



THE EFFECT OF COMBINED PURSED LIP BREATHING AND PEPPERMINT AROMATHERAPY ON THE RESPIRATORY STATUS OF CORONARY HEART DISEASE PATIENTS

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ABSTRACT

Since cardiovascular disease is the world's biggest cause of death, it poses a threat to the entire planet. Common signs of cardiac issues include shortness of breath, changes in breathing patterns, breathing frequency, and breathing depth. Patients with coronary heart disease require intervention to enhance their respiratory condition since respiratory issues can negatively impact their quality of life. It is necessary to demonstrate how a combination therapy of pursed lip breathing (PLB) and peppermint aromatherapy affects the respiratory condition of individuals with coronary heart disease. Only one intervention—breathing exercises to lessen dyspnea or aromatherapy to lessen tension and anxiety in individuals with coronary heart disease—has been offered by prior research. In order to enhance the respiratory status of patients with coronary heart disease, this study combines pursed lip breathing with peppermint aromatherapy interventions. Purposive sampling strategies were used to split a sample of 44 coronary heart disease patients into an intervention group and a control group for the quasi-experimental study design. Stopwatches, oximeters, and observation sheets were the tools utilized. The Mann Whitney U Test and the Wilcoxon Signed Rank Test were used for statistical analysis. Following the intervention, the data demonstrated an increase in oxygen saturation and a decrease in respiratory rate. Both the rise in oxygen saturation and the decrease in respiratory rate were greater in the intervention group compared to the control group. The combination therapy of pursed lip breathing and peppermint aromatherapy had an impact on respiratory status, according to the statistical test findings, which indicated a p-value < 0.05. In patients with coronary heart disease, the combination therapy of pursed lip breathing and peppermint aromatherapy was found to significantly lower respiratory rate and raise oxygen saturation.

Keywords: coronary heart disease; peppermint aromatherapy; pursed lip breathing; respiratory status

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INTRODUCTION

In both industrialized and developing nations, coronary heart disease (CHD) is the primary cause of death (Liang & Wang, 2021). Common indicators of heart issues include shortness of breath and changes in respiratory status. Due to reduced cardiac function and inadequate blood circulation, CHD patients frequently have tachypnea and shallow breathing patterns. This can lead to hypoxia, a condition in which a drop in blood oxygen levels can force patients to breathe more quickly to meet their oxygen needs (Yuvindanati, 2021). Intervention is required to alleviate the symptoms of shortness of breath in CHD patients since it might negatively impact their quality of life. Patients with cardiovascular illness who have dyspnea may benefit from pursed lip breathing exercises (Wu et al., 2020). Pursed lip breathing slows down the breathing rate and improves airflow. Additionally, this method can raise blood oxygen saturation (Rahmawan, Al-Afik, & Rubidiyani, 2024). Mint leaf aromatherapy is a non-pharmacological method of treating dyspnea in addition to pursed lip breathing. Menthol, a natural decongestant, is the primary ingredient in mint leaves (Wulandari et al., 2024). Endorphins, which improve sensations of coziness and relaxation, can be released more when aromatherapy is used (Yunita, 2021). When patients engage in pursed lip breathing exercises, the addition of aromatherapy can improve their comfort and yield greater benefits (Muchtar & Arofiati, 2024).

The benefits of pursed lip breathing and peppermint aromatherapy have been the subject of multiple prior investigations, but these studies only offered one intervention—pursed lip breathing/deep breathing or aromatherapy alone. This study differs from earlier research in that patients with coronary heart disease will get both pursed lip breathing treatment and peppermint aromatherapy as an intervention, and their respiratory state will be evaluated. The purpose of this study is to examine how patients with coronary heart disease respond to combination pursed lip breathing and peppermint aromatherapy therapy.

METHOD

The design of this study is quasi-experimental. Patients with coronary heart disease who received care at Ir. Soekarno Sukoharjo Regional General Hospital between February and April of 2025 made up the study's population. Purposive sampling was used to determine the sample size, which was 44, with 22 patients in the intervention group and 22 in the control group. Stopwatches to measure breathing frequency, oximeters to assess oxygen saturation, and observation sheets were the tools employed. For three days in a row, the intervention included a 15-minute session of pursed lip breathing and peppermint aromatherapy. Data analysis employed the Mann Whitney U Test to examine data differences between the intervention and control groups and the Wilcoxon Signed Rank Test to examine data before to and following intervention in both the intervention and control groups. This study has adhered to the ethical guidelines provided by the Ethics Committee of the University of Aisyiyah Surakarta, which issued the ethical certification number 353/II/AUEC/2025 on February 13, 2025.

RESULT

Table 1.
Frequencies of Respondent Characteristics

<i>Characteristics</i>	<i>f</i>	<i>%</i>
Age (years old)		
30-35	8	18,2
46-60	20	45,5
61-75	14	31,8
76-90	2	4,5
Gender		
Male	19	43,2
Female	25	56,8

The table 1 shows that based on the age of respondents, the majority were in the 46-60 age group, namely 20 people (45.5%). Based on the gender of respondents, the majority were female, namely 25 people (56.8%).

Table 2.
Univariate Analysis of Breathing Frequency and Oxygen Saturation

	Intervention group		Control group	
	Pre-test	Post-test	Pre-test	Post-test
Respiratory rate				
Mean	19,91	17,00	19,72	18,36
Median	20.00	17.50	20.00	18.00
Std deviasi	1.444	1.15	1.88	1.217
Minimum	18	14	16	16
Maksimum	24	18	24	20
SpO2				
Mean	96,86	98,32	97,18	97,55
Median	97.00	98.00	98.00	98.00
Std deviasi	1.246	.780	1.140	.800
Minimum	95	97	95	96
Maksimum	99	100	99	99

According to the table 2, the intervention group's mean respiratory rate was 19.91 during the pre-test and dropped to 17.00 during the post-test. The respiratory rate in the control group dropped from 19.72 in the pre-test to 18.36 at the post-test. In the intervention group, the mean respiratory rate dropped by 2.91, but in the control group, it dropped by 1.36. The intervention group's mean SpO2 value rose from 96.86% at the pre-test to 98.32% at the post-test. SpO2 in the control group rose from 97.18% at the pre-test to 97.55% at the post-test. While the control group's mean SpO2 value increased by 0.37%, the intervention group's increased by 1.46%.

Table 3.

Normality Test of Respiratory Rate and Oxygen Saturation Data

Data Normality	Shapiro-Wilk		
	Statistic	Df	Sig.
Respiratory rate (RR)			
Intervention group			
Pre test	.775	22	.000
Post test	.821	22	.001
Control group			
Pre test	.907	22	.041
Post test	.821	22	.001
Saturasi oksigen (SpO2)			
Intervention group			
Pre test	.882	22	.013
Post test	.818	22	.001
Control group			
Pre test	.838	22	.002
Post test	.789	22	.000

The aforementioned table demonstrates that the respiratory rate (RR) and oxygen saturation (SpO2) values have a p -value < 0.05 according to the Shapiro-Wilk test, suggesting that the data are not regularly distributed.

Table 4.

Bivariate Analysis of the Effect of Pursed Lip Breathing Combination Therapy and Peppermint Aromatherapy on Respiratory Rate

Aromatherapy on Respiratory Rate				
	Intervention group		Control group	
	<i>Pre-test</i>	<i>Post-test</i>	<i>Pre-test</i>	<i>Post-test</i>
Median	20,00	17,50	20,00	18,00
Min-Max	18-24	14-18	16-24	16-20
<i>Wilcoxon Signed Ranks Test</i>	<i>p</i> = 0,000		<i>p</i> = 0,001	
<i>Mann-Whitney U Test</i>	<i>p</i> = 0,001			

The aforementioned table demonstrates that the Wilcoxon Signed Ranks Test revealed a p -value of 0.000 for the intervention group's difference in pre-test and post-test respiratory rate values, compared to 0.001 for the control group. The Mann-Whitney U Test revealed a p -value of 0.001 for the difference in post-test respiratory rate values between the intervention group and the control group.

Table 5.

Bivariate Analysis of the Effect of Pursed Lip Breathing Combination Therapy and Peppermint Aromatherapy on Oxygen Saturation

	Intervention group		Control group	
	<i>Pre-test</i>	<i>Post-test</i>	<i>Pre-test</i>	<i>Post-test</i>
Median	97,00	98,00	98,00	98,00
Min-Max	95-99	97-100	95-99	96-99
<i>Wilcoxon Signed Ranks Test</i>	<i>p</i> = 0,000		<i>p</i> = 0,023	
<i>Mann-Whitnev U Test</i>	<i>p</i> = 0.004			

According to the above table, the Wilcoxon Signed Ranks Test revealed a p-value of 0.000 for the intervention group's difference in pre-test and post-test oxygen saturation values, compared to 0.023 for the control group. The Mann-Whitney U Test revealed a p-value of 0.004 for the difference in post-test oxygen saturation values between the intervention group and the control group.

DISCUSSION

The intervention group's respiratory rate decreased from the pre-test to the post-test, according to the results. The Wilcoxon Signed Ranks Test revealed a significant change in respiratory rates between the pre-test and post-test following the combination intervention of pursed lip breathing and peppermint aromatherapy. Oxygen saturation indicators were used to measure the patient's dyspnea in addition to respiratory rate. In comparison to the pre-test, the intervention group's oxygen saturation values increased during the post-test. There was a substantial shift in oxygen saturation following the intervention, according to the Wilcoxon Signed Ranks Test of oxygen saturation levels between the pre-test and post-test.

The study's findings demonstrate that the patient's breathing rate dropped and oxygen saturation considerably enhanced following a combination of pursed lip breathing and peppermint aromatherapy treatments. The breathing method known as "pursed lip breathing" entails taking a breath through the nose and gently exhaling via pursed lips. By improving airflow and reducing breathing rate, pursed lip breathing helps lessen dyspnea (Nguyen & Duong, 2022). This activity can raise blood oxygen saturation, which is crucial for cardiac patients (Gusty, 2024; Rahmawan, Al-Afik, & Rubidiyani, 2024). Pursed lip breathing helps patients manage their breathing, lower their breathing rate, and enhance airflow. Gas exchange, tidal volume, respiratory rate, inspiratory and expiratory muscle activity, and arterial SaO₂ can all be improved by pursed lip breathing (Mitsungnern, Srimookda, Imoun, Wansupong, & Kotruchin, 2021). Pursed lip breathing increases oxygen saturation and lowers respiratory rate in patients (Febyastuti et al., 2024).

According to Mitsungnern's (2021) research, pursed lip breathing techniques help lessen anxiety and dyspnea. One non-pharmacological method of treating dyspnea is mint leaf aromatherapy. Menthol, a natural decongestant, is the primary ingredient in mint leaves. Mint leaves contain two essential oils: menthol and menthone (Wulandari et al., 2024). According to research by Hamdani, Roslianti, Fitriani, and Andriansyah (2022), aromatherapy using mint leaves can improve oxygen saturation, decrease breathing frequency, and lessen dyspnea. According to research by Fitria et al. (2024), pneumonia patients who get a combination therapy of PLB and peppermint aromatherapy have a reduction in respiratory rate. A combination intervention of PLB and aromatherapy can improve oxygen saturation and reduce breathing frequency in ARI patients, according to research by Adhimah & Rahmawati (2024). In a similar vein, study by Muchtar & Arofiati (2024) demonstrated that giving patients with dyspnea a combination of PLB and peppermint aromatherapy therapy can lower breathing frequency and raise oxygen saturation.

In comparison to the first day of hospitalization or the first examination, every responder in the intervention and control groups reported that their dyspnea had lessened on the third day when the researchers performed the evaluation. The Wilcoxon Signed Ranks Test revealed a significant difference between the pre-test and post-test respiratory rates in the intervention group, according to statistical testing. The Mann-Whitney U Test revealed a significant difference in the post-test respiratory rate values between the intervention group and control group. The aforementioned statistical results show that the respiratory rates of the intervention group and the control group decreased between the pre-test and the post-test, and that the respiratory rates of the two groups differed significantly at the post-test. It is evident that the respiratory rate dropped more dramatically in the intervention group than in the control group, despite the fact that both groups' respiratory rates changed significantly between the pre-test and the post-test.

The patient's respiratory state was evaluated using oxygen saturation markers in addition to respiratory rate. The findings demonstrated that while oxygen saturation increased in both the intervention and control groups at the post-test relative to the pre-test, the intervention group's increase was greater than the control group's. Both the intervention group and the control group experienced substantial changes in oxygen saturation values between the pre-test and post-test, according to the Wilcoxon Signed Ranks Test. Similarly, there was a significant difference between the intervention group and the control group's post-test oxygen saturation values according to the Mann-Whitney U Test.

Oxygen treatment was administered to research participants in both the intervention and control groups. Patients with coronary heart disease are treated by giving them oxygen to get their blood oxygen levels back to normal. The heart's workload can be decreased by providing the tissues with an ample supply of oxygen (N. K. Wulandari et al., 2020). According to Yamin and Budi Widiyanto (2024), oxygen therapy is one of the treatments used to maintain proper tissue oxygenation and lessen the burden on the heart caused by inadequate oxygen delivery. The coronary circulation provides the oxygen that myocardial cells need to continue functioning (N. K. Wulandari et al., 2020). The extent of infarction and acute ischemic injury will decrease with increased arterial oxygen pressure (Agustina et al., 2023).

Reduced respiratory rate and increased oxygen saturation are two benefits of oxygen treatment. The capacity of hemoglobin to bind oxygen is known as oxygen saturation. The degree of saturation (SpO₂) is used to quantify it. The quantity of oxygen that enters the lungs is one component that influences oxygen saturation (Yamin & Budi Widiyanto, 2024). In order for more oxygen to be bound by hemoglobin and transported to tissues throughout the body, an increase in the volume of oxygen entering the lungs indirectly increases the diffusion capacity of the lungs and raises the partial pressure of O₂ (PO₂), returning oxygen saturation to normal levels (N. K. Wulandari et al., 2020). After receiving binasal cannula oxygen therapy, 100 patients with myocardial infarction demonstrated an increase in oxygen saturation, according to a study by Yamin & Budi Widiyanto (2024). Following combination therapy with pursed lip breathing and peppermint aromatherapy, the intervention group's heart rate decreased and oxygen saturation increased because the therapy improved the patients' capacity to breathe and absorb more oxygen.

CONCLUSION

Patients with coronary heart disease benefit significantly from the combination therapy of pursed lip breathing and peppermint aromatherapy, as evidenced by a decrease in respiratory rate and an increase in oxygen saturation following therapy, as demonstrated by a significant change in the Wilcoxon Signed Ranks Test. Patients who got a combination therapy of peppermint aromatherapy and pursed lip breathing had a significantly different respiratory condition than patients who did not receive therapy. The intervention group's respiratory rate decreased more than the control group's, and their oxygen saturation increased more. The intervention group and the control group differed significantly in respiratory rate and oxygen saturation according to the Mann-Whitney U Test.

REFERENCES

- Adhimah, M., & Rahmawati, E. (2024). Penerapan Modifikasi Pursed Lips Breathing dan Aromaterapi Eucalyptus terhadap Saturasi Oksigen dan Frekuensi Napas Anak dengan ISPA. *Ners Muda*, 5(2), 126. <https://doi.org/10.26714/nm.v5i2.13648>
- Agustina, D., Septiawan, T., Masnina, R., Diana, E. R., & Riyadi, A. (2023). Efektivitas terapi oksigen terhadap penyelamatan miokard pada pasien infark miokard dengan elevasi ST: Literatur review. *Jurnal Keperawatan*, 15(1), 287–292. <http://journal.stikeskendal.ac.id/index.php/Keperawatan>
- Febyastuti, I. widya, Widyaningtyas, N. H., & Zakaria, E. D. (2024). Studi Kasus: Penerapan Pursed Lip Breathing dan Diaphragmatic Breathing Exercise pada Pasien Congestive Heart Failure dengan Sesak Napas di Instalasi Gawat Darurat. *Holistic Nursing and Health Science*, 6(2), 86–95. <https://doi.org/10.14710/hnhs.6.2.2023.86-95>

- Fitria, I. L., Kartika, Y., Sari, & Arsa, S. A. W. (2024). The Effect Of Giving A Combination Of Pursed Lips Breathing Exercise And Peppermint Aromatherapy On Respiratory Rate In Pneumonia Patients. 4(02), 7823–7830.
- Hamdani, D., Roslianti, E., Fitriani, A., & Andriansyah, D. (2022). Case Study of Intervention using Mint Leaf Aroma Therapy in Bronchial Asthma Patients. *JURNAL VNUS (Vocational Nursing Sciences)*, 4(1), 22–30. <https://doi.org/10.52221/jvnus.v4i1.317>
- Liang, F., & Wang, Y. (2021). Coronary heart disease and atrial fibrillation: A vicious cycle. *American Journal of Physiology - Heart and Circulatory Physiology*, 320(1), 1–12. <https://doi.org/10.1152/AJPHEART.00702.2020>
- Muchtar, S. A., & Arofiati, F. (2024). Penerapan Teknik Pursed Lip Breathing dan Aromaterapi Daun Mint pada Pasien Dyspnea di IGD RS PKU Muhammadiyah Yogyakarta. *Jurnal Ilmu Farmasi Dan Kesehatan*, 2, 170–176. <https://doi.org/10.59841/an-najat.v2i2.1163>
- Muhammad Iqbal Rahmawan, Al-Afik, & Enggar Rubidiyani. (2024). Pemberian Posisi Semi-Fowler Untuk Meningkatkan Saturasi Oksigen Pasien Congestive Heart Failure Di ICU RSUD Tidar Magelang. *Corona: Jurnal Ilmu Kesehatan Umum, Psikolog, Keperawatan Dan Kebidanan*, 2(2), 79–85. <https://doi.org/10.61132/corona.v2i2.402>
- Nguyen, J. D., & Duong, H. (2022). Pursed Lip Breathing. [Www.Ncbi.Nlm.Nih.Gov/Books/Nbk545289/](http://www.ncbi.nlm.nih.gov/books/Nbk545289/)
- Thapanawong Mitsungrern, Srimookda, N., Imoun, S., Wansupong, S., & Kotruchin, P. (2021). The effect of pursed-lip breathing combined with number counting on blood pressure and heart rate in hypertensive urgency patients: A randomized controlled trial. <https://doi.org/10.1111/jch.14168>
- Wu, Q., Liu, L., & Jiang, X. (2020). Effect of voluntary breathing exercises on stable coronary artery disease in heart rate variability and rate-pressure product: A study protocol for a single-blind, prospective, randomized controlled trial. *Trials*, 21(1), 1–11. <https://doi.org/10.1186/s13063-020-04402-2>
- Wulandari, N. K., Siswanto, J., & Widiyati, S. (2020). Oxygen Therapy Supply To Haemodynamic Status In Patient With Acute Myocardial Infarction. *Journal of Applied Health Management and Technology*, 2(1), 34–38. <https://doi.org/10.31983/jahmt.v2i1.5505>
- Wulandari, W., Sudiarti, P. E., & Virgo, G. (2024). Pemberian Aroma Terapi Daun Mint (Menta Piperita) Untuk Mengurangi Sesak Napas Dengan Diagnosa TB Paru di RSUD Arifin Achmad. *Jurnal Pahlawan Kesehatan*, 1(1), 199–208. <https://journal-mandiracendikia.com/index.php/mdi/article/view/448/339>
- Yamin, L. S., & Budi Widiyanto. (2024). Terapi oksigen terhadap perubahan saturasi oksigen melalui pemeriksaan oksimetri pada pasien infark miokard akut (ima). *Prosiding Konferensi Nasional II PPNI Jawa Tengah 2014*, 138–143.
- Yunita, D. (2021). Efektivitas Pemberian Aromaterapi Lavender terhadap Penurunan Intensitas Nyeri Pada Pasien Post Sectio Caesarea (Vol. 75, Issue 17).
- Yuvindanati. (2021). Asuhan Keperawatan pada Pasien dengan NSTEMI (Non ST segment Elevation Myocardial Infarction) di Ruang ICCU RSUD Haji Surabaya. http://repository.stikeshangtuah-sby.ac.id/574/1/1820059_YUVINDANATI_KTI_NSTEMI_2021.pdf