Open Access Health Scientific Journal
https://oahsj.org/index.php/oahsj Vol. 6 No. 2 August 2025, pp. 186-192

Research article

The Effect of Aromatherapy Massage With Lavender Oil On Pain Levels and Quality Of Life in Diabetic Neuropathy Patients

Nevia Kholifah, Agus Purnama*, Rina Afrina

Universitas Indonesia Maju, Jakarta, Indonesia
*Corresponden Author: Agus Purnama (purnama.aguz@gmail.com)

ARTICLE INFO

Keywords:
Aromatherapy Massage,
Diabetes Mellitus,
Diabetic Neuropathy,
Quality of Life.

ABSTRACT

Background: Diabetes Mellitus has increased significantly worldwide. Diabetes is a A metabolic disease characterized by hyperglycemia. Diabetic neuropathy pain is a complication of diabetes. Reducing pain is essential to improving the quality of life of patients with diabetic neuropathy. This study aimed to determine the effect of aromatherapy massage with lavender oil on pain levels and quality of life in diabetic neuropathy patients at Cengkareng Regional Hospital.
Methods: This research design is a quantitative study with a Quasy Experiment approach with one equivalent control group pretest-posttest design. Data collection using VAS and WHO-QOL questionnaires. Data analysis was performed univariately and bivariately with the Shapiro Wilk test using Jamovi 2.3.28 software.
Results: There was a difference in pain levels before and after being given aromatherapy massage with lavender oil in diabetic neuropathy patients with a P value of 0.017 with an effect size of 1.22. Meanwhile, for the quality of life of diabetic neuropathy patients, a P value of 0.274 was obtained, indicating that there was no difference in the level of quality of life of patients after being given aromatherapy massage with lavender oil with an effect size of 0.494.
Conclusion: It is hoped that aromatherapy massage with lavender oil can be used as input for health services in reducing pain levels and improving the quality of life of diabetic neuropathy patients.

I. Introduction

Diabetes Diabetes continues to be a global public health problem, including in Indonesia (Kusumawati, 2022). Diabetes Mellitus can cause complications such as increased heart disease, stroke, neuropathy, retinopathy, kidney failure, and death (Eltrikanawati & Tampubolon, 2020) .
According to the International Diabetes Federation (IDF), the African and Arab Regions rank first and second among the world's seven regions in terms of diabetes prevalence, with prevalence rates of 134% and 87.4%, respectively. Southeast Asia ranks third with a prevalence rate of 67%, while Indonesia ranks first with approximately 13,136 million sufferers (IDF, 2021). Based on doctors' diagnoses in the 2018 Basic Health Research (Riskesdas), the province with the highest number of diabetes sufferers is DKI Jakarta, with 3.4% of the population.
Neuropathic pain is characterized by tingling, burning, sharp, stabbing, and radiating sensations or even an electric shock-like sensation (Akter, 2019) . Relevant studies has shown that painful neuropathic can affects the patient's quality of life (QoL), namely limiting daily life activities - day, skills maintenance self, work, sleep quality, and interpersonal relationships (Rahaman et al., 2023).
One method of managing neuropathic pain is massage combined with various aromatherapy oils. One popular scent is lavender. Lavender essential oil can provide relaxation (carminative), sedative, reduce anxiety, and improve mood (Donatello et al., 2020).

Received 1 June 2025; Accepted 19 July 2025; Published 1 August 2025
 DOI: https://doi.org/10.55700/oahsj.v6i2.74

Massage with lavender oil can significantly reduce pain scores (Aini et al., 2024) . In addition, massage with lavender oil significantly improves sensory and motor function in patients with diabetic neuropathy (Meutia et al., 2023) . In addition to its effects on pain and sensory and motor function, massage with lavender oil can improve health-related quality of life (Riwayati et al., 2024). The results of this study are expected to determine the effect of aromatherapy massage with lavender oil on pain levels and quality of life in diabetic neuropathy patients at Cengkareng Regional Hospital.

II. METHODS

The type of research used is a qualitative method with a quasi-experimental research method with a "non-equivalent control group design". The sampling technique used is simple random sampling. with a sample size of 20 respondents with a minimum sample calculation using Gpower software (version 3.1.9.4). In this study, the t-test-means analysis type was used: difference between two independent means (two groups), significance score/α (α err prob) 0.03 and using statistical power (1-β err prob) for the calculation of the sample size was 97% (0.97) with a clinical assessment of the effect size of 1.83 and using the direction of the two-tailed hypothesis and added drop out 10%, namely 2 people.

This study lasted for 14 days, from December 7, 2024 to December 21, 2024 in the inpatient room of Cengkareng Regional Hospital. The population in this study were patients with cases of diabetic neuropathy pain at Cengkareng Regional Hospital who were being hospitalized. With the characteristics of respondents consisting of age, gender, education and occupation. The sampling technique in this study used a simple random sampling method with inclusion criteria, namely patients with type 2 diabetes mellitus who experienced diabetic neuropathy and with pre-test questionnaire results DN4> 4, patients who were treated in the inpatient room, and received conventional therapy such as insulin and other diabetes medications, could communicate well and were willing to be respondents while the exclusion criteria in this study were patients who were allergic to lavender oil, patients refused the use of lavender oil, patients with active infections and open wounds and had other medical diagnoses such as stroke, multiple sclerosis.

Data collection was carried out using questionnaire sheets, namely DN4, VAS, WHOQOL. The DN4 questionnaire was used to detect diabetic neuropathy pain with a sensitivity value of 100% and a specificity of 83.17% (Kadek et al., 2019). The WHO-QOL questionnaire was used to measure quality of life, the results of the correlation test using the Spearman rank test showed that all domains had a correlation of more than 0.70 which indicated that all domains were acceptable (Permana et al., 2021) . The WHO-QOL questionnaire consists of 4 dimensions, where the score for each domain is transformed from 0-100, the results of the summed scores are categorized into: less (0-25), sufficient (26-50), good (51-75), very good (76-100). The VAS questionnaire is an assessment tool for measuring pain, VAS has a reliability test result of r = 0.94, validity of 0.99 and it can be concluded that VAS is believed to be more sensitive, simple and easy to use (Vitani, 2019).

Data analysis was performed univariately and bivariately. Statistical test results were obtained using the Wilcoxon Signed Ranks Test. Application The statistical analysis used in this study was JAMOVI 2.2.5, univariate analysis used descriptive analysis while bivariate analysis used the dependent T test to see the average effect before and after therapy was given to the intervention and control groups and the independent T test to see the difference before and after therapy was given to the intervention and control groups.

This study used two groups: a control group and an intervention group, with pre- and post-test questionnaires. The intervention group received aromatherapy massage with lavender oil and conventional therapy, while the control group received only conventional therapy. Researchers performed aromatherapy massage with lavender oil for 30 minutes per session, every day for 7 days.

This research has received a research ethics approval letter from the University of Indonesia Maju with No. 11335/ Sket/Ka-Dept/RE/UIMA/XI/2024.

III. RESULTS

The results of the research conducted were presented in the form of a table consisting of respondent characteristics including age, gender, education and occupation.

Table 1: characteristics of research respondents based on age, gender, education, occupation.

Characteristics	Category	(n)/ mean	(%) / SD
Age (mean, SD)	Numeric	54.8	8.49
Gender (n, %)	Man	12	54.5
	Woman	10	45.5
Education (N, %)	Senior High School	11	50.0
	Junior High School	5	22.7
	Elementary School	4	18.2
	College	2	9.1
Jobs (n, %)	housewife	10	45.5
	Employee	10	45.5
	Laborer	2	9.1

Based on table 1, it shows that the respondents were male, namely 12 respondents (54.5%), and female respondents numbered 10 respondents (45.5%) with an average age of 54.8%. In terms of education, high school showed the dominant results, namely 11 respondents (50.0%), for occupation, housewives and employees had the same number of respondents, namely 10 respondents (45.5%).

Table 2: Effect of Aromatherapy Massage with lavender oil on pre and post pain levels in the intervention group and control group

Variables	Mean	Elementary School	P	Effect Size
Pre Pain Intervention	6.55	0.522	0.002	3.62
Post Intervention Pain	5.45	0.157		
Pre Pain Control	65.09	5.89	0.221	9.99
Post Pain Control	6.45	1.04		

Based on table 2. In the intervention group, the results of the analysis test using the Wilcoxon test obtained a p value (0.002) <0.05, meaning that the data was not normally distributed, Ho was rejected and Ha was accepted, meaning that there was an influence before and after being given aromatherapy massage in the intervention group with an effect size of 3.62, meaning that it had a strong effect. Meanwhile, the results of the analysis test in the control group had a p value (0.221) > 0.05, meaning that Ho was accepted and Ha was rejected, meaning that there was no change in the level of pain in the control group with an effect size of 9.99.

Table 3: Effect of Aromatherapy Massage with lavender oil on pre and post quality of life in the intervention group and control group

Variables	Mean	Elementary School	P	Effect Size
Pre QOL Intervention	61.5	8.07	0.184	2.05
Post QOL Intervention	68.2	6.60		
Pre QOL Control	58.27	5,159	0.189	10.4
Post QOL Control	6.64	0.674		

Based on table 3, the results of the analysis test of the intervention group obtained the results of P (0.184)> 0.05, meaning that the data was normally distributed, Ho was accepted and Ha was rejected, meaning that there was no influence before and after being given aromatherapy massage in the intervention group with an effect size of 2.05, meaning that it had a small effect, while the results of the analysis test in the control group had a value of p (0.189)> 0.05, meaning that Ho was accepted and Ha was rejected, meaning that there was no influence of aromatherapy massage on the quality of life in the control group with an effect size of 10.4.

Table 4: Differences in Pain Levels in Control and Intervention Group Patients After Aromatherapy Massage with Lavender Oil

Group	Painful	Mean (SD)	P	Effect Size
Aromatherapy massage	Intervention	5.45 (0.522)	0.017	1.22
	Control	6.45 (1.04)		

Based on Table 4, the test results using the Mann-Whitney U test obtained a P value (0.017) < 0.05, indicating a significant difference between the intervention and control groups. This indicates that aromatherapy massage with lavender oil is effective in reducing pain levels in diabetic neuropathy patients with an effect size of 1.22.

Table 5: Differences in Quality of Life in Control and Intervention Group Patients After Aromatherapy Massage with Lavender Oil

Group	Painful	Mean (SD)	P	Effect Size
Aromatherapy massage	Intervention	68.2 (6.60)	0.274	0.494
	Control	65.1 (5.89)		

Based on table 5, the results of the test on the influence of the level of quality of life in diabetic neuropathy patients obtained a P value (0.274) > 0.05, meaning there was no significant difference between the intervention group and the control group with an effect size of 0.494.

IV. DISCUSSION

Based on the research results, the age characteristics of respondents who experienced diabetic neuropathy were obtained with an average of 54 years. These results are in line with Imelda's research entitled the relationship between age, gender and hypertension with the incidence of type 2 diabetes mellitus at the Tugu Community Health Center, Cimanggis District, Depok City in 2019, which stated that there is a relationship between age and the incidence of type 2 diabetes mellitus, where people over 45 years old have an 8 times greater risk (Imelda, 2019) . The American Diabetes Association states that the risk of diabetes mellitus increases with age. This is based on an increase in the composition of fat in the body that accumulates in the abdomen, thus triggering central and then triggering insulin resistance which is the initial process of type 2 diabetes mellitus (IDF, 2021) . Based on Fitirani's (2021) research at the Tanjung Rejo Community Health Center, it was stated that the majority of respondents were over 54 years old because theoretically this risk factor cannot be changed and the older one is, the body's metabolic process begins to decrease (Delfina et al., 2021) .

Respondents based on gender in this study were predominantly female. This finding aligns with Widiasari's study , which found that women are at greater risk because, physically, they have a higher chance of increasing their Body Mass Index (BMI). Furthermore, premenstrual syndrome and menopause can disrupt body fat distribution, leading to its accumulation and increasing a woman's risk of developing type 2 diabetes (Widiasari et al., 2021) . This contrasts with Erna et al.'s (2021) study, which found that the majority of respondents with diabetes were male. This is likely due to men engaging in more physical activity than women (Irawan et al., 2021).

The results of the study at the educational level were mostly high school graduates, namely 11 respondents. In this study, there was no gap between theory and fact. This is because according to Massiani's research, the higher a person's education level will make it easier for someone to receive or grasp information about Diabetes Mellitus (Massiani et al., 2023) . While the characteristics of respondents in terms of work have the same value between housewives and employees, namely 10 respondents, this study is in line with Resti Arania's research, where work factors influence the risk of Diabetes Mellitus because light or low physical activity causes a lack of energy burning in the body so that excess energy in the form of fat in the body results in obesity which is one of the risk factors for Diabetes Mellitus (Adolph, 2019) .

Based on research, it can be assumed that the older a person is, the higher the prevalence of diabetes. Women tend to have a higher chance of having an increased body mass index (BMI), and differences in sex hormone levels between adult men and women contribute to the high incidence of diabetes mellitus

in women. According to researchers, occupations, especially those involving low physical activity, contribute to the risk of diabetes mellitus through reduced energy expenditure and fat accumulation.
Based on the study, the post-pain level in the control group was moderate, similar to the results of the post-pain level in the intervention group, which was moderate. In line with Hassayati's 2021 study, which found that pain levels in the intervention group decreased after foot massage, changes in pain experienced in patients in this study indicated that the elderly were more comfortable with the massage, with reduced pain and stiffness (Awanis, 2021) . Diabetic neuropathy is the most common complication of diabetes, likely affecting every segment of the central nervous system. Appropriate interventions to reduce complaints of peripheral neuropathy are important in patients with type II diabetes mellitus and are widely used with non-pharmacological techniques such as massage (Nupoor & Sripriya, 2022) . In line with Hamid's 2023 study, aromatherapy massage can reduce pain levels in patients with neuropathy in the intervention group compared to the control group (Abdel Hamid Hawash et al., 2023) . Based on this study, the researchers assumed that although post-pain levels in the control and intervention groups may have shown similar moderate results, significant changes in the intervention group indicated the intervention's effectiveness. This is because massage and aromatherapy oils can increase parasympathetic activity, lower cortisol levels, and reduce nerve irritation.
Based on the research, the quality of life of the pre-control group and the intervention group was good. In line with Hella's 2019 study, the quality of life of the pre-patients was mostly moderate (Soebandi et al., 2019) . Quality of life can be defined as an individual's perception of their position in life within the context of the culture and value system in which they live. Patients with neuropathic pain can have a significant impact on quality of life, affecting an individual's ability to perform daily activities and participate in social activities (Nababan1 & Benny Siringoringo, 2022) . Research conducted by Mervat Abdul Hamid Hawash, et al. 2023 stated that aromatherapy massage with lavender and chamomile oils was also shown to significantly reduce neuropathic pain and improve the quality of life of diabetic patients (Abdel Hamid Hawash et al., 2023) .
Based on research showing a significant difference between pain levels in the intervention and control groups, it shows that aromatherapy massage with lavender oil is effective in reducing pain levels in diabetic neuropathy patients (Mohammed et al., 2019) . Aromatherapy massage is a massage combined with the use of various aromatherapy oils. One of the most popular aromas is lavender. The results of several research journals conclude that lavender essential oil has a relaxing (carminative) and calming effect, so it can reduce anxiety and improve a person's mood (Donatello et al., 2020) . The results of this study are in line with research (Meutia et al., 2023) where aromatherapy massage intervention can reduce pain levels in diabetic neuropathy patients compared to the control group without treatment (Meutia et al., 2023) . Based on previous and current research, researchers believe that aromatherapy massage with lavender oil is effective in reducing diabetic neuropathy pain, and this intervention could be a viable non-pharmacological option. The combination of aromatherapy massage with lavender oil can provide a relaxing effect and reduce pain by increasing lymphatic and blood flow.
Based on the difference test in the intervention and control groups, it was found that there was no significant difference, indicating that aromatherapy massage with lavender oil is effective in improving the quality of life in diabetic neuropathy patients. Relevant studies that show that painful neuropathic can affects the patient's quality of life (QoL), namely limiting daily life activities - day, skills maintenance Self-esteem, work, sleep quality, and interpersonal relationships (Rahaman et al., 2023). Another study by Fitriyani in 2021 involving diabetic neuropathy patients who received an intervention in the form of massage with lavender oil, found that massage with lavender oil had a significant improvement in health-related quality of life (Riwayati et al., 2024) . Based on the current and previous research, it can be assumed that aromatherapy massage with lavender oil is not always effective in improving the quality of life of diabetic neuropathy patients, and this could be due to several factors.

V. CONCLUSION

It is hoped that aromatherapy massage with lavender oil can be used as input for health services in reducing pain levels and improving the quality of life of diabetic neuropathy patients and can be a consideration for hospitals to make complementary services part of the Standard Operating Procedure (SOP).

VI. ACKNOWLEDGMENTS:
We express our deepest gratitude to the Director of Cengkareng Regional Hospital for the support, permission, and facilities provided during this research. We also express our deep appreciation to the UIMA Jakarta Campus for their invaluable guidance, direction, and academic support.

VII. CONFLICTS OF INTEREST
This research is free from any conflict

REFERENCES

Abdel Hamid Hawash, M., Gamal Ramadan Asal, M., & Ramadan Shaheen Ibrahim, S. (2023). Effect of Aromatherapy Massage with Chamomile Oil versus Lavender Oil on Neuropathic Pain and Quality of Life in Diabetic Patients: randomized controlled clinical trial. *Egyptian Journal of Health Care*, *14* (2), 724–737. https://doi.org/10.21608/ejhc.2023.302778

Abdullah, K. (2021). *Quantitative Research Methodology* (N. Saputra (ed.)). Muhammad Zaini Publishing Foundation.

Adolph, R. (2019). *The Relationship Between Work And Physical Activity With The Incidence Of Diabetes Mellitus At The Mardi Waluyo Clinic, Central Lampung Regency*. *5* (September), 1–23.

Aini, S., Kusumawati, N., Asmalinda, R., Tuanku, P., & Riau, T. (2024). *Sehat: Integrated Health Journal Combination Of Effleurage Massage And Lavender Aromatherapy Oil On Diabetic Neuropathy In Type 2 Diabetes Mellitus Patients In The Mawar Inpatient Ward, Arifin Achmad Regional Hospital, Riau Province* (Vol. 3, Issue 2).

Akter, N. (2019). Diabetic Peripheral Neuropathy: Epidemiology, Physiopathology, Diagnosis and Treatment. *Delta Medical College Journal*, *7* (1), 35–48. https://doi.org/10.3329/dmcj.v7i1.40619

Alam, U., Fawwad, A., Shaheen, F., Tahir, B., Basit, A., & Malik, R.A. (2017). Improvement in Neuropathy Specific Quality of Life in Patients with Diabetes after Vitamin D Supplementation. *Journal of Diabetes Research*, *2017*. https://doi.org/10.1155/2017/7928083

Alemi, S., Abolmaali Alhosseini, K., Malihialzackerini, S., & Khabiri, M. (2021). The Effectiveness of Mindfulness Training-Aromatherapy Massage on Pain perception quality of sleep and quality of life of Elderly Women with Chronic Pain: Effectiveness of mindfulness-Aromatherapy massage on psychological health of elderly women with pain. *Iranian Journal of Aging*, *16* (2), 1–16. https://doi.org/10.32598/sija.16.2.3058.1

Apriani Suryana, A., Djajasasmita, D., Yani, A., Anatomy, B., Medicine, General Achmad Yani University, F., Physiology, B., & Medicine, General Achmad Yani University Abstract, F. (2022). The Relationship Between Lumbar Lordosis Depth and Pain Intensity in Obese Low Back Pain Patients at the Neurology Polyclinic of Rshs Bandung. *Indonesian Journal of Sports Physiology*, *5* (1), 25–32. http://jifo.or.id/index.php/jifo/article/view/128

Assy, MH, Draz, NA, Fathy, SE, & Hamed, MG (2021). Impact of vitamin D levels in diabetic people with peripheral neuropathy. *Egyptian Journal of Neurology, Psychiatry and Neurosurgery*, *57* (1). https://doi.org/10.1186/s41983-021-00370-9

Aulia, N. (2023). *Jasmine Aromatherapy Hypertension Journal*.

Awanis, H. (2021). The Effect of Foot Massage Therapy and Lavender Aromatherapy on Rheumatoid Arthritis (RA) Pain Intensity in the Elderly in the Jembatan Kecil Community Health Center Work Area in 2021. *Thesis.*

Azzahra Utomo, A., Aulia, AR, Rahmah, S., Amalia, R., Studi, PS, Masyarakat, K., Health Sciences Veteran National Development University Jakarta Jl Limo Raya No, F., & Limo, K. (2018). *Risk Factors Of Type 2 Diabetes Mellitus: A Systematic Review*. https://jurnal.umj.ac.id/index.php/AN-NUR

Badrujamaludin, A. (2021). *The relationship between physical activity and the incidence of diabetic neuropathy in patients with type 2 diabetes mellitus*.

Biology, J., Science and Technology, F., Alauddin Makassar, U., Examination, C., Treatment and Prevention Methods LESTARI, C., Aisyah Sijid, S., Biology Study, P., & Alauddin Makassar Jl Yasin Limpo Gowa, UH (2021). *Diabetes Mellitus: Review of Etiology*. http://journal.uin-alauddin.ac.id/index.php/psb

Cebeci, D., Karasel, S., & Yaşar, Ş. (2021). Venous Lakes of the Lips Successfully Treated With a Sclerosing Agent 1% polidocanol: analysis of 25 reported cases. *International Journal of Surgery Case Reports*, *78* (June 2013), 265–269. https://doi.org/10.1016/j.ijscr.2020.12.057

Chia, C. W., Egan, J. M., & Ferrucci, L. (2018). Age-related changes in glucose metabolism, hyperglycemia, and cardiovascular risk. *Circulation Research*, *123* (7), 886–904. https://doi.org/10.1161/CIRCRESAHA.118.312806

Cho, M.-K., & Kim, M.Y. (2024). The effect of aromatherapy on pain in individuals with diabetes: a systematic review and meta-analysis. *Journal of Korean Biological Nursing Science*, *26* (2), 71–82. https://doi.org/10.7586/jkbns.24.012

Chotimah, N., Syolihan, D., & Putri, R. (2023). *Nursing Professional Program, Kusuma Husada University, Surakarta 2023 Application of Aromatherapy Massage (Lavender) to Pain Levels in Type II Diabetes Patients in the ICU. Application of Aromatherapy Massage (Lavender) to Pain Levels in Type II Diabetes Patients*. *20*, 1–7.

Darwin, M., & Reynalda, M. (2021). Book Review: Quantitative Research Methods. *Indonesian Science Media*, 74–84.

Delfina, S., Carolita Maharani, I., Habsah, S., & Ayatillahi, ta. (2021). *Literature Review: Analysis of Determinants of Risk Factors for Type 2 Diabetes Mellitus in Productive Age*. *2* (4).

Devi, FL (2021). Neuropathic Pain Management. *Journal of Professional Nursing Research*, *3* (1). https://doi.org/10.37287/jppp.v3i1.370

Devi, P., Madhu, K., Ganapathy, B., Sarma, G.R.K., John, L., & Kulkarni, C. (2018). Evaluation of efficacy and safety of gabapentin, duloxetine, and pregabalin in patients with painful diabetic peripheral neuropathy. *Indian Journal of Pharmacology*, *44* (1), 51–56. https://doi.org/10.4103/0253-7613.91867

Donatello, NN, Emer, AA, Salm, DC, Ludtke, DD, Bordignon, SASR, Ferreira, JK, Salgado, ASI, Venzke, D., Bretanha, LC, Micke, GA, & Martins, DF (2020). Lavandula angustifolia essential oil inhalation reduces mechanical hyperalgesia in a model of inflammatory and neuropathic pain: The involvement of opioid and cannabinoid receptors. *Journal of Neuroimmunology*, *340*, 577145. https://doi.org/10.1016/J.JNEUROIM.2020.577145

Elsayed, NA 2. C. and D. of DS of C. in D., Aleppo, G., Aroda, VR, Bannuru, RR, Brown, FM, Bruemmer, D., Collins, BS, Hilliard, ME, Isaacs, D., Johnson, EL, Kahan, S., Khunti, K., Kosiborod, M., Leon, J., Lyons, SK, Murdock, L., Perry, M. Lou, Prahalad, P., Pratley, R.E., … Gabbay, R.A. (2023). 2. Classification and Diagnosis of Diabetes: Standards of Care in Diabetes—2023. *Diabetes Care*, *46*. https://doi.org/10.2337/dc23-S002

.