

Lavender Aromatherapy and the Incidence of Post-Operative Nausea and Vomiting: A Randomized Controlled Trial

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Effectiveness of
Lavender
Aromatherapy to
Standard
Antiemetic
Therapy

ABSTRACT

Objective: To evaluate the effectiveness of lavender aromatherapy, in addition to standard antiemetic therapy, in reducing postoperative nausea and vomiting among patients undergoing exploratory laparotomy.

Study Design: Randomized controlled trial study

Place and Duration of Study: This study was conducted at the DHQ Hospital Sheikhupura, Pakistan, between February and July 2024.

Methods: The sample size used was 70 adult patients who had undergone laparotomy with general anesthesia, experienced nausea or vomiting in 24 hours after surgery and were enrolled and randomized to either intervention (n=35) or control (n=35) group. Both groups were treated with standard antiemetics, and the experimental one was also treated with lavender aromatherapy according to the validated protocols. The levels of nausea and vomiting were evaluated on levels at baseline and after 15 and 40 minutes of intervention. Analysis of data involved comparison of within and between group changes at individual time point.

Results: Baseline nausea and vomiting rates were comparable between groups. At 40 minutes, nausea was significantly lower in the intervention group compared to controls (2.9% vs. 17.1%, $p=0.04$). Vomiting showed a marked reduction at 15 minutes (8.6% vs. 48.6%, $p=0.001$) and was completely absent in the intervention group at 40 minutes (0% vs. 14.3%, $p=0.02$). Both groups showed within-group improvement over time, but reductions were more pronounced in the lavender group.

Conclusion: When lavender aromatherapy was applied together with the conventional antiemetic treatment, nausea as well as vomiting after exploratory laparotomy was greatly reduced. It is safe, not invasive, and cost-effective, which makes it appropriate to be incorporated as a postoperative supportive strategy.

Key Words: Lavender aromatherapy, postoperative nausea and vomiting, exploratory laparotomy, complementary therapy,

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INTRODUCTION

Exploratory laparotomy stands out as a critical surgical intervention employed in cases where the etiology of abdominal symptoms remains vague and varies across patients. The number of this surgical procedure accounts for at least 175,000 surgeries per year in America, and around 85,000 were done yearly in England for diverse surgical causes and presentations.¹

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PONV is the second most common and distressing symptom following surgery and anaesthesia, second only to pain. In some cases, these symptoms can be more common than pain and result in more suffering for patients, regardless of whether the surgery was minor or major.²

The pharmacological properties of the anaesthetic agents used are closely linked to the etiology of PONV, as prolonged exposure leads to elevated drug concentrations that overwhelm the body's elimination mechanisms. Notably, general anaesthesia poses a significant risk in comparison to local anaesthesia, with the duration of general anaesthesia correlating with increased susceptibility to PONV. Each additional 30 minutes of anaesthesia is projected to raise the risk of PONV by 59%.

PONV is also the contributor to numerous issues, such as dehydration, electrolyte imbalances, and changes in acid-base equilibrium. Moreover, it is also associated with a range of respiratory issues including aspiration, pneumothorax, and esophageal rupture. PONV can also increase intracranial pressure, suture disruption, wound dehiscence, bleeding, oral intake delay, prolonged

hospital stay, anxiety, fatigue, and unanticipated hospital readmission thereby exacerbating healthcare spending.³

PONV is defined as the onset of nausea or vomiting among the postoperative patients in the post-anaesthesia care unit (PACU) or the period of first 24-48 hours following exploratory laparotomy in the general ward. The global prevalence of PONV is estimated to be 75 million patients each year.

A distinction should be made between the subjective experience of nausea and the objective experience of vomiting to provide useful surgical attention. Excessive parasympathetic nervous system leads to nausea with evident symptoms of bradycardia, diaphoresis, salivation, pallor skin, and bradycardia. Vomiting, on the other hand, refers to the violent expulsion of stomach contents through the mouth, and is usually instigated by some form of strong urge.⁴

Dopamine antagonists (Inj. Metoclopramide), histamine antagonists (Inj. Ranitidine), serotonin antagonists (Inj. Ondansetron), muscarinic, neurokinin, corticosteroids, benzodiazepines, and cannabinoids (Inj. Cannabidiol) are commonly used as pharmacological agents in the management of postoperative nausea and vomiting (PONV).⁵ Despite this, complementary treatment like aromatherapy has gained interest given its growing use in health care.⁶

According to the National Institutes of Health, aromatherapy is the therapeutic use of essential oils derived out of plants, which have unique chemical composition with certain curative effect (ie. nausea, pain and anxiety).⁷ The low toxicity, uncommon allergic reactions, calming and anxiolytic effects, mood elevation, and analgesic activity of lavender oil are especially appreciated.^{8,9}

Five randomized controlled trials in a systematic review support the idea that aromatherapy is an effective adjunct in managing PONV and suggests further studies using standardized nausea scales.¹⁰ A recent Italian protocol also supports the idea that lavender aromatherapy can be used as an effective adjunct in PONV management.¹¹

Aromatherapy is a valuable part of the holistic care of the patient during the postoperative period 13, and thus the study will help determine the effectiveness of aromatherapy in the prevention of PONV.

METHODS

This is a randomized controlled trial that assessed the efficacy of lavender aromatherapy in preventing the postoperative nausea and vomiting (PONV) in adult patients undergoing exploratory laparotomy. The eligible participants were adults within the age of 18-65 years who underwent general anesthesia and experienced nausea or vomiting within 24 hours of surgery. Convenience sampling was used to recruit the patients, and a sample of 70 participants (35 in each

group) was calculated to yield 80% statistical power of a 95% confidence interval. This research was carried out at DHQ Hospital Sheikhupura, Punjab, Pakistan after it received ethical consent at the University of Health Sciences, Lahore. Participants were thoroughly educated on the study processes, assured of confidentiality and given the right to withdraw any time without repercussions.

The period of collecting the data was between February 2024 and July 2024, a span of six months. Informed consent was obtained and after that all the participants were grouped randomly to an intervention or control group using a computer-generated randomization sequence to reduce any allocation bias. The two groupings were given normal antiemetic treatment in case of nausea or vomiting. In the intervention group, there was lavender essential oil aromatherapy on top of the antiemetic. The aromatherapy protocol used was a legitimate and valid procedure as outlined by Bolgeo et al. (2023) and Karaman et al. (2019). In case a subject of the intervention group complained of nausea, or right after the initial vomiting, a sterile gauze pad soaked in 0.2 ml of lavender oil was placed 10 cm below the nose of the subject using sterile forceps. The participant was told to wait 5 minutes to inhale the aroma whilst being observed.

There were standardized outcome assessment between groups. In the case of participants with nausea, 15 and 40 minutes after the intervention compared the severity. In the case of vomiting, the vomiting frequency was measured at 15 and 20 minutes of the first vomiting. Control group members were only given the prescribed antiemetic drug and their symptoms were measured at the same time frames like the intervention group so as to be comparable.

Throughout the study, adherence to ethical standards, patient safety, and uniform assessment procedures was maintained. This methodology ensured methodological rigor and allowed for accurate evaluation of the added benefit of lavender aromatherapy in managing PONV in postoperative patients.

RESULTS

The sociodemographic characteristics of the participants indicated that the majority of the members of both groups were middle aged, with most of them falling in the 41-60 years bracket. It was found that a greater percentage of the participants in the control group were in this age bracket than the intervention group. The Females constituted 51.4 percent of the control, and 37.1 percent of the intervention and the male gender was a little higher on the whole. The majority of the participants in both groups are married with equal representation of married people in the control (91.4) and intervention (88.6) groups. These results show similar baseline demographic factors of the two groups (Table 1).

The history of medical records showed that nearly half of the group of controls (48.6) and over half of the intervention group (57.1) had gone through a previous surgery. The level of medical problems was higher among participants of the intervention group (71.4%), than among those of the control group (62.9%). Anesthesia drugs were given to all the participants in the two groups. When it comes to the variables of the procedure, only in the intervention group was lavender aroma therapy used at the moment of injection, but duration of the surgery was different, and the majority of the procedures took 1-1.5 hours in both groups. These features depict clinical comparability of groups prior to intervention (Table 2).

The occurrence of postoperative nausea revealed that the two groups reported similar baseline levels of nausea. Nausea dropped in the control group and tended to rise in the intervention group at 15 minutes but there was no significant difference between the two groups.

At 40 minutes, there was a significant difference in the nausea between the intervention and control group, with the intervention group showing reduced nausea (2.9% versus 17.1%). The within-group comparisons indicated a substantial decrease in the baseline of both groups at 40 minutes, and it was more pronounced in the intervention group (Table 3).

At baseline postoperative vomiting did not differ between the two groups but at 15 minutes, the control group vomited significantly (48.6%) more than the intervention group (8.6%) which was highly significant. At 40 minutes, the further reduction of vomiting in the intervention group became zero, and 14.3% of participants in the control group still vomited. The two groups showed considerable changes in baseline and time; nevertheless, the reduction was observed to be higher in the intervention group, which can substantiate the applicability of lavender aroma therapy in alleviating postoperative vomiting (Table 4).

Table No. 1: Sociodemographic and clinical characteristics between groups.

Variables	Control Group 35 (%)	Mean± SD	Interventional Group 35(%)	Mean ±SD	All participants 70 (%)	Mean ±SD
Age						
25-40	8(22.9)	48.9±9.89	17 (48.6)	44.91±9.86	25(35.7)	46.9±10.0
41-60	22(62.9)		15 (42.9)		37(52.9)	
61-70	05(14.3)		03(8.6)		8(11.4)	
Gender						
Female	18(51.4)	1.51±0.50	13(37.1)	1.37±0.49	31 (44.3)	1.44±0.50
Male	17(48.6)		22 (62.9)		39 (55.7)	
Marital status						
Married	32(91.4)	1.09±0.28	31(88.6)	1.11±0.32	63 (90.0)	1.10±0.30
unmarried	3(8.6)		4(11.4)		7(10.0)	

Table No. 2: Medical History of control group and interventional group (N=70).

Variables	Control Group35 (%)	Mean± SD	Interventional Group 35(%)	Mean ±SD	All participants 70 (%)	Mean ±SD
History of Surgery						
Yes	17(48.6)	1.51±0.50	20(57.1)	1.43±0.50	37(52.9)	1.47±0.50
No	18(51.4)		15(42.9)		33(47.1)	
Any kind of medical problem of participant						
Yes	22(62.9)	1.37±0.49	25(71.4)	1.28±0.45	47(67.1)	1.32±0.47
No	13(37.1)		10(28.6)		23(32.9)	
Anesthesia drug						
Yes	35(100%)	1.00±0.00	35(100.0)	1.00±0.00	70(100)	1.00±0.00
Anesthesia drug						
Injection onset	35(100.0)	0.00±0.00	0(0.0)	1.00±0.00	35(50.0)	0.50±0.50
Injection onset+lavender aroma therapy	0(0.0)		35(100.0)		35(50.0)	
Surgery time						
1 hour	8(22.9)	2.05±0.76	4(11.4)	2.25±0.74	12 (17.1)	2.15±0.75
1.5 hour	18(51.4)		20(57.1)		38(54.3)	
2 hours	8(22.9)		9(25.7)		17(24.3)	
2.5 hour	1(2.9)		2(5.7)		3(4.3)	

Table No. 3: Incidence of postoperative nausea within and between the groups at three different time intervals

Time interval	Group	Yes, n (%)	No, n (%)	Total	P-value (Between Groups)
Before Intervention	Control	15 (42.86%)	20 (57.14%)	35 (100%)	0.808
	Intervention	14 (40.0%)	21 (60.0%)	35 (100%)	
At 15 Minutes	Control	7 (20.0%)	28 (80.0%)	35 (100%)	0.27
	Intervention	11 (31.4%)	24 (68.6%)	35 (100%)	
	P-value (Within Group vs. Baseline) Control: <0.008; Experimental: 0.25				
At 40 Minutes	Control	6 (17.1%)	29 (82.9%)	35 (100%)	0.04
	Intervention	1 (2.9%)	34 (97.1%)	35 (100%)	
	P-value (Within Group vs. Baseline) Control: <0.004; Intervention: <0.001				

Table No. 4: Incidence of postoperative vomiting within and between groups at three different time intervals

Time interval	Control (n=35)	Intervention (n=35)	Between-group P-value
Before Treatment (Baseline)			
Vomiting, n (%)	20 (57.1%)	21 (60.0%)	0.808
No vomiting, n (%)	15 (42.9%)	14 (40.0%)	
At 15 Minutes			
Vomiting, n (%)	17 (48.6%)	3 (8.6%)	0.001
No vomiting, n (%)	18 (51.4%)	32 (91.4%)	
Within group P-value	<0.250a	<0.25a	
At 40 Minutes			
Vomiting, n (%)	5 (14.3%)	0 (0.00%)	0.02
No vomiting, n (%)	30 (85.7%)	35 (100.0%)	
Within group P-value	<0.001	<0.001	

DISCUSSION

The results of the proposed study are consistent with the literature and demonstrate that lavender aromatherapy in conjunction with the conventional therapy has a huge impact in alleviating nausea and vomiting among surgical patients. The demographic factors related to the participants (gender composition, age bracket, and marital status) were also similar to the same in the past literature, which indicates that the findings can be applicable in different groups. There were also similarities in the clinical characteristics of the work such as the surgical history and medical history which is similar to other studies and this confirms the external validity of the study and also proves that the factors do not play a significant role in the activity of lavender aromatherapy in managing PONV.^{13, 14}

Among the key results of this research was the fact that lavender aromatherapy, when used alongside conventional therapy had a higher effectiveness in reducing nausea compared to the control group of individuals who only received conventional therapy. These findings were confirmed by the past studies that indicated that lavender aromatherapy can help in relieving postoperative nausea with better results with

time.¹⁵ This is in line with another study that has established the benefits of aromatherapy to be gradual and long lasting in the management of PONV.¹⁶

The combination of lavender aromatherapy and the conventional treatment also resulted in increased reduction of vomiting compared to the control group. This observation also reinforces the current amount of evidence that aromatherapy could make a useful tool in the management of both nausea and vomiting which seems more difficult to control in postoperative patients. A review of research was carried out in Turkey, which showed that aromatherapy was applicable in the management of PONV, and the ginger and lavender oils are better in comparison with others.¹⁷ The research offers a good evidence in favor of the application of lavender aromatherapy in the management of PONV. These results are consistent with those of other researchers, who have confirmed that lavender aromatherapy is a good intervention in the treatment of postoperative nausea and vomiting. These findings are reinforced by another study.¹⁸ The capacity of lavender to relieve nausea as well as vomiting provides an important clue that the compound can be used as a non-pharmacological alternative to conventional drugs, which have side effects.

Nevertheless, there are limitations to the study as well. The sample used was quite small, and it should be supplemented with bigger studies using more diverse populations to verify and further develop these results. Further studies that might be conducted in the future include the outcomes of lavender aromatherapy in the long run given that this study was conducted on the immediate postoperative conditions. It might also be explored through further researches that could look at how well lavender aromatherapy can be used in conjunction with other complementary therapies to see whether there is a synergistic effect that could be used to increase patient outcomes.

Lavender aromatherapy is a safe and effective potential to manage PONV in clinical practice at low cost. Its non-invasiveness and a small number of side effects make it a promising alternative to postoperative treatment, particularly when it comes to patients with a high sensitivity to conventional drugs. Lavender aromatherapy might be implemented into usual postoperative practice, and would cost less to the healthcare because it would decrease the necessity of use of pharmacological treatment and increase patient satisfaction.

CONCLUSION

This study reveals that lavender aromatherapy, when combined with conventional therapy, is a favorable intervention in the management of PONV incidence. These findings indicate that lavender aromatherapy can reduce the occurrence of nausea and vomiting considerably and can be used as an alternative to traditional pharmacological therapy. Lavender aromatherapy is a relatively inexpensive and patient-friendly method of postoperative care, considering its lack of invasiveness and a small number of side effects. These findings should be confirmed by future studies using bigger samples and long-term follow-up to investigate the expanded clinical use of this treatment alternative.

Author's Contribution:

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