pratama, F., Kesuma Dewi, T., & DIII Keperawatan Akper Dharma Wacana Metro, P. (2023). Penerapan Terapi Musik Klasik Terhadap Tekanan Darah Pada Pasien Hipertensi Di Puskesmas Yosomulyo Application Of Classical Music Therapy On Blood Pressure In Hypertension Patients At Yosomulyo Puskesmas. *Jurnal Cendikia Muda*, *3*(3).

Dinas Kesehatan Jawa Tengah. (2023). *Buku Saku Kesehatan Triwulan 3 Tahun 2023*.

Dr Mochamad Abdul Hakam, P., Kepala Dinas Kesehatan Kota Semarang Ketua Dr Noegroho Edy Rijanto, F., Kepala Bidang Sumber Daya Kesehatan Redaktur Hanif Pandu Suhito, Mk., Editor Prahita Indriana Raniasmi, Ms., Desain Grafis Veronica Aurora Putri Kesekretariatan Diah Lestari Rahmawati, S., Kontributor Bidang Pencegahan, S., & Penyakit Bidang Kesehatan Masyarakat Bidang Pelayanan Kesehatan Bidang Sumber Daya Kesehatan Instalasi Farmasi Badan Pusat Statistik Kota Semarang Dispendukcapil Kota Semarang Rumah Sakit Se -Kota Semarang, P. (2023). *Profil Kesehatan 2022 Dinas Kesehatan Kota Semarang*. Www.Dinkes.Semarangkota.Go.Id

Faridah, V. N., Pramestirini, R. A., Nisa, K., & Sholikah, M. (2024). Pengaruh Latihan Slow Deep Breathing Dan Aromaterapi Mawar Terhadap Penurunan Tekanan Darah Pada Lansia Penderita Hipertensi. *Jurnal Keperawatan*, *16*(3). Http://Journal.Stikeskendal.Ac.Id/Index.Php/Keperawatan

Fisioterapi Dan Pendidikan Profesi Fisioterapis, S., & Yogyakarta, A. (2023). Hubungan Usia Dan Jenis Kelamin Terhadap Kejadian Hipertensi. *Prosiding Seminar Nasional Penelitian Dan Pengabdian Kepada Masyarakat LPPM Universitas 'Aisyiyah Yogyakarta*, *1*, 363–369. Https://Proceeding.Unisayogya.Ac.Id/Index.Php/Prosemnaslppm/Article/View/70/85

Herawati, N., Maya Sari, K., & Armanda Tri Murtiningsih Akademi Keperawatan YPTK Solok, Dan. (2018). Pengaruh Terapi Musik Klasik Terhadap Penurunan Tekanan Darah Pada Lansia Dengan Hipertensi Di Kelurahan Simpang Rumbio Wilayah Kerja Puskesmas Ktk Kota Solok. *Menara Ilmu*, *XII*(3), 91–98. Https://Jurnal.Umsb.Ac.Id/Index.Php/Menarailmu/Article/View/714/639

Ismarina Dewi, Herliawati, & Muharyani Putri Widita. (2015). Perbandingan Perubahan Tekanan Darah Lansia Penderita Hipertensi Setelah Dilakukan Terapi Musik Klasik Dan Relaksasi Autogenik Di Wilayah Kerja Puskesmas Pembina Palembang. *Jurnal Keperawatan Sriwijaya*, *2*(2), 124–129. Https://Media.Neliti.Com/Media/Publications/181757-ID-Perbandingan-Perubahan-Tekanan-Darah-Lan.Pdf

Kementerian Kesehatan Republik Indonesia. (2023). *Profil Kesehatan Indonesia 2022*. Https://Kemkes.Go.Id/Id/Profil-Kesehatan-Indonesia-2022

Kune, N., Yusuf, Z. K., & Djamaludin, N. (2022). Pengaruh Aromaterapi Mawar Terhadap Penurunan Tekanan Darah Pada Penderita Hipertensi. *Jambura Nursing Journal*, *4*(2), 108–120. Https://Ejurnal.Ung.Ac.Id/Index.Php/Jnj/Article/View/15280/Pdf

Perry AG, & PP. (2021). *Fundamentals Of Nursing*. Elsevier Health Science.

Puskesmas Sekaran. (2025). *Data Kejadian Hipertensi Di Puskesmas Sekaran Bulan Januari-Februari Tahun 2025*.

Riyada, F., Fauziah, S. A., Liana, N., & Hasni, D. (2024). Faktor Yang Mempengaruhi Terjadinya Resiko Hipertensi Pada Lansia. *Scientific Journal*, *3*(1), 27–47. Http://Journal.Scientic.Id/Index.Php/Sciena/Issue/View/17

Siagian, Y., Wati, L., Hang, S., & Tanjungpinang, T. (2022). Pengaruh Terapi Musik Klasik Mozart Terhadap Tekanan Darah Penderita Hipertensi Di Kelurahan Sungai Enam Kijang Marina 1 , Hotmaria Julia. *Jurnal Inovasi Riset Ilmu Kesehatan*, *1*(3).

Siauta, M., Goha, M. M., & Tamin, S. (2023). Efektivitas Kombinasi Terapi Relaksasi Autogenik Dengan Musik Klasik Terhadap Penurunan Tekanan Darah. *Jurnal Keperawatan*, *15*(1), 293–02.

Sucipto, A., Qorahman, W., & Agustin, L. (2022). Pengaruh Relaksasi Autogenik Terhadap Tekanan Darah Sistolik Dan Diastolik Pada Lansia Dengan Hipertensi. *Jurnal Borneo Cendekia*, *6*(2).

World Health Organization. (2023). *Global Report On Hypertension The Race Against A Silent Killer*. Https://Www.Who.Int/Health-Topics/Hypertension#Tab=Tab_1