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Effect of Olive Oil Back Massage on Selected Fetomaternal Parameters and Maternal Satisfaction Among Primigravid Women During the First Stage of Labour: A Quasi-Experimental Study

Mekala Moorthy
Department of Obstetrics and Gynaecological Nursing, KMCH College of Nursing, Coimbatore, Tamil Nadu, India
**Corresponding author: buddlymeghu87@gmail.com*

ABSTRACT

Background: Labour is a physiological process characterised by progressive cervical dilatation, regular uterine contractions, and fetal descent. Although childbirth is a natural process, many women experience pain, anxiety, and physical discomfort during the first stage of labour. Massage is widely used as a non-pharmacological intervention to promote comfort during labour. However, limited evidence is available regarding the effect of olive oil back massage on fetomaternal physiological parameters and maternal satisfaction.

Purpose: To evaluate the effect of olive oil back massage on selected fetomaternal parameters and maternal satisfaction among primigravid women during the first stage of labour.

Methods: A quantitative study with a quasi-experimental pretest-posttest control group design was conducted among 60 primigravid women admitted to the labour room of Kasturba Memorial Hospital, Dindigul, Tamil Nadu, India. Participants were selected using purposive sampling and allocated to an experimental group (n = 30) and a control group (n = 30). Women in the experimental group received olive oil back massage during the active first stage of labour in addition to routine intrapartum care, while those in the control group received routine care alone.

Results: Women who received olive oil back massage had significantly longer uterine contraction duration than those who received routine care (63.00 ± 8.70 vs. 57.50 ± 7.82 seconds; $p < 0.05$). A significant difference was also observed in uterine contraction frequency between the groups. No significant differences were found in fetal heart rate, systolic blood pressure, or diastolic blood pressure. Among women in the experimental group, 66.7% reported adequate satisfaction and 33.3% reported moderate satisfaction.

Conclusion: Olive oil back massage was associated with favourable uterine contraction characteristics without adverse effects on maternal or fetal physiological parameters. The intervention was well accepted by the participants and may be considered a simple, low-cost complementary nursing intervention during the first stage of labour.

Keywords: Complementary Therapy, Labour, Maternal Satisfaction, Olive Oil Massage, Primigravid Women, Uterine Contractions

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BACKGROUND

Childbirth is a normal physiological process involving coordinated uterine contractions, cervical dilatation, cervical effacement, and fetal descent, resulting in the birth of a baby. Although labour is a natural event, it is often accompanied by pain, anxiety, fear, and physical discomfort, particularly during the first stage of labour. Women's childbirth experiences are influenced not only by physiological changes but also by the quality of intrapartum care, emotional support, and comfort measures provided during labour. A positive childbirth experience has been associated with greater maternal satisfaction, improved psychological well-being, and favourable maternal and neonatal outcomes (World Health Organization [WHO], 2018).

Improving the quality of intrapartum care remains a priority in maternity services worldwide. The World Health Organization recommends respectful, woman-centred care that supports the normal progress of labour while avoiding unnecessary interventions. Within this approach, non-pharmacological interventions are increasingly used because they can improve maternal comfort, reduce anxiety, and promote positive childbirth experiences without compromising maternal or neonatal safety (WHO, 2018; Vallely et al., 2023).

Labour pain remains one of the most challenging aspects of childbirth. Although pharmacological methods provide effective pain relief, they may not always be available, appropriate, or acceptable to every woman because of contraindications, limited resources, or personal preference. Consequently, interest in complementary and non-pharmacological approaches has increased. Systematic reviews have reported that interventions such as massage therapy, hydrotherapy, acupressure, breathing exercises, and relaxation techniques can reduce labour pain and anxiety while improving women's childbirth experiences (Smith et al., 2018b; Nori et al., 2023).

Massage therapy is one of the most commonly used complementary interventions during labour. It promotes relaxation, reduces muscle tension, and may reduce pain perception through stimulation of sensory receptors and the release of endogenous endorphins (Choudhary et al., 2021). Randomised controlled trials have shown that massage therapy can reduce labour pain, improve maternal coping, shorten labour duration, and increase childbirth satisfaction (Kaçar et al., 2021; Sade et al., 2025). Massage applied to the lumbosacral region is particularly beneficial during the active first stage of labour, when pain commonly radiates to the lower back. Gentle rhythmic massage may reduce anxiety, promote relaxation, and improve women's ability to cope with labour pain (Patyal et al., 2024). Because it is simple, inexpensive, and non-invasive, back massage can be incorporated into routine nursing care without requiring specialised equipment or advanced technical skills.

Olive oil is commonly used as a lubricant during massage because it reduces skin friction and facilitates smooth hand movements (Bayraktar & Başer, 2021). While massage therapy during labour has been investigated in several studies, most have focused on pain relief, labour duration, or childbirth experience. Comparatively few studies have examined the use of olive oil as the massage medium or evaluated its effect on objective fetomaternal physiological parameters, including uterine contraction characteristics, fetal heart rate, maternal blood pressure, and maternal satisfaction.

Given the growing emphasis on evidence-based and woman-centred maternity care, there is limited evidence on whether olive oil back massage influences both fetomaternal physiological parameters and maternal satisfaction during labour. Addressing this gap may help determine whether this simple intervention can be incorporated into routine intrapartum nursing care to improve maternal comfort while maintaining maternal and fetal well-being.

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OBJECTIVE

To evaluate the effect of olive oil back massage on selected fetomaternal parameters and maternal satisfaction among primigravid women during the first stage of labour.

METHODS

Study Design and Setting

A quantitative research approach with a quasi-experimental pretest-posttest control group design was adopted. The study was conducted over a period of five weeks in the labour room of Kasturba Memorial Hospital, Dindigul, Tamil Nadu, India. The study was undertaken to evaluate the effect of olive oil back massage on selected fetomaternal parameters and maternal satisfaction among primigravid women during the first stage of labour.

Participants

The study population consisted of primigravid women admitted to the labour room during the active first stage of labour. A total of 60 women who fulfilled the eligibility criteria were selected using a non-probability purposive sampling technique. Thirty women were assigned to the experimental group and thirty to the control group.

To minimise contamination between the two groups, participants were recruited on alternate days. On the days allocated to the experimental group, one or two eligible women were recruited and received olive oil back massage in addition to routine intrapartum care. Women admitted on the alternate days were recruited into the control group and received routine intrapartum care alone. Random allocation was not feasible because the intervention was carried out in a routine clinical setting.

Women were included if they were primigravida with a singleton pregnancy, cephalic presentation, cervical dilatation of at least 3 cm during the active first stage of labour, willing to participate in the study, and able to understand Tamil or English.

Women with high-risk pregnancies, multiple pregnancies, malpresentation, obstetric complications requiring immediate medical intervention, contraindications to massage therapy, or those unwilling to participate were excluded.

Research Instruments

Data were collected using a structured tool consisting of three sections.

Section I: Demographic variables, including age, educational status, place of residence, type of family, monthly family income, and religion.

Section II: Assessment of selected fetomaternal parameters, including fetal heart rate, uterine contraction duration, uterine contraction frequency, systolic blood pressure, and diastolic blood pressure. Fetal heart rate was assessed by routine fetal monitoring. Uterine contraction duration and frequency were assessed through clinical observation and the partograph. Maternal blood pressure was measured using a standard sphygmomanometer. All measurements were recorded before the intervention and repeated after completion of the intervention.

Section III: Maternal satisfaction was assessed only among women in the experimental group after completion of the intervention using a structured rating scale developed for the study. The rating scale consisted of **10 statements** scored on a **five-point Likert scale**. Positively worded statements were scored from **0 (strongly disagree)** to **4 (strongly agree)**, while negatively worded statements were reverse scored. The total score ranged from **0 to 40**. Based on the total score, maternal satisfaction was classified as **dissatisfied (0–13)**, **moderately satisfied (14–26)**, and **adequately satisfied (27–40)**.

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Validity and Reliability of the Tool

The content validity of the research tool was established by a panel comprising **four experts in obstetric and gynaecological nursing and one obstetrician**. The experts reviewed the tool for relevance, clarity, and appropriateness of the items before data collection.

The reliability of the maternal satisfaction rating scale was established before the main study using the **inter-rater method**. The equivalence of the scale was assessed using the **Karl Pearson correlation coefficient**, and the reliability coefficient was **r = 0.90**, indicating good reliability.

Intervention

Women in the experimental group received olive oil back massage in addition to routine intrapartum care. Approximately **10 mL of pure olive oil** was applied over the lumbosacral region, and gentle circular massage was administered for **10 minutes** at **one-hour intervals** for **three consecutive sessions** during the active first stage of labour.

Women in the control group received routine intrapartum care according to the hospital protocol and did not receive the massage intervention.

Data Collection Procedure

Administrative permission to conduct the study was obtained from Kasturba Memorial Hospital, Dindigul. Ethical approval was obtained from the Institutional Research Committee before the commencement of the study. Eligible participants were informed about the purpose of the study, and written informed consent was obtained before enrolment.

Baseline demographic information and pretest assessment of fetal heart rate, uterine contraction duration, uterine contraction frequency, systolic blood pressure, and diastolic blood pressure were recorded for both groups.

Women in the experimental group then received olive oil back massage according to the study protocol, while women in the control group received routine intrapartum care. After completion of the intervention, fetomaternal parameters were reassessed using clinical observation and labour room records. Maternal satisfaction was assessed only among women in the experimental group after completion of the intervention using the structured rating scale.

Data Analysis

The collected data were coded and entered into the Statistical Package for the Social Sciences (SPSS) for analysis.

Descriptive statistics, including frequency, percentage, mean, and standard deviation, were used to summarise demographic characteristics and study variables.

Paired *t*-tests were used to compare pretest and post-test values within each group. Independent *t*-tests were used to compare post-test values between the experimental and control groups. A *p*-value of less than 0.05 was considered statistically significant.

Ethical Considerations

Ethical approval was obtained from the Institutional Research Committee before the commencement of the study. Administrative permission was obtained from Kasturba Memorial Hospital, Dindigul.

Written informed consent was obtained from all participants before enrolment. Participation was voluntary, and participants were informed that they could withdraw from the study at any stage without affecting the care they received. Confidentiality and anonymity were maintained throughout the study, and the information collected was used only for research purposes.

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RESULTS

Participant Characteristics

A total of 60 primigravid women participated in the study, with 30 women allocated to the experimental group and 30 to the control group. The demographic characteristics of the two groups were comparable. Most participants in both groups were aged 18–25 years, resided in rural areas, belonged to nuclear families, and were Hindu. The distribution of age, educational status, place of residence, family type, monthly family income, and religion was similar in both groups (Table 1).

Table 1. Demographic Characteristics of the Participants

Variable	Experimental Group n (%)	Control Group n (%)
Age (years)		
18–25	24 (80.0)	21 (70.0)
26–30	6 (20.0)	9 (30.0)
Education		
Illiterate	7 (23.3)	5 (16.7)
Primary	5 (16.7)	13 (43.3)
Higher Secondary	12 (40.0)	9 (30.0)
Graduate	6 (20.0)	3 (10.0)
Residence		
Urban	13 (43.3)	10 (33.3)
Rural	17 (56.7)	20 (66.7)
Type of Family		
Nuclear	17 (56.7)	16 (53.3)
Joint	13 (43.3)	14 (46.7)
Monthly Family Income (₹)		
<3000	2 (6.7)	6 (20.0)
3000–5000	12 (40.0)	14 (46.7)
>5000	16 (53.3)	10 (33.3)
Religion		
Hindu	21 (70.0)	26 (86.7)
Muslim	2 (6.7)	1 (3.3)
Christian	7 (23.3)	3 (10.0)

Fetomaternal Parameters in the Experimental Group

Before the intervention, all participants had fetal heart rate, uterine contraction duration, uterine contraction frequency, systolic blood pressure, and diastolic blood pressure within the normal range. Following the intervention, fetal heart rate, uterine contraction frequency, systolic blood pressure, and diastolic blood pressure remained within the normal range in all participants. Uterine contraction duration remained within the normal range in 23 women (76.7%), while seven women (23.3%) had values above the normal range (Table 2).

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Table 2. Distribution of Pretest and Post-test Fetomaternal Parameters in the Experimental Group (n = 30)

Fetomaternal Parameters	Pretest Normal n (%)	Pretest Below Normal	Pretest Above Normal	Post-test Normal n (%)	Post-test Below Normal	Post-test Above Normal
Fetal heart rate	30 (100.0)	0	0	30 (100.0)	0	0
Uterine contraction duration	30 (100.0)	0	0	23 (76.7)	0	7 (23.3)
Uterine contraction frequency	30 (100.0)	0	0	30 (100.0)	0	0
Systolic blood pressure	30 (100.0)	0	0	30 (100.0)	0	0
Diastolic blood pressure	30 (100.0)	0	0	30 (100.0)	0	0

The mean uterine contraction duration increased from **54.03 ± 5.54 seconds** before the intervention to **63.00 ± 8.70 seconds** after the intervention, and the difference was statistically significant ($t = 5.15$, $p < 0.05$). A statistically significant difference was also observed in uterine contraction frequency ($t = 8.91$, $p < 0.05$). No statistically significant differences were found in fetal heart rate, systolic blood pressure, or diastolic blood pressure (Table 3).

Table 3. Comparison of Pretest and Post-test Fetomaternal Parameters in the Experimental Group (n = 30)

Parameter	Pretest Mean ± SD	Post-test Mean ± SD	Mean Difference	Paired *t* value
Fetal heart rate (beats/min)	136.00 ± 3.61	135.70 ± 3.57	0.30	1.60
Uterine contraction duration (sec)	54.03 ± 5.54	63.00 ± 8.70	8.97	**5.15***
Uterine contraction frequency	3.82 ± 0.63	2.72 ± 0.50	1.10	**8.91***
Systolic blood pressure (mmHg)	116.00 ± 7.11	116.14 ± 6.77	0.14	1.12
Diastolic blood pressure (mmHg)	76.30 ± 6.95	76.07 ± 6.04	0.23	0.42

df = 29; ***p* < 0.05**

Fetomaternal Parameters in the Control Group

Before and after routine intrapartum care, all participants had fetal heart rate, uterine contraction frequency, systolic blood pressure, and diastolic blood pressure within the normal

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range. Uterine contraction duration remained within the normal range in 29 women (96.7%) during both assessments, while one participant (3.3%) had values above the normal range (Table 4).

Table 4. Comparison of Pretest and Post-test Fetomaternal Parameters in the Control Group (n = 30)

Parameter	Pretest Mean ± SD	Post-test Mean ± SD	Mean Difference	Paired *t* value
Fetal heart rate (beats/min)	135.90 ± 3.57	135.53 ± 3.53	0.37	0.20
Uterine contraction duration (sec)	52.56 ± 6.26	57.50 ± 7.82	4.94	**5.80***
Uterine contraction frequency	2.43 ± 0.65	2.39 ± 0.09	0.04	**3.53***
Systolic blood pressure (mmHg)	114.60 ± 6.30	115.30 ± 6.77	0.70	1.40
Diastolic blood pressure (mmHg)	74.00 ± 5.53	75.20 ± 6.92	1.20	1.35

df = 29; ***p* < 0.05**

Uterine contraction duration showed a statistically significant increase following routine intrapartum care ($t = 5.80$, $p < 0.05$). A statistically significant difference was also observed in uterine contraction frequency ($t = 3.53$, $p < 0.05$). No statistically significant differences were found in fetal heart rate, systolic blood pressure, or diastolic blood pressure.

Comparison of Post-test Fetomaternal Parameters Between the Experimental and Control Groups

The post-test mean uterine contraction duration was higher in the experimental group than in the control group (63.00 ± 8.70 seconds versus 57.50 ± 7.82 seconds). A statistically significant difference was observed between the two groups ($p < 0.05$).

A statistically significant difference was also observed in uterine contraction frequency between the two groups. No statistically significant differences were found in fetal heart rate, systolic blood pressure, or diastolic blood pressure.

Table 5. Comparison of Post-test Fetomaternal Parameters Between the Experimental and Control Groups

Parameter	Experimental Group Mean ± SD	Control Group Mean ± SD	Mean Difference	Independent *t* value
Fetal heart rate (beats/min)	135.70 ± 3.57	135.53 ± 3.53	0.17	0.35
Uterine contraction duration (sec)	63.00 ± 8.70	57.50 ± 7.82	5.50	**7.42***

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Uterine contraction frequency	2.72 ± 0.50	2.39 ± 0.09	0.33	**4.96***
Systolic blood pressure (mmHg)	116.14 ± 6.77	115.30 ± 6.77	0.84	1.25
Diastolic blood pressure (mmHg)	76.07 ± 6.04	75.20 ± 6.92	0.87	1.33

df = 58; ***p* < 0.05**

Women who received olive oil back massage had a longer mean uterine contraction duration than those who received routine intrapartum care. A statistically significant difference was also observed in uterine contraction frequency between the two groups. Fetal heart rate, systolic blood pressure, and diastolic blood pressure remained comparable, with no statistically significant differences observed between the groups.

Maternal Satisfaction Following Olive Oil Back Massage

Maternal satisfaction was assessed only among women in the experimental group after completion of the intervention. Twenty women (66.7%) were adequately satisfied with olive oil back massage, while 10 women (33.3%) were moderately satisfied. None of the participants reported dissatisfaction with the intervention (Table 6).

Table 6. Maternal Satisfaction Among Women Who Received Olive Oil Back Massage (n = 30)

Level of Satisfaction	Frequency	Percentage (%)
Dissatisfied	0	0.0
Moderately satisfied	10	33.3
Adequately satisfied	20	66.7
Total	**30**	**100.0**

DISCUSSION

The present study evaluated the effect of olive oil back massage on selected fetomaternal parameters and maternal satisfaction among primigravid women during the first stage of labour. The findings suggest that olive oil back massage can be used as a supportive nursing intervention during labour without adversely affecting maternal or fetal physiological parameters.

Fetal heart rate remained within the normal physiological range in both the experimental and control groups throughout the study. No statistically significant differences were observed between the groups, indicating that olive oil back massage did not adversely influence fetal well-being. Continuous assessment of fetal heart rate is essential during labour, and the findings of the present study suggest that the intervention can be provided safely as part of routine intrapartum care. Similar findings have been reported in previous studies, which found that massage therapy during labour improved maternal comfort without compromising fetal status (Kaçar et al., 2021; Sade et al., 2025).

Women who received olive oil back massage had a greater increase in uterine contraction duration than those who received routine intrapartum care. Adequate uterine contraction duration is essential for effective cervical dilatation and fetal descent. Massage may promote relaxation, reduce maternal anxiety, and improve coping during labour, which could

support normal uterine activity. Similar observations have been reported in studies evaluating massage and other non-pharmacological interventions during labour (Norhapifah et al., 2024; Patyal et al., 2024).

A statistically significant difference was also observed in uterine contraction frequency. This finding should be interpreted with caution because uterine contraction patterns change naturally as labour progresses. As cervical dilatation advances, contractions generally become longer, stronger, and more frequent regardless of the intervention. Although women in the experimental group showed greater changes than those receiving routine care, the quasi-experimental design does not allow the observed differences to be attributed solely to olive oil back massage. Other clinical factors that influence labour progression may also have contributed to the findings.

Maternal systolic and diastolic blood pressure remained stable throughout the study, and no significant differences were observed between the groups. These findings indicate that olive oil back massage did not adversely affect maternal cardiovascular status during labour. Similar findings have been reported in previous studies, supporting the physiological safety of massage as a complementary intervention during childbirth (Nori et al., 2023; Sade et al., 2025).

Most women who received olive oil back massage reported moderate to high levels of satisfaction. Maternal satisfaction is an important indicator of quality intrapartum care because it reflects women's perceptions of comfort, support, and overall childbirth experience. The high level of satisfaction observed in this study may be related to the relaxing effect of massage and the continuous support provided during labour. Previous studies have also reported improved maternal satisfaction following massage therapy and other supportive labour interventions (Kaçar et al., 2021; Patyal et al., 2024).

The findings of this study should be interpreted in light of the study design. Participants were recruited using purposive sampling and allocated to study groups on alternate days rather than by randomization. Although the baseline characteristics of the two groups were generally comparable, the possibility of selection bias and residual confounding cannot be excluded. These factors should be considered when interpreting the observed differences between the groups.

Overall, the findings indicate that olive oil back massage is a simple, low-cost, and feasible nursing intervention that can be incorporated into routine intrapartum care. While the intervention was associated with favourable uterine contraction characteristics and high maternal satisfaction, larger multicentre randomized controlled trials are needed to confirm these findings and determine the extent of its clinical benefit.

STRENGTHS OF THE STUDY

1. The study focused exclusively on primigravid women, reducing variability related to previous childbirth experience.
2. Both maternal and fetal physiological parameters were assessed, allowing evaluation of the safety of the intervention.
3. Olive oil back massage is a simple, inexpensive, and non-invasive intervention that can be incorporated into routine maternity care with minimal resources.
4. Maternal satisfaction was assessed in addition to physiological outcomes, providing information on women's experiences of the intervention.
5. The study was conducted in a clinical setting, increasing the practical relevance of the findings for nursing practice.

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LIMITATIONS OF THE STUDY

1. The study was conducted in a single hospital, which may limit the generalizability of the findings.
2. The sample size was relatively small.
3. Participants were selected using purposive sampling, which may have introduced selection bias.
4. The quasi-experimental design did not include random allocation; therefore, causality cannot be established.
5. Uterine contractions were assessed using clinical observation and the partograph rather than electronic monitoring.
6. Neonatal outcomes, including Apgar score, neonatal intensive care unit admission, and breastfeeding initiation, were not evaluated.
7. Long-term maternal and neonatal outcomes were not assessed.
8. The findings are limited to primigravid women and may not be generalizable to multiparous women.

NURSING IMPLICATIONS

Nursing Practice

Olive oil back massage may be used as a supportive nursing intervention during the first stage of labour. The technique is simple, inexpensive, and requires minimal equipment. It can be incorporated into routine intrapartum care to improve maternal comfort while maintaining maternal and fetal physiological stability.

Nursing Education

Education on evidence-based complementary therapies should be included in undergraduate and postgraduate maternity nursing programmes. Nursing students should receive supervised training in safe massage techniques that can be applied during labour.

Nursing Administration

Hospitals may consider developing clinical guidelines for the use of selected non-pharmacological interventions during labour. Regular training programmes may help improve nurses' knowledge and skills in providing supportive labour care.

Nursing Research

Further multicentre studies with larger sample sizes and randomized controlled designs are recommended to confirm the effectiveness of olive oil back massage and evaluate its effects on additional maternal and neonatal outcomes.

CONCLUSION

Olive oil back massage was associated with favourable uterine contraction characteristics and high maternal satisfaction among primigravid women during the first stage of labour. Fetal heart rate and maternal blood pressure remained within normal physiological limits throughout the study, supporting the safety of the intervention in low-risk labour.

The findings suggest that olive oil back massage may be considered a simple, inexpensive, and acceptable complementary nursing intervention during the first stage of labour. However, because this study used a quasi-experimental design with purposive sampling, the findings should be interpreted with appropriate caution. Further multicentre randomized controlled trials are needed to confirm these findings before wider implementation in clinical practice.

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FUNDING

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CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest related to this study.

ETHICAL APPROVAL

Permission to conduct the study was obtained from the Institutional Research Committee of the College of Nursing and the Hospital Administration of Kasturba Memorial Hospital, Dindigul. Written informed consent was obtained from all participants before data collection. Confidentiality and anonymity were maintained throughout the study.

AUTHOR CONTRIBUTIONS

MM conceived and designed the study, collected the data, analysed and interpreted the findings, and prepared the manuscript.

DATA AVAILABILITY STATEMENT

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

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