

“An Experimental Study to Evaluate the Effectiveness of Lavender Oil Back Massage on Labour Pain Perception and Progress of Labour Among Pregnant Mothers in a Selected Hospital at Meerut U.P.”,

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ABSTRACT

Introduction: Childbirth is a natural physiological process; however, labour pain is considered one of the most severe forms of pain experienced by women. According to the World Health Organization (WHO), approximately 140 million births occur globally each year, and nearly 60–90% of women experience moderate to severe labour pain during childbirth. In India, more than 23 million births occur annually, with institutional deliveries accounting for 88.6% according to the National Family Health Survey (NFHS-5, 2019–21). Despite improvements in maternal healthcare services, nearly 70–80% of labouring women do not receive adequate pain relief during labour. Non-pharmacological interventions such as massage and aromatherapy are increasingly recommended because they are safe, economical, non-invasive, and easy to administer. Lavender oil possesses analgesic, anxiolytic, and relaxing properties that may help reduce labour pain perception and improve the progress of labour. Therefore, the present study was undertaken to evaluate the effectiveness of lavender oil back massage on labour pain perception and progress of labour among pregnant mothers.

Objectives: To assess the post-test pain perception and progress of labour among pregnant mothers in experimental and control group. To evaluate the effectiveness of lavender oil back massage on labour pain perception and progress of labour among pregnant mothers in experimental and control group. To find out the relationship between labour pain perception and progress of labour among pregnant mothers. To determine the association between labour pain perception and progress of labour among pregnant mothers with their selected demographic variables.

Methodology: The study adopted a quantitative research approach with a true experimental post-test only control group design. The study was conducted in District Women Hospital, Meerut among pregnant mothers in the first stage of labour. A total of 60 pregnant mothers were selected by using non-probability convenience sampling technique, consisting of 30 mothers in the experimental group and 30 mothers in the control group. Lavender oil back massage was administered to the experimental group during the first stage of labour, whereas the control group received routine care only. The progress of labour was monitored by using a simplified partograph, and labour pain perception was assessed using the Numeric Pain Rating Scale (NPRS). Descriptive and inferential statistics including frequency, percentage, mean, standard deviation, unpaired t-test, Pearson correlation, and Chi-square test were used for data analysis.

Results: The mean post-test labour pain perception score was significantly lower in the experimental group (4.96 ± 1.30) than in the control group (7.96 ± 1.01) ($t = 9.6, p = 0.001$). The mean progress of labour score was significantly higher in the experimental group (4.36 ± 0.75) compared to the control group (3.60 ± 0.48) ($t = 6.1, p = 0.001$). Pearson's correlation analysis showed a small negative but statistically non-significant relationship between labour pain perception and progress of labour in both groups. A significant association was observed between age and labour pain perception, and between place of residence and progress of labour in the experimental group ($p < 0.05$).

Conclusion: The study concluded that lavender oil back massage was highly effective in reducing labour pain perception and improving the progress of labour among pregnant mothers during the first stage of labour. The intervention was found to be safe, economical, non-invasive, and beneficial in promoting maternal comfort and positive labour outcomes. Therefore, lavender oil back massage can be recommended as an effective non-pharmacological nursing intervention for the management of labour pain and enhancement of labour progress among pregnant mothers.

Keywords: Lavender oil back massage, labour pain perception, progress of labour, pregnant mothers, labour pain management, non-pharmacological intervention.

INTRODUCTION

Labour is a physiological process through which the fetus, placenta, and membranes are expelled from the uterus. Although labour is a natural event, it is associated with severe pain and discomfort for many women. Labour pain is influenced by physical, emotional, psychological, and cultural factors. Excessive labour pain may increase maternal anxiety, stress, fatigue, and fear, which can negatively affect the progress of labour and maternal wellbeing.

Pain management during labour is an essential component of maternity care. Various pharmacological and non-pharmacological methods are used to relieve labour pain. Pharmacological methods may provide effective pain relief but can produce side effects for both mother and fetus. Therefore, non-pharmacological interventions are increasingly preferred because they are safe, cost-effective, non-invasive, and easy to administer.

Back massage is one of the commonly used non-pharmacological methods for reducing labour pain. Lavender oil is widely known for its relaxing, analgesic, and calming effects. Lavender oil back massage stimulates relaxation, improves blood circulation, reduces muscle tension, and promotes comfort during labour. It may also help in improving the progress of labour by reducing stress and promoting uterine efficiency.

Nurses play a significant role in providing supportive care to mothers during labour. The use of lavender oil back massage can be an effective nursing intervention to improve maternal comfort and labour outcomes. Hence, the investigator felt the need to evaluate the effectiveness of lavender oil back massage on labour pain perception and progress of labour among pregnant mothers.

THE OBJECTIVES OF THE STUDY WERE

1. To assess the post-test pain perception and progress of labour among pregnant mothers in experimental and control group.
2. To evaluate the effectiveness of Lavender oil Back massage on pain perception and progress of labour among pregnant mothers in experimental and control group.
3. To find out the relationship between pain perception and progress of labour among pregnant mothers.
4. To find the association between pain perception and labour progress among pregnant mothers with their selected demographic variables.

RESEARCH METHODOLOGY

True experimental post-test only control group design was adopted. The researcher selected 60 pregnant mothers by using non-probability convenience sampling technique by adopting random assignment between the group who met the eligibility criteria in this study, inclusion criteria Mothers in the first stage of labour, Willing to participate, Singleton pregnancy with cephalic presentation. Exclusion criteria include High-risk pregnancies, Mothers receiving pharmacological analgesia (e.g., epidural), Complicated labour. (e.g., obstructed labour, fetal distress, severe pre-eclampsia/eclampsia, Abruptio placenta, cord prolapse, or prolonged labour.), Women with impaired skin integrity on back, Known allergy to lavender oil. written consent was taken from samples by describing the purpose of study and convincing confidentiality of the information provided. Study was conducted at District Women Hospital, Meerut after obtaining written permission from the SIC of District Women Hospital, Meerut. The data was collected with structured demographic questionnaire, Numeric Pain Rating Scale (NPRS), and simplified partograph. Lavender oil back massage was administered to the experimental group during the first stage of labour, whereas the control group received routine care only. Progress of labour was monitored continuously by simplified partograph and post-test assessment of labour pain perception was conducted after completion of the first stage of labour. Descriptive and inferential statistics were used for data analysis.

RESULTS

The findings of the study are presented according to the objectives of the study. The data is prepared under the subsequent sections: -

Table 1. Frequency and percentage distribution of pregnant mothers with their selected demographic variables
N=60

Demographic data	Background Information	Experimental		Control	
		Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
Age	18–23 years	6	20	4	13.3
	24–29 years	24	80	26	86.7

	30–35 years	0	0	0	0
	36 years and above	0	0	0	0
Religion	Hindu	15	50	22	73.3
	Muslim	15	50	8	26.7
	Christian	0	0	0	0
	Sikh	0	0	0	0
Education Status	No formal education	3	10.0	0	0
	Primary Education	7	23.3	10	33.3
	Secondary Education	12	40.0	14	46.7
	Graduate & above	8	26.7	6	20
Occupation	House maker	25	83.3	22	73.4
	Labourer	2	6.7	0	0
	Service/Job	3	10	8	26.6
	Other	0	0	0	0
Monthly Family Income	Less than ₹10,000/-	0	0	0	0
	₹10,000–₹25,000/-	14	46.7	11	36.7
	₹25,001–₹50,000/-	12	40	14	46.7
	More than ₹50,000	4	13.3	5	16.6
Type of Family	Nuclear	10	33.3	9	30
	Joint	20	66.7	21	70
	Extended	0	0	0	0
	Single parent	0	0	0	0
Place of Residence	Rural	16	53.3	11	36.7
	Urban	14	46.7	19	63.3
	Slum	0	0	0	0
	Other	0	0	0	0
Diet Pattern	Vegetarian	11	36.7	13	43.3
	Non-vegetarian	19	63.3	17	56.7

Table 2. Frequency and percentage distribution regarding the score of Labour pain perception among pregnant mothers in experimental and control group. N=60

Sr no.	Pain perception	Experimental Group		Control Group	
		Post - test		Post – test	
		f	%	f	%
1	None	0	0	0	0
2	Mild	4	13.3	0	0
3	Moderate	21	70	5	16.7
4	Severe	5	16.7	25	83.3
TOTAL		30	100	30	100

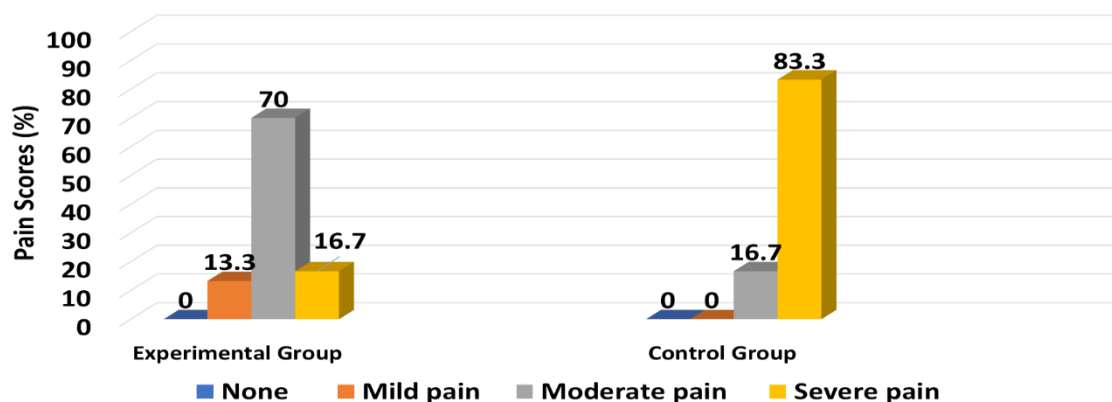


Figure 2 :Percentage Distribution of pregnant mothers according to Post - test Pain Scores in Experimental Group and Control Group.

Table 3. Frequency and percentage distribution regarding the progress of labour among pregnant mothers in experimental and control group. N=60

Sr no.	Progress of labour	Experimental Group		Control Group	
		Post - test		Post – test	
		f	%	f	%
1	INADEQUATE	0	0	0	0
2	MODERATE	4	13.3	11	36.7
3	ADEQUATE	26	86.7	19	63.3
TOTAL		30	100	30	100

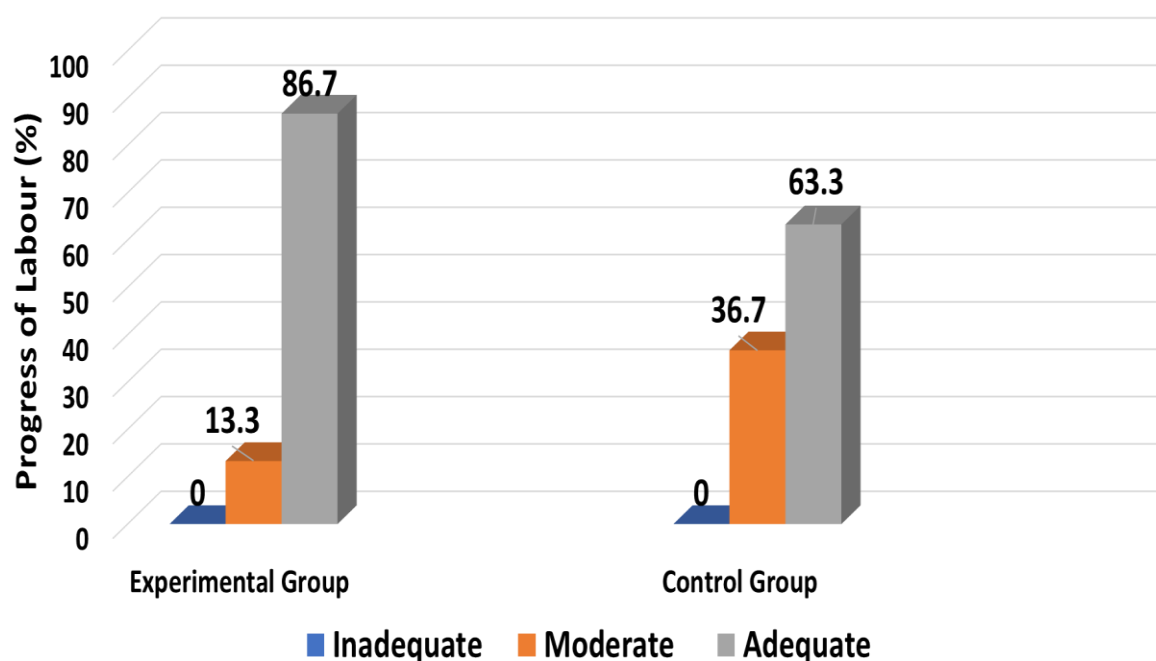


Figure 3: Percentage distribution of pregnant mothers according to Post - test Progress of Labour in Experimental Group and Control Group.

Table 4. Comparison between post-test across of pain perception between experimental and control group.
N=60

GROUP	LEVEL OF PAIN PERCEPTION					
	Mean $\pm$ SD	Mean Difference	't' value	df	p- value	Inference
Experimental	4.96 $\pm$ 1.30	3.00	9.6	58	0.001	Significant
Control	7.96 $\pm$ 1.01					

Unpaired t test , $p < 0.05$ S*

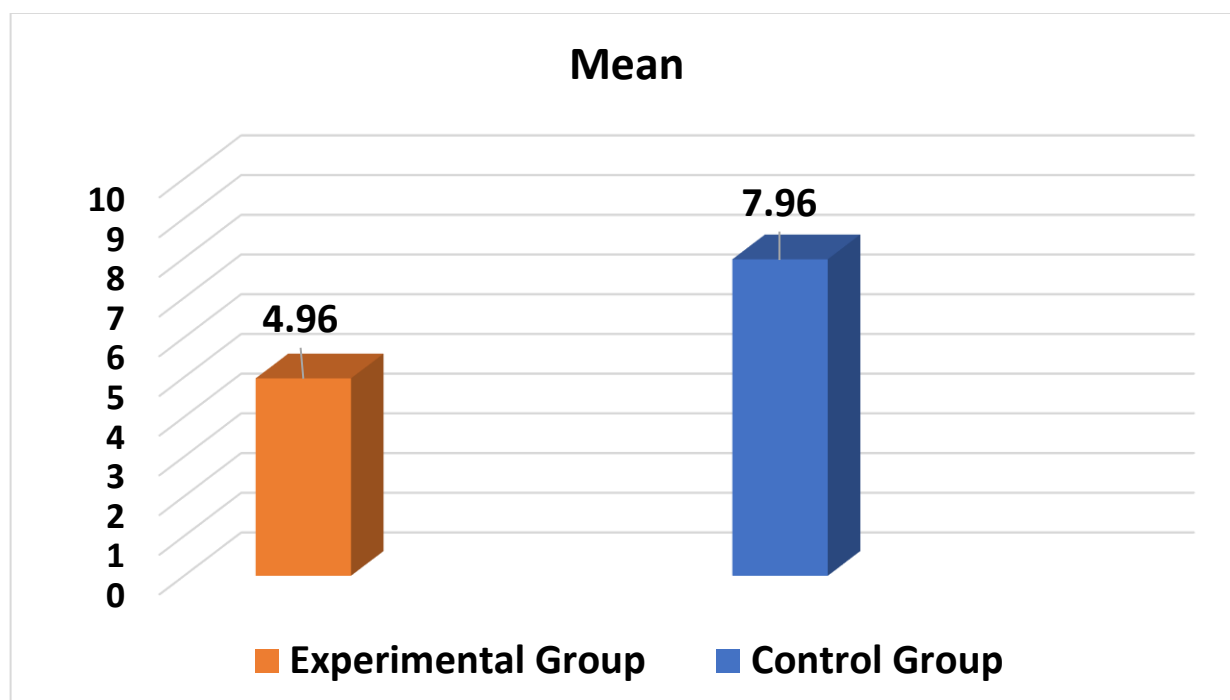


Figure -4 Comparison of mean between post-test across of pain perception between experimental and control group.

Table 5. Comparison between post-test across of labour progress between experimental and control group.
N=60

GROUP	PROGRESS OF LABOUR					
	Mean $\pm$ SD	Mean Difference	't' value	df	p- value	Inference
Experimental	4.36 $\pm$ 0.75	0.97	6.1	58	0.001	Significant

Control	3.6 ± 0.48					
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Unpaired t test , p < 0.05 S*

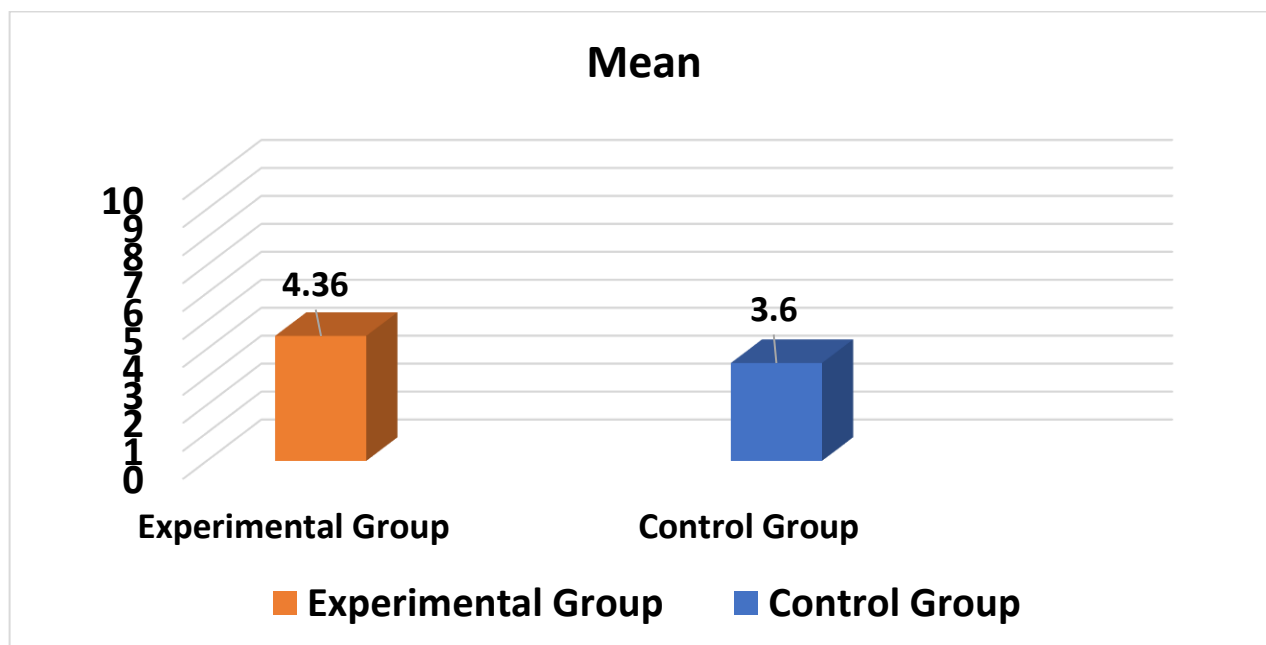


Figure- 5 Comparison of mean between post-test across of labour progress between experimental and control group.

Table 6. Correlation between pain perception and progress of labour in experimental group. N=60

S. No.	Variables	Mean ± SD	Mean Difference	'r' value	P value	Inference
1.	Pain perception	4.96 ± 1.30	0.60	-0.1576	0.4057	Not significant
2.	Progress of labour	4.36 ± 0.75				

The results of the Pearson correlation indicated that there was a small negative and statistically non-significant relationship between X and Y (r = -0.158, p = 0.406)

Table 7. Correlation between pain perception and progress of labour in control group. N=60

S. No.	Variables	Mean ± SD	Mean Difference	'r' value	P value	Inference
1	Pain perception	7.96 ± 1.01	4.36	-0.1607	0.3962	Not significant
2	Progress of labour	3.6 ± 0.48				

The results of the Pearson correlation indicated that there was a small negative and statistically non-significant relationship between X and Y ($r = -0.161$, $p = 0.396$).

Table 8. Description of Association between pain perception among pregnant mothers in experimental group with their selected demographic variables. n=30

S. No.	Demographic variable	Category	Pain assessment score in Experimental group			df	χ^2 value	P value	Inference
			Mild pain	Moderate pain	Severe pain				
1.	Age	18–23 years	2	1	3	2	10.297	0.005	S*
		24–29 years	2	20	2				
2.	Religion	Hindu	3	10	2	2	1.247	0.535	NS
		Muslim	1	11	3				
3.	Education Status	No formal education	1	1	1	6	4.942	0.551	NS
		Primary Education	1	6	0				
		Secondary Education	2	8	2				
		Graduate & above	0	6	2				
4.	Occupation	House maker	4	16	5	4	2.571	0.631	NS
		Labourer	0	2	0				
		Service/Job	0	3	0				
5.	Monthly Family Income	₹10,000–₹25,000/-	2	9	3	4	1.622	0.804	NS
		₹25,001–₹50,000/-	2	9	1				
		More than ₹50,000	0	3	1				
6.	Type of Family	Nuclear	2	6	2	2	0.814	0.665	NS
		Joint	2	15	3				

7.	Place of Residence	Rural	2	11	3	2	0.114	0.944	NS
		Urban	2	10	2				
8.	Diet Pattern	Vegetarian	2	8	1	2	0.922	0.630	NS
		Non-vegetarian	2	13	4				

(p<0.05 significant level) S: Significant, NS Non -Significant

Table 9. Description of Association between pain perception among pregnant mothers in Control group with their selected demographic variables. n=30

S. No.	Demographic variable	Category	Pain assessment in Experimental group		df	χ^2 value	P value	Inference
			Moderate pain	Severe pain				
1.	Age	18–23 years	1	3	1	0.230	0.630	NS
		24–29 years	4	22				
2.	Religion	Hindu	4	18	1	0.136	0.711	NS
		Muslim	1	7				
3.	Education Status	Primary Education	1	9	2	0.548	0.760	NS
		Secondary Education	3	11				
		Graduate & above	1	5				
4.	Occupation	House maker	4	18	1	0.136	0.711	NS
		Service/Job	1	7				
5.	Monthly Family Income	₹10,000–₹25,000/-	3	8	2	1.948	0.377	NS
		₹25,001–₹50,000/-	2	12				

		More than ₹50,000	0	5				
6.	Type of Family	Nuclear	1	8	1	0.285	0.592	NS
		Joint	4	17				
7.	Place of Residence	Rural	2	9	1	0.028	0.865	
		Urban	3	16				
8.	Diet Pattern	Vegetarian	3	10	1	0.678	0.410	NS
		Non-vegetarian	2	15				

(p<0.05 significant level) S: Significant, NS Non -Significant

Table 10. Description of Association between progress of labour in among pregnant mothers in Experimental group with their selected demographic variables. n=30

S. No.	Demographic variable	Category	Progress of Labour Experimental Group		df	χ^2 value	P Value	Inference
			Moderate	Adequate				
1.	Age	18–23 years	0	6	1	1.153	0.282	NS
		24–29 years	4	20				
2.	Religion	Hindu	1	14	1	1.153	0.282	NS
		Muslim	3	12				
3.	Education Status	No formal education	0	3	3	0.673	0.879	NS
		Primary Education	1	8				
		Secondary Education	2	10				
		Graduate & above	1	5				
4.	Occupation	House maker	4	21	2	0.923	0.630	NS
		Labourer	0	2				
		Service/Job	0	3				

5.	Monthly Family Income	₹10,000–₹25,000/-	3	11	2	1.669	0.434	NS
		₹25,001–₹50,000/-	1	11				
		More than ₹50,000	0	4				
6.	Type of Family	Nuclear	0	10	1	2.307	0.128	NS
		Joint	4	16				
7.	Place of Residence	Rural	4	12	1	4.038	0.044	S*
		Urban	0	14				
8.	Diet Pattern	Vegetarian	1	10	1	0.270	0.602	NS
		Non-vegetarian	3	16				

(p<0.05 significant level) S: Significant, NS Non -Significant

Table 11. Description of Association between progress of labour in among pregnant mothers in Control group with their selected demographic variables.n=30

S. No.	Demographic variable	Category	Progress of Labour Control Group		df	χ^2 value	P Value	Inference
			Moderate	Adequate				
1.	Age	18–23 years	2	2	1	0.353	0.552	NS
		24–29 years	9	17				
2.	Religion	Hindu	8	14	1	0.003	0.954	NS
		Muslim	3	5				
3.	Education Status	Primary Education	5	5	2	2.624	0.269	NS
		Secondary Education	3	11				

		Graduate & above	3	3				
4.	Occupation	House maker	8	14	1	0.003	0.954	NS
		Service/Job	3	5				
5.	Monthly Family Income	₹10,000–₹25,000/-	4	7	2	0.029	0.985	NS
		₹25,001–₹50,000/-	5	9				
		More than ₹50,000	2	3				
6.	Type of Family	Nuclear	3	6	1	0.061	0.804	NS
		Joint	8	13				
7.	Place of Residence	Rural	3	8	1	0.660	0.416	NS
		Urban	8	11				
8.	Diet Pattern	Vegetarian	5	8	1	0.031	0.858	NS
		Non-vegetarian	6	11				

($p < 0.05$ significant level) S: Significant, NS Non -Significant

The findings of the study are presented according to the objectives of the study. A total of 60 pregnant mothers participated in the study, with 30 mothers each in the experimental and control groups.

The demographic characteristics revealed that the majority of pregnant mothers in both the experimental group (80%) and control group (86.7%) belonged to the age group of 24–29 years. Regarding religion, 50% of mothers in the experimental group and 73.3% in the control group were Hindu. Most mothers had secondary education (40% in the experimental group and 46.7% in the control group). The majority were housewives (83.3% and 73.3%, respectively) and belonged to joint families. Most mothers in the experimental group were from rural areas (53.3%), whereas the majority in the control group belonged to urban areas (63.3%). A higher proportion of mothers in both groups followed a non-vegetarian diet pattern. With regard to labour pain perception, 13.3% of mothers in the experimental group experienced mild pain, 70% experienced moderate pain, and 16.7% experienced severe pain. In contrast, 83.3% of mothers in the control group experienced severe pain, while only 16.7% reported moderate pain. None of the mothers in either group reported absence of pain.

Regarding the progress of labour, 86.7% of mothers in the experimental group demonstrated adequate progress of labour, whereas only 63.3% of mothers in the control group had adequate labour progress. Moderate progress of labour was observed in 13.3% of mothers in the experimental group compared to 36.7% in the control group.

Comparison of post-test pain perception scores between the two groups using the unpaired t -test showed a statistically significant difference. The mean post-test pain perception score in the experimental group was 4.96 ± 1.30 , whereas it was 7.96 ± 1.01 in the control group. The calculated t -value was 9.6 ($df = 58$, $p = 0.001$), indicating that lavender oil back massage was effective in reducing labour pain perception among pregnant mothers.

Similarly, comparison of post-test progress of labour scores revealed a statistically significant difference between the two groups. The mean progress of labour score was 4.36 ± 0.75 in the experimental group and 3.60 ± 0.48 in the control group. The calculated t -value was 6.1 ($df = 58$, $p = 0.001$), demonstrating that lavender oil back massage significantly improved the progress of labour.

Pearson's correlation analysis was performed to determine the relationship between labour pain perception and progress of labour. The findings showed a small negative and statistically non-significant correlation in the experimental group ($r = -0.158, p = 0.406$) as well as in the control group ($r = -0.161, p = 0.396$), suggesting that although lower pain perception tended to be associated with better labour progress, the relationship was not statistically significant.

The Chi-square test was used to determine the association between labour pain perception, progress of labour, and selected demographic variables. In the experimental group, a statistically significant association was observed between age and labour pain perception ($\chi^2 = 10.297, p = 0.005$) and between place of residence and progress of labour ($\chi^2 = 4.038, p = 0.044$). No other demographic variables showed statistically significant associations in either the experimental or control groups.

Overall, the findings indicate that lavender oil back massage was effective in reducing labour pain perception and enhancing the progress of labour among pregnant mothers during the first stage of labour.

DISCUSSION

The present study was undertaken to evaluate the effectiveness of lavender oil back massage on labour pain perception and progress of labour among pregnant mothers admitted to a selected hospital at Meerut, Uttar Pradesh. The findings demonstrated that mothers who received lavender oil back massage experienced significantly lower labour pain and better progress of labour compared to those who received routine care alone.

The study revealed that the majority of mothers in the experimental group (70%) experienced moderate pain and only 16.7% experienced severe pain after the intervention. In contrast, 83.3% of mothers in the control group experienced severe labour pain. The mean post-test pain perception score was significantly lower in the experimental group (4.96 ± 1.30) than in the control group (7.96 ± 1.01), with a statistically significant difference ($t = 9.6, p = 0.001$). These findings indicate that lavender oil back massage is an effective non-pharmacological intervention for reducing labour pain perception.

The findings are consistent with the study conducted by Yazdkhasti and Pirak (2016), who reported that aromatherapy with lavender essence significantly reduced the severity of labour pain among primiparous women. Similarly, Kazeminia et al. (2020), in their systematic review and meta-analysis, concluded that lavender aromatherapy effectively decreases labour pain intensity and improves maternal comfort during childbirth.

The present study also demonstrated a significant improvement in the progress of labour among mothers who received lavender oil back massage. Adequate labour progress was observed in 86.7% of mothers in the experimental group compared to 63.3% in the control group. The mean progress of labour score was significantly higher in the experimental group (4.36 ± 0.75) than in the control group (3.60 ± 0.48), with a calculated t -value of 6.1 ($p = 0.001$). These findings suggest that the relaxing and anxiolytic effects of lavender oil, combined with the benefits of back massage, may help reduce maternal stress and muscular tension, thereby facilitating better labour progression.

These results are supported by the findings of Kaya et al. (2023) and Breuninger et al. (2026), who concluded that aromatherapy and massage interventions are associated with reduced labour pain, enhanced maternal relaxation, and improved childbirth outcomes.

Pearson's correlation analysis in the present study revealed a small negative but statistically non-significant relationship between labour pain perception and progress of labour in both the experimental ($r = -0.158, p = 0.406$) and control groups ($r = -0.161, p = 0.396$). This finding indicates that although mothers with lower pain scores tended to have better labour progress, the association was not strong enough to achieve statistical significance.

Regarding the association between demographic variables and study outcomes, the present study found a statistically significant association between age and labour pain perception in the experimental group ($\chi^2 = 10.297, p = 0.005$). In addition, place of residence showed a significant association with the progress of labour in the experimental group ($\chi^2 = 4.038, p = 0.044$). However, no significant associations were observed for the remaining demographic variables. These findings suggest that while certain maternal characteristics may influence labour experiences, the beneficial effects of lavender oil back massage are broadly applicable across different population groups.

Overall, the findings of the present study support the growing body of evidence that lavender oil back massage is a safe, economical, non-invasive, and effective complementary nursing intervention for reducing labour pain perception and promoting favourable labour outcomes. The incorporation of this intervention into routine maternity nursing practice may contribute to improving maternal comfort and enhancing the quality of intrapartum care.

IMPLICATIONS

Nursing Education

The findings support the inclusion of aromatherapy and lavender oil back massage techniques in maternity nursing education. Student nurses should receive theoretical knowledge and practical training on non-pharmacological labour pain management through workshops and continuing nursing education programmes.

Nursing Practice

Lavender oil back massage can be incorporated as a safe, simple, economical, and non-invasive nursing intervention to reduce labour pain, promote maternal comfort and relaxation, and improve the progress of labour. It may also be integrated into routine labour room care and antenatal education programmes.

Nursing Management

Nurse administrators should encourage the use of evidence-based non-pharmacological interventions in labour rooms. Standard protocols, staff training programmes, and adequate resources should be provided to facilitate the effective implementation of lavender oil back massage in clinical practice.

Nursing Research

The study provides a basis for further research on aromatherapy in labour pain management. Future studies with larger samples, different settings, and comparisons with other non-pharmacological interventions are recommended to strengthen the evidence and evaluate maternal and neonatal outcomes.

RECOMMENDATIONS

1. Conduct studies with larger samples.
2. Compare lavender massage with other pain relief methods.
3. Replicate the study in different settings.
4. Include both primigravida and multigravida mothers.
5. Assess maternal and neonatal outcomes.
6. Train nurses in aromatherapy and labour pain management.
7. Incorporate lavender massage into routine labour care.

LIMITATIONS

1. Small sample size ($n = 60$).
2. Conducted in a single hospital.
3. Limited to the first stage of labour.
4. No comparison with other interventions.
5. Long-term outcomes were not assessed.
6. Short duration of follow-up.

CONCLUSION:

The study demonstrated that lavender oil back massage significantly reduced labour pain perception and improved the progress of labour among pregnant mothers during the first stage of labour. Although a negative relationship was observed between labour pain perception and labour progress, it was not statistically significant. Thus, lavender oil back massage can be recommended as a safe, simple, economical, and effective non-pharmacological nursing intervention in labour room care.

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