

**Labour pain threshold and labour analgesia requirement in mothers with prenatal yoga practice- A clinical study**

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**Abstract**

**Background:** Although labour is a physiological process, it can nevertheless be terrifying. The two things that come with labour are anxiety and pain. The purpose of this study is to assess the relationship between pregnant women’s requirement for labour analgesia and the effects of Yoga.

**Objective:** To determine the effects of Yoga practice on maternal and foetal outcome in pregnant women.

**Study design and Method:** It is a prospective observational study which includes 100 women which were divided into 2 groups. 50 pregnant women received Yoga therapy and 50 pregnant women received routine

antenatal care. The outcomes in both groups that is gestational age at delivery, pain score, need for labour analgesia, maternal and neonatal complications, birth weight of neonate were compared between both groups.

**Results:** The pregnant women in the Yoga group delivered at higher gestational age, because this group had a higher pain tolerance, the Yoga group also needed less labor analgesia. The majority of the women in the Yoga group were born naturally with minimal maternal and neonatal complications.

**Conclusion:** The results of the present study concluded that Yoga can enhance the pregnancy and neonatal

outcomes. Also Yoga in pregnant women was beneficial in reducing labour pain.

**Keywords:** Yoga, Pregnant Women, Uterine Segment

### Introduction

Pain is defined as “an unpleasant sensory and emotional experience, associated with actual or potential damage” as said by the International Association for the study of Pain. Visceral pain during labour is felt through the stimulation of nociceptors during the phase of cervical dilatation and distension of the lower uterine segment<sup>1</sup>. It is connected to the experience of giving birth to a new life rather than an illness, in contrast to other acute and chronic painful situations<sup>1</sup>.

Exercise during pregnancy is one of the best strategies to minimize pregnancy related issues. These include depression, anxiety, hypertension, pelvic pain, low back pain, constipation, urine incontinence, fatigue, sleeplessness and mother’s excessive weight gain. It also improves a person’s capacity to adjust to tasks associated with caring of baby. Pregnant women can engage in a variety of physical activities including Pilates, yoga, pregnant gymnastics and Kegel exercises. Antenatal Yoga is one of the physical pursuits that expectant mothers frequently engage in<sup>2</sup>. Pregnancy Yoga has been shown to help with several areas of the Pregnancy, including Labor pain management<sup>1</sup>.

Yoga includes slow dynamic and static movements with focused breathing, a controlled stretching and it does not include any vigorous practices. To a pregnant women yoga gives the capacity to adjust the inner and outer changes with extraordinary flexibility. Hence yoga practice is safe during pregnancy.

Yogasana and pranayama help mothers to stay calm, relaxed and minimize tension, stress both in their body and mind<sup>4</sup>. Practice of asanas maintains the body supple and flexible. It strengthens the pelvic floor muscles, constipation is relieved and digestion is improved. Pregnancy symptoms such as morning sickness, pedal edema, body aches and leg cramps might be reduced by Yoga. It aids in lowering anxiety and blood pressure<sup>4</sup>.

In industrialized nations, the use of neuraxial analgesia for labour has grown widespread. The availability of anesthesiologists in labor and delivery rooms, growing emphasis on women’s health, and notable advancements in analgesic techniques have all contributed to its rise over the previous three to four decades<sup>5</sup>. The most effective technique for reducing pain during labor is still epidural analgesia<sup>6</sup>. Technology has advanced to make it even safer than before. Maternal request itself is a sufficient indication to begin epidural analgesia in the absence of medical contraindications, and if it is done correctly, it can be considered at any stage of labour without affecting the rate of instrumental or Caesarean delivery<sup>6</sup>.

Regular, painful uterine contractions that have a visceral and somatic component are related to labor pain. These contractions become more frequent and intense as the labor goes on. Visceral discomfort is caused by cervical dilatation and uterine contractions. Slow conducting afferent fibers (A-delta and C) accompanying sympathetic nerves enter the spinal cord at T10 to L1 level, where they deliver pain sensations. The pudenda nerve (S2-4) transmits somatic pain, which is produced when labor advances due to the fetal head descent and the pressure that follows on the pelvic floor, vagina and perineum<sup>7</sup>.

**Methods of pain relief during labour**

There are many beliefs and conflicts around use of safe and effective analgesics during labor, making it even more difficult to implement. The commonly used methods of labour analgesia are listed in Table 1.

Table 1: Methods of Labour Analgesia

Non-Pharmacological	Pharmacological	
	Systemic	Regional
1. Continuous emotional support	1. Inhalational methods a) Entonox	1. Neuraxial techniques a) Lumbar epidural analgesia
2. Relaxation/ breathing techniques	b) Volatile anesthetic agents: Sevoflurane,	b) CSEA
3. TENS	Isoflurane,	c) CSA
4. Bio-feedback and physical therapy	Desflurane, Enflurane	d) Single shot spinal analgesia
5. Hydrotherapy	2. Systemic Analgesics	e) Dural puncture epidural technique
6. Intradermal water injection	a) Opioids: Pethidine,	2. Maintenance of LA
7. Hypnosis	Meperidine,	a) Intermittent top ups
8. Acupuncture/ Acupressure	morphine, diamorphine,	b) Continuous epidural infusion
9. Miscellaneous: aromatherapy, music, massage, therapeutic use of heat and cold	fentanyl, sufentanil, remifentanil, alfentanil	c) PCEA
	b) Non-opioid analgesics: - Agonist - antagonist analgesics(	d) CI-PCEA
		e) PIEB
		3. Alternative

	nalbuphine, buprenorphine, btorphenol) - Sedatives, tranquilizers( barbiturates, benzodiazepines, phenothiazine derivatives) -Dissociative or amnesic drugs (ketamine)	regional anesthetic techniques a) Lumbar sympathetic block b) Pudendal block c) Paracervical block
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CSEA- Combined Spinal Epidural Analgesia

CSA-Continuous Spinal Analgesia

PCEA- Patient Controlled Epidural Analgesia

CI-PCEA- Computer Integrated Patient controlled epidural Analgesia

PIEB- Programmed Intermittent Epidural Bolus

TENS-Transcutaneous Electrical Nerve Stimulation

LA- Labour Analgesia

A reliable sensory block, no motor block, no tachyphylaxis, and a favorable safety profile are characteristics of the perfect local anesthetic for labor analgesia. It should also be safe to use accidentally<sup>7</sup>.

**Materials and Methods**

This was an observational study which was conducted in the Department of Obstetrics and Gynaecology at Sri Siddhartha Medical College and Hospital, Tumkur during the period from March 2022 to August 2023 after getting the approval from the Ethical Committee among the pregnant women with gestational age 26-28weeks who visited department of OBG as per the inclusion and exclusion criteria after proper counseling and after getting their consent.

**Inclusion Criteria**

**Pregnant women with**

1. Age group 18-35 years
2. BMI 19.8-26
3. GA -20 to 28 weeks
4. No physical and mental disability
5. No musculoskeletal disorder.

**Exclusion criteria**

1. Multiple pregnancies.
2. Medical problems such as diabetes, hypertension, cardiac diseases.
3. Physical maternal abnormalities.
4. Pregnancy from in vitro fertilization.
5. Foetal abnormality on ultrasound scans.
6. Subjects with known psychiatric disorders.

**Method of collection of data:**

Every pregnant woman included in this study were counseled and consent was obtained. After satisfying the inclusion and exclusion criteria, pregnant women with 26-28 weeks of gestation age were divided into 2 groups. Group A received YOGA therapy that is yoga asanas which strengthen the pelvic floor muscles, Pranayamic breathing and relaxation techniques by trained YOGA instructor through one to one session for 7 days. The subjects were instructed to practice Yoga for 45 minutes for 3 days in a week until delivery. To make sure compliance, a house visit and weekly telephone follow up were conducted. The participants were instructed to maintain a Yoga therapy notebook. Group B are the pregnant woman who received only routine antenatal care and not practiced YOGA. A comparative study was done between two groups and the maternal and fetal outcome was evaluated.

**Statistical Analysis**

In the present study both Descriptive and inferential statistical analysis has been carried out. Results on continuous measurements are presented on Mean  $\pm$  SD and results on categorical measurements are presented on Number (%).At the 5% significance level, significance is assessed. The chi-square test was performed to compare the categorical data and the student-t test was used to check if there were any significant differences in the birth weight of the baby and pain,. Every p values < 0.05 was considered to be statistically significant.

Table 2: Patients group Cohort

Variables	No. of Patients	%
Yoga group	50	50.0
Non yoga group	50	50.0
Total	100	100.0

Table 3: Age in Years- Frequency distribution in two groups of patients studied

Age In Years	Yoga Group	Non Yoga Group	Total
21-25	37(74%)	37(74%)	74(74%)
26-30	13(26%)	13(26%)	26(26%)
Total	50(100%)	50(100%)	100(100%)
Mean $\pm$ SD	24.2 $\pm$ 1.76	24.28 $\pm$ 1.84	24.24 $\pm$ 1.79

Samples are age matched with P=0.825, student t test

Table 4: SES- Frequency distribution in two groups of patients studied

SES	Yoga group	Non yoga group	Total
Lower middle	28(56%)	31(62%)	59(59%)
Upper lower	22(44%)	19(38%)	41(41%)
Total	50(100%)	50(100%)	100(100%)

P=0.680, Not Significant, Chi-Square Test

Table 5: Gestational Age in weeks- Frequency distribution in two groups of patients studied

Gestational Age	Yoga Group	Non Yoga Group	Total
36-38	3(6%)	1(2%)	4(4%)
38-39	10(20%)	9(18%)	19(19%)
39-41	37(74%)	40(80%)	77(77%)
Total	50(100%)	50(100%)	100(100%)
Mean ±SD	38.11±0.79	37.78±0.41	38.05±0.68

P<0.001\*\*, Significant, Student t test (Two tailed)

Table 6: Antepartum Complications- Frequency distribution in two groups of patients studied

Antepartum Complications	Yoga Group	Non Yoga Group	Total
No	45(90%)	28(56%)	73(73%)
Yes	5(10%)	22(44%)	27(27%)
Preterm labour	1(2%)	0(0%)	1(1%)
Fetal distress	2(4%)	0(0%)	2(2%)
Severe oligohydramnios	2(4%)	0(0%)	2(2%)
Total	50(100%)	50(100%)	100(100%)

P≤0.001\*\*, Significant, Chi-Square Test

Table 7: VAS SCORE- Frequency distribution in two groups of patients studied

Vas Score	Yoga Group	Non Yoga Group	Total
0	0(0%)	0(0%)	0(0%)
1-3	12(24%)	5(10%)	17(17%)
4-6	38(76%)	34(68%)	72(72%)
7-10	0(0%)	11(22%)	11(11%)
Total	50(100%)	50(100%)	100(100%)
Mean ± SD	4.48±1.11	5.44±1.3	4.96±1.29

P≤0.001\*\*, Significant, Student t Test

Table 8: LABOUR ANALGESIA- Frequency distribution in two groups of patients studied

Labour Analgesia	Yoga Group	Non Yoga Group	Total
No	26(52%)	41(82%)	67(67%)
Yes	24(48%)	9(18%)	33(33%)
Total	50(100%)	50(100%)	100(100%)

P=0.002\*\*, Significant, Chi-Square Test

Table 9: Mode Of Delivery- Frequency distribution in two groups of patients studied

Mode Of Delivery	Yoga Group	Non Yoga Group	Total
FTVD	37(74%)	16(32%)	53(53%)
LSCS	13(26%)	34(68%)	47(47%)
Total	50(100%)	50(100%)	100(100%)

P≤0.001\*\*, Significant, Chi-Square Test

Table 10: EPISIOTOMY- Frequency distribution in two groups of patients studied

Episiotomy	Yoga Group	Non Yoga Group	Total
No	18(36%)	34(68%)	52(52%)
Yes	32(64%)	16(32%)	48(48%)
Total	50(100%)	50(100%)	100(100%)

P=0.002\*\*, Significant, Chi-Square Test

Table 11: Maternal Complication- Frequency distribution in two groups of patients studied

Maternal Complication	Yoga Group	Non Yoga Group	Total
No	47(94%)	43(86%)	90(90%)
Yes	3(6%)	7(14%)	10(10%)
PPH	3(6%)	3(6%)	6(6%)
Uterine Inversion	0(0%)	4(8%)	4(4%)
Total	50(100%)	50(100%)	100(100%)

P=0.317, Not Significant, Fisher Exact Test

Table 12: Birth Weight (KG)- Frequency distribution in two groups of patients studied

Birth Weight(Kg)	Yoga Group	Non Yoga Group	Total
Up to 2.50	1(2%)	2(4%)	3(3%)
2.50-3.50	43(86%)	48(96%)	91(91%)
3.50-4.50	6(12%)	0(0%)	6(6%)
Total	50(100%)	50(100%)	100(100%)
Mean ± SD	3.01±0.32	2.86±0.21	2.93±0.28

P=0.008\*\*, Significant, Student t Test

Table 13: APGAR- Frequency distribution in two groups of patients studied

APGAR	Yoga Group	Non Yoga Group	Total	p value
1 MIN				
1-3	0(0%)	0(0%)	0(0%)	0.117
4-6	4(8%)	0(0%)	4(4%)	
7-10	46(92%)	50(100%)	96(96%)	
5 MIN				
1-3	0(0%)	0(0%)	0(0%)	0.117
4-6	4(8%)	0(0%)	4(4%)	
7-10	46(92%)	50(100%)	96(96%)	
Total	50(100%)	50(100%)	100(100%)	

Chi-Square Test/Fisher Exact Test

Table 14: NICU Admission- Frequency distribution in two groups of patients studied

NICU Admission	Yoga Group	Non Yoga Group	Total
No	41(82%)	35(70%)	76(76%)
Yes	9(18%)	15(30%)	24(24%)
Mas	9(18%)	0(0%)	9(9%)
Total	50(100%)	50(100%)	100(100%)

P=0.241, Not Significant, Chi-Square Test

## Results

Overall 100 pregnant mothers were studied (50 pregnant mothers who practiced Yoga and 50 pregnant mothers who received routine ANC care).

### Variables Observed

1. Gestational age at the time of delivery.
2. Antepartum complications.
3. VAS score in labour.
4. Labour analgesia requirement.
5. Mode of delivery.
6. Episiotomy.
7. Birth weight of baby.
8. Maternal and Neonatal complications.

According to Table-3 results showed that the mean and standard deviation of the age of the participants in the Yoga and control groups were 24.2± 1.76 and 24.2±1.84 respectively. The demographic details of the pregnant women in the yoga group did not significantly differ from that of the control groups (Table 3 and 4).

The mean and standard deviation of the gestational age at delivery were 38.11±0.79 in yoga group and 37.78±0.41 in the control group .The student t test showed a significant difference between the two groups (p<0.001) i.e(Table-5).

Data presented in Table-6 show that there was lesser incidence of ante partum complications in intervention arm(p<0.001) so that 10% in the yoga group and 44% in the control group had antepartum complications in the form of pre-term labour, fetal distress and severe oligohydramnios.

The difference in visual analog scores between two study groups is given in Table-7. The Yoga groups VAS scores were substantially lower than the control group.

In the Yoga group, 48% of women required labour analgesia while 52% delivered without any pain relief



(Table-8). This showed that the pain tolerance level was more in the intervention arm when compared to control group. This parameter was correlated to the vas scores that is the VAS scores in the Yoga group were significantly less compared to control group and hence lesser requirement for labour analgesia.

According to Table- 9, 74% of the women in the Yoga group and 32% of women in control group had normal vaginal delivery while the remaining women underwent emergency caesarean section for variety of reasons. Thus there was a significant statistical difference in the two groups ( $p < 0.001$ ). In addition, Table-10 showed 64% in the yoga group and 32% in the control group performed an episiotomy during natural birth which was statistically significant ( $p = 0.002$ ).

Neonates born to mothers in the Yoga group had significantly higher birth weights than in the control arm, with mean  $\pm$ SD in the Yoga group being  $3.01 \pm 0.32$  and control group  $2.86 \pm 0.21$ . (Table- 12)

As shown in Table-11 and Table-14 there was no much statistical difference in the maternal complications and the neonatal complications in both the groups.

The APGAR score in the first and fifth minute were almost similar and the results did not show any statistical significance between the two groups. (Table-13)

### Discussion

Yoga together with meditation can have beneficial effect on maternal changes and pain during pregnancy, including the benefit of helping to prepare the body to withstand the pressure of childbirth, helps to reduce back pain, helps the body to carry extra weight more effectively during pregnancy and also improves blood circulation. This study aimed to correlate the pain tolerance and need for labour analgesia in both the groups.<sup>8</sup>

Yoga exercises help to relieve tension in the muscles that may form during pregnancy and improve the muscle strength, flexibility, and energy levels, all of which contribute to a quicker and easier labor.<sup>(8)</sup> Preterm labor and other antepartum problems are not increased by exercise or Yoga during pregnancy.<sup>(8)</sup> Most of the yoga exercises include stretching exercises which are supposed to improve the tensile strength and flexibility of the vaginal perineal muscles. Therefore Yoga exercises can possibly facilitate vaginal delivery.<sup>(9)</sup>

Data presented in Table-6 show that there was lesser incidence of antepartum complications in intervention arm ( $p < 0.001$ ) so that 10% in the yoga group and 44% in the control group had antepartum complications in the form of pre-term labour, fetal distress and severe oligohydramnios.

Prenatal yoga is a combination of position (asana) and breath control (pranayama). In the first stage of labour, pain is visceral and not localised.<sup>(10)</sup> Pain is of greater intensity and focused in the lower abdomen.<sup>(10)</sup> The visual analog scores between the two study groups is shown in Table-7. The vas scores in the Yoga group was significantly lower than that of control groups indicating better pain tolerance levels in the Yoga group. In the Yoga group, 48% of women required labour analgesia while 52% delivered without any pain relief. This showed that the pain tolerance level was more in the intervention arm when compared to control group. This parameter was correlated to the vas scores that is the VAS scores in the Yoga group were significantly less compared to control group and hence lesser requirement for labour analgesia.

The results showed that 74% of the women in the Yoga group and 32% of women in control group had normal vaginal delivery and the rest underwent emergency

caesarean section for various kinds of reasons. Hence there was a significant statistical difference in the two groups ( $p < 0.001$ ). In addition, 64% in the yoga group and 32% in the control group performed an episiotomy during natural birth which was statistically significant ( $p = 0.002$ ). Neonates born to mothers in the Yoga group had significantly higher birth weight than in the control arm, with mean  $\pm$ SD in the Yoga group being  $3.01 \pm 0.32$  and control group  $2.86 \pm 0.21$ .

The APGAR score in the first and fifth minute were almost similar and the results did not show any statistical significance between the two groups.

### Conclusion

The results of the present study concluded that practicing Yoga helped pregnant women in suppressing labor pain. Since the pain threshold was more in the Yoga group the need for labour analgesia was also less. The study also concluded that Yoga therapy lowers pregnancy related problems and is safe during pregnancy. The women who practiced yoga delivered at higher gestational age. It also had a positive influence on mode of delivery and reduces emergency CS. Also concluded that birth weight of neonates born to mothers in Yoga group was higher than control group.

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