



INNOVATIVE: Journal Of Social Science Research

Volume 4 Nomor 2 Tahun 2024 Page 9299-9305

E-ISSN 2807-4238 and P-ISSN 2807-4246

Website: <https://j-innovative.org/index.php/Innovative>

## Application Of Portable Sauna On The Blood Pressure Of Hypertension Patients In The Manente Public Health Center

Gitalia Putri Medea<sup>1✉</sup>, Christien Anggreni Rambli<sup>2</sup>, Chatrina Maria Agustina Bajak<sup>3</sup>

Politeknik Negeri Nusa Utara, Sangihe

Email: [gitaliaputri@gmail.com](mailto:gitaliaputri@gmail.com)<sup>1✉</sup>

### Abstrak

Hipertensi merupakan penyakit penyebab kematian dini di seluruh dunia. Peningkatan *systolic blood pressure* (SBP) secara konsisten muncul sebagai prediktor insiden kardiovaskuler sehingga penurunan SBP dibawah target direkomendasikan untuk mengurangi risiko coronary vascular disease. Tujuan penelitian ini untuk mengetahui efek dari penerapan sauna portable terhadap tekanan darah pada penderita hipertensi. Metode penelitian yang digunakan adalah penelitian eksperimental dengan *time series design*. Sampel dalam penelitian ini adalah 12 pasien hipertensi di Puskesmas Manente dengan menggunakan teknik consecutive sampling yang dilakukan selama 6 bulan. Instrumen yang digunakan adalah tensi meter untuk mengukur tekanan darah sistolik dan diastolik. Data dianalisis dengan menggunakan uji Repeated Measure. Hasil penelitian menunjukkan bahwa terdapat perbedaan yang signifikan antara tekanan darah sistolik pada pengukuran sebelum sauna, pengukuran 1, pengukuran 2, dan pengukuran 3 ( $p\text{-value} = 0.029; \alpha < 0.05$ ) pada penderita hipertensi. Namun, tidak ada perbedaan tekanan darah diastolic yang signifikan antara sebelum sauna, pengukuran 1, pengukuran 2, dan pengukuran 3 pada penderita hipertensi ( $p\text{-value} = 0.029; \alpha < 0.05$ ). Sauna portable merupakan pengobatan non farmakologi yang dapat diberikan pada pasien hipertensi karena dapat membantu menurunkan tekanan darah. Saat pasien menjalani sauna, pasien akan merasa rileks dan pembuluh darah sistemik akan mengalami vasodilatasi sehingga tekanan darah pun akan menurun.

Kata Kunci: *Hipertensi, Portable Sauna, Tekanan Darah*

## Abstract

Hypertension is a disease that causes death throughout the world. Elevated systolic blood pressure (SBP) has consistently emerged as a predictor of cardiovascular events, so reducing SBP below target is recommended to reduce the risk of coronary vascular disease. This study aimed to determine the effect of using a portable sauna on blood pressure in hypertension sufferers. The research method used experimental research with a Time Series Design. The sample in this study was 12 hypertensive patients at the Manente Public Health Center using consecutive sampling techniques carried out for 6 months. The instrument used a blood pressure meter to measure systolic and diastolic blood pressure. Data were analyzed using a Repeated Measure test. The results of the study showed that there was a significant difference between systolic blood pressure in measurements before the sauna, 1<sup>st</sup> measurement, 2<sup>nd</sup> measurement, and 3<sup>rd</sup> measurement ( $p\text{-value} = 0.029; \alpha < 0.05$ ) in hypertension sufferers. However, there was no significant difference in diastolic blood pressure before the sauna, 1<sup>st</sup> measurement, 2<sup>nd</sup> measurement, and 3<sup>rd</sup> measurement in hypertensive sufferers ( $p\text{-value} = 0.029; \alpha < 0.05$ ). A portable sauna is a non-pharmacological treatment that can be given to hypertensive patients because it can help lower blood pressure. When the patient undergoes a sauna, the patient will feel relaxed and the systemic blood vessels will experience vasodilation so that blood pressure will decrease.

Keywords: *Blood Pressure, Hypertension, Sauna Bathing*

## INTRODUCTION

Hypertension is a disease that causes death throughout the world. Hypertension is a condition where systolic blood pressure (SBP) is greater than or equal to 140 mmHg, diastolic blood pressure is greater than or equal to 90 mmHg, or is taking blood pressure-lowering medication. Elevated SBP consistently appears as a predictor of cardiovascular incidents so reducing SBP below the target is recommended to reduce the risk of coronary vascular disease (CVD) (Kunutsor et al., 2024). It is estimated that the prevalence of hypertension worldwide is 1.28 billion adults aged 30-79 years, two-thirds of this prevalence live in low and middle-income countries. As many as 46% of people with hypertension do not realize that they suffer from hypertension. Less than half, namely 42%, of hypertension sufferers, are diagnosed and treated, but only 21% of hypertension sufferers can control it. One of the global targets related to non-communicable diseases is to reduce the prevalence of hypertension by 33% between 2010 and 20230 (WHO, 2023).

Uncontrolled hypertension can cause heart attacks with the formation of atherosclerosis, stroke, and kidney damage. In adults who suffer from undiagnosed hypertension, there is a risk of increased morbidity and mortality. Treatment or management to reduce or control hypertension is very important because it prevents complications

(Debora et al., 2023). Apart from medical treatment with anti-hypertension drugs, hypertension sufferers can also modify their lifestyle, minimize risk factors, and carry out non-pharmacological management. Sauna bathing is a non-pharmacological treatment that can control and reduce hypertension. Sauna bathing is a traditional treatment from Finland that uses short-term passive exposure to hot temperatures for relaxation and leisure which has many health benefits. Sauna bathing has the benefit of protecting blood vessels (Kunutsor et al., 2024). The working mechanism of sauna bathing is the use of hot temperatures, this can improve endothelial function, modulate the autonomic nervous system, change the level of circulating natriuretic peptides, reduce oxidative stress, and improve arterial compliance (Ketelhut & Ketelhut, 2019; Laukkanen et al., 2023).

One of the treatments to control hypertension is non-pharmacological, namely sauna bathing. Sauna bathing is a type of passive heat therapy that is characterized by exposure to high environmental temperatures with dry air for a short period. The beneficial effects of sauna bathing on CVD include reducing blood pressure, improving endothelial function, modulating the autonomic nervous system, improving lipids, reducing oxidative stress and inflammation profiles, and improving the cardiorespiratory system (Kunutsor et al., 2024; Laukkanen et al., 2018). This study aims to determine the effect of using a portable sauna on blood pressure in hypertension sufferers.

## RESEARCH METHOD

The research method used experimental research with a time series design. The sample in this study was 12 hypertensive patients at the Manente Public Health Center using consecutive sampling techniques carried out for 6 months. Inclusion criteria for the study included: 1) Respondents aged 18-65 years; 2) Hypertension sufferers with systolic blood pressure  $\geq 130$  mmHg and/or systolic blood pressure  $\geq 80$  mmHg; 3) Willing to be a respondent. Meanwhile, exclusion criteria include 1) Uncontrolled hypertension; 2) Orthostatic hypotension; 3) Alcohol consumption; 4) Suffering from other complications; 5) Suffering from cardiovascular disease; 6) Fever; 7) Acute infectious or inflammatory conditions and skin conditions such as blisters and urticaria. The instrument used a blood pressure meter to measure systolic and diastolic blood pressure. Data were analyzed using a Repeated Measure test.

The treatment was given by providing therapy via a portable sauna to respondents for 10-15 minutes. Respondents who met the inclusion criteria were recruited to become research respondents. This research was conducted in the afternoon after the respondents took an afternoon shower. Respondents measured their blood pressure using an aneroid

blood pressure monitor. The respondent's blood pressure results were recorded. Respondents were given treatment, namely entering the portable sauna provided. The temperature in the portable sauna was adjusted according to needs by paying attention to the maximum limit. Respondents were in the Portable Sauna for 10-15 minutes according to the respondent's ability. When the respondent feels discomfort the respondent can leave the sauna immediately without waiting for the sauna session to finish. After the 1st session was finished, the respondent came out of the portable sauna and had their blood pressure measured. Respondents rested for 10 minutes before continuing the activity. The sauna application will be repeated 4 days later (4 days after that is called the 2nd session). In the 2nd session, respondents entered the portable sauna for 10-15 minutes and then had their blood pressure measured afterward (the procedure was the same as the 1st session). After that, 4 days later the portable sauna will be applied again to the respondent for 10-15 minutes and then the blood pressure will be measured again. The procedure was the same as the previous session. The results of the pressure measurements are notified to the respondent. There are 4 blood pressure measurement results, namely 1) Blood pressure of hypertensive sufferers before treatment (T0); 2) Blood pressure of hypertensive sufferers after the 1st treatment session (T1); 3) Blood pressure of hypertensive sufferers after the second treatment session 2 (T2); 4) Blood pressure of hypertensive sufferers after the 3rd treatment session (T3).

## RESULTS AND DISCUSSION

### Analysis Univariate

Table 1. Frequency Distribution of Respondent Characteristics Based on Age, Gender & Education

Variable		n	%
Age	Young Adult	10	83.3
	Middle Adulthood	2	16.7
Gender	Female	8	66.7
	Male	4	33.3
Level of Education	Middle Education	7	58.3
	Higher Education	5	41.7

The research results based on Table 1 showed that the majority of respondents were young adults with 10 respondents (83.3%). Most of the respondents' gender were female, 8 respondents (66.7%). The education level of the respondents was mostly middle education

with 7 respondents (58.7%).

Table 2. Bivariate Analysis of Respondents' Blood Pressure

Variable		Median (Min-Max)	p-value
Systolic Blood Pressure	Before Sauna	130 (130-183)	0.029*
	1 <sup>st</sup> Measurement	120 (110-210)	
	2 <sup>nd</sup> Measurement	122 (110-150)	
	3 <sup>rd</sup> Measurement	125 (110-160)	
Diastolic Blood Pressure	Before Sauna	90 (70-122)	0.427
	1 <sup>st</sup> Measurement	90 (80-122)	
	2 <sup>nd</sup> Measurement	87.50 (70-100)	
	3 <sup>rd</sup> Measurement	84 (70-110)	

\*Significant at  $\alpha < 0.05$

The research results based on Table 2 showed that there was a significant difference between systolic blood pressure in measurements before the sauna, 1<sup>st</sup> measurement, 2<sup>nd</sup> measurement, and 3<sup>rd</sup> measurement in hypertension sufferers in the Manente Public Health Center (p-value = 0.029;  $\alpha < 0.05$ ). However, there was no significant difference in diastolic blood pressure before the sauna, 1<sup>st</sup> measurement, 2<sup>nd</sup> measurement, and 3<sup>rd</sup> measurement in hypertension sufferers in the Manente Public Health (p-value = 0.029;  $\alpha < 0.05$ ).

## DISCUSSION

The results showed that there was a significant difference between systolic blood pressure in measurements before the sauna, 1<sup>st</sup> measurement, 2<sup>nd</sup> measurement, and 3<sup>rd</sup> measurement (p-value = 0.029;  $\alpha < 0.05$ ). This research is in line with research conducted by Lee et al (2022) that sauna bathing shows significant additional effects, one of which is on systolic blood pressure and total cholesterol levels. Sauna bathing is a valuable lifestyle tool that complements exercise to lower systolic blood pressure. The results of the study also showed that there was no significant difference in diastolic blood pressure before the sauna, 1<sup>st</sup> measurement, 2<sup>nd</sup> measurement, and 3<sup>rd</sup> measurement (p-value = 0.029;  $\alpha < 0.05$ ). This research is in line with research by Polii et al (2016), namely that after taking a steam bath for 20 minutes, hypertension sufferers found a significant increase in diastolic blood pressure.

Sauna bathing is a type of passive heat therapy that is characterized by exposure to high environmental temperatures with dry air for a short period. The temperature in the

portable sauna bathing can be adjusted from 80 degrees to 100 degrees. Sauna humidity varies between 10% and 20%. The duration of sauna bathing ranges from 5 to 20 minutes with a frequency of 2-3 times per week (Laukkanen et al., 2018). The beneficial effects of sauna bathing on CVD include reducing blood pressure, improving endothelial function, modulating the autonomic nervous system, improving lipid profiles, reducing oxidative stress and inflammation, and improving the cardiorespiratory system (Laukkanen et al., 2018).

Sauna bathing is used for health, relaxation, and pleasure purposes. Some evidence suggests that sauna bathing can prevent the risk of acute and chronic diseases. These benefits include reducing the risk of blood vessel diseases such as stroke, high blood pressure, coronary vascular disease (CVD), and neurocognition. Apart from that, there are benefits for non-vascular diseases such as flu, lung disease, rheumatism, and lung disease. A physiological response is produced by moderate or high-intensity physical activity such as walking. However, there is no active function of skeletal muscles during sauna bathing. During a sauna bathing session, heart rate can increase from baseline to 120-150 beats per minute. Blood volume is partially diverted from internal organs to the peripheral parts of the body, namely by decreasing venous return which is not facilitated by active performance of skeletal muscles. However, there is an opinion that explains that muscle blood flow increases to a certain extent as a response to heat stress (Boryśławski et al., 2021; Zaccardi et al., 2017).

## CONCLUSION

Nurses are one of the health professions who have the responsibility to carry out their duties in providing care competently. The nursing code of ethics is an ethical standard in the nursing profession. The nursing code of ethics is used as a basis for nursing practice regarding the ethical, legal, and protection responsibilities of nurses in their practice.

## REFERENCE

- Axson, S. A., Giordano, N. A., Hermann, R. M., & Ulrich, C. M. (2019). Evaluating nurse understanding and participation in the informed consent process. *Nursing Ethics, 26*(4), 1050–1061. <https://doi.org/10.1177/0969733017740175>
- Cheluvappa, R., & Selvendran, S. (2020). Medical negligence - Key cases and application of legislation. *Annals of Medicine and Surgery, 57*(July), 205–211. <https://doi.org/10.1016/j.amsu.2020.07.017>
- Cheraghi, R., Valizadeh, L., Zamanzadeh, V., Hassankhani, H., & Jafarzadeh, A. (2023). Clarification of ethical principle of the beneficence in nursing care: an integrative

- review. *BMC Nursing*, 22(1), 1–9. <https://doi.org/10.1186/s12912-023-01246-4>
- Glaser, J., Nouri, S., Fernandez, A., Sudore, R. L., Schillinger, D., Klein-Fedyshin, M., & Schenker, Y. (2020). Interventions to Improve Patient Comprehension in Informed Consent for Medical and Surgical Procedures: An Updated Systematic Review. *Medical Decision Making*, 40(2), 119–143. <https://doi.org/10.1177/0272989X19896348>
- Griffith, R. (2019). Negligence and the standard of care in district nursing. *British Journal of Community Nursing*, 24(1), 35–37. <https://doi.org/10.12968/bjcn.2019.24.1.35>
- Huda, K., & Huda, M. K. (2021). Perlindungan Hukum Perawat Atas Pelimpahan Wewenang Dari Dokter Dalam Melakukan Tindakan Medis Jahit Luka Di Igd Rumah Sakit. *Jurnal Hukum Dan Etika Kesehatan*, 1(1), 98–121.
- Jacoby, S. R., & Scruth, E. A. (2017). Negligence and the nurse. *Clinical Nurse Specialist*, 31(4), 183–185. <https://doi.org/10.1097/NUR.0000000000000301>
- Mahaputri, A. A. I., Budiarta, I. N. P., & Dewi, A. A. S. L. (2019). Perlindungan Hukum Bagi Profesi Perawat Terhadap Pelaksanaan Praktik Keperawatan. *Jurnal Analogi Hukum*, 1(3), 277–281. <https://ejournal.warmadewa.ac.id/index.php/analogihukum%0APerlindungan>
- Pursio, K., Kankkunen, P., Sanner-Stiehr, E., & Kvist, T. (2021). Professional autonomy in nursing: An integrative review. *Journal of Nursing Management*, 29(6), 1565–1577. <https://doi.org/10.1111/jonm.13282>
- Riasari, R. H. (2021). Perlindungan Hukum Terhadap Perawat Pada Rumah Sakit Berdasarkan Undang-Undang Nomor 38 Tahun 2014 Tentang Keperawatan (Legal Protection Against Nurses on Hospital Based Law Number 38 of 2014 About Nursing). *Jurnal Hukum Lex Generalis. Vol.2. No.10*, 2(10), 946–960.
- Stievano, A., & Tschudin, V. (2019). The ICN code of ethics for nurses: a time for revision. *International Nursing Review*, 66(2), 154–156. <https://doi.org/10.1111/inr.12525>