Introduction

Labor pain is one of the most severe pains a woman experiences in her life, occurring with uterine contractions, cervical dilation, and effacement. Adequate knowledge about the labor and delivery process can impart a sense of emotional well-being and confidence to ensure successful labor. During labor, increased anxiety enhances the pain perception, increases labor duration and catecholamine secretion which reduces blood flow in the uterus. This decreases the uterine contractions and increases labor duration. The release of catecholamines further adds to the emotional stress and causes a delay in the labor process, which in turn increases the demand for cesarean section from mothers. In India, the cesarean section rate has increased from 2.9% in 1990–1993 to 17.2% in 2015–2016.

Effectiveness of back massage on pain relief during first stage of labor in primi mothers admitted at a Tertiary care center

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Abstract

Background: Labor pain is one of the most severe pains a woman experiences in her life, causing an increase in anxiety and stress levels. Massage therapy has proven beneficial for relaxation purposes.

Aim: To evaluate the effectiveness of back massage in relieving pain during the first stage of labor in primi mothers.

Methodology: The study included 40 primipara mothers belonging to the age group 22–25 years, equally divided into 2 groups: Experimental (massage therapy) and control (routine care). The socio-demographic data, labor assessment parameters (cervical dilation, status of fetal membranes, frequency and duration of uterine contractions during the latent and active phase of labor, and the total duration of the first stage of labor), and the level of labor pain (numerical rating pain scale) were recorded. Data analysis was performed by one-way ANOVA and two independent samples t-test (P ≤ 0.05 as significant).

Results: During the latent and active phase of labor, majority of the mothers experienced 4–5 contractions in a span of 10 min. During the latent phase of labor, uterine contractions for 20–40 s were exhibited by 90% and 75% mothers in the experimental and control group, respectively; and during active phase, contractions of >40 s were exhibited by 85% mothers in both groups. A significant difference in the post-test pain scores was noted between the 2 groups (P < 0.0001).

Conclusion: Our study proved that back massage was effective in reducing pain during the first stage of labor in primipara mothers in comparison to those who were subjected to routine care.

Keywords: Anxiety, first stage labor, labor pain, massage

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in the brain for pain relief. Another comfort measure is
massaging, which is an ancient method that women have received
for relaxation purposes. It is widely used and in turn reduces the
duration of labor by increasing the uterine contractions. Massage therapy has proven beneficial in varying conditions
such as prenatal depression, pre-/full-term infants, autism,
skin conditions, hypertension, aging-related problems such as
Parkinson’s disease and dementia, and sports-related injuries.

The intensity of labor pain varies in every individual. The pain
is either moderate or severe, which is unbearable and increases
the stress levels in the mother. Based on the information
available in the literature on the type of massaging technique and
lubricant, this study was conducted using 2 types of massaging
techniques - Effleurage (gliding strokes) and Petrissage (Kneading
strokes) along with jasmine oil as the lubricant to soothe the labor
pain. The main aim of the study was to assess and compare the
effectiveness of back massage on pain during the first stage of labor
in primipara mothers at a tertiary care center in Karad, Maharashtra.

Methodology

Study design
This interventional study was conducted at a tertiary care center in
Karad, Maharashtra, after receiving approval from the institutional
ethics committee (KIMSDU/IEC/01/2015 Dated:05-03-2015,
Protocol number: 0334/2017-18) was acquired along with written
informed consent from primi mothers participating in the study. The
study plan was explained in detail to all the participating mothers.

Study subjects
The study included a total of 40 primipara mothers, 18–29 years
old, either with full-term pregnancy or with fetus in cephalic
presentation, and mothers willing to participate. They were
allotted to 2 groups using the lottery method, a simple random
sampling technique. The 2 groups were: Experimental (n = 20,
mothers received back massage during the first stage of labor) and control (n = 20, mothers did not receive back massage).

Multipara mothers, mothers with high-risk pregnancy or skin
infection on the back, and mothers who had a fully dilated
 cervix at the time of admission were excluded from the study.

The sample size for the study was calculated using the
proportionality formula from a study conducted by Joseph
and Fernandez. The post-test visual analog scale (VAS) score
was 3.1 ± 1.1 and 7.95 ± 1.5 in the experimental and control
groups, respectively. At the statistical power of 80% the following
formula was used
\[
N = \left( \frac{SD_1^2 + SD_2^2}{Z_{1-\alpha}^2 + Z_{1-\beta}^2} \right)
\]

Based on the formula, a minimum of 30 mothers were required
to conduct the study. We included 10 more, resulting in a final
sample size of 40.

Study procedure
Only 2 primipara mothers, one from each group, were attended to
daily during the course of the study. The socio-demographic data
such as age, education, religion, occupation, and family’s income of
the mothers were recorded. The assessment of progress of labor, i.e., from the time of admission until the end of first stage of labor,
was performed by evaluating the cervical dilatation, status of
fetal membranes on admission, frequency, and duration of uterine
contractions during the latent and active phase of labor, and the
total duration of the first stage of labor. This labor assessment
proforma was validated by 9 experts from the Department of Obstetrics and Gynecological Nursing. The numerical rating
pain scale (0 = no pain, 1-3 = mild pain, 4-6 = moderate pain,
7-10 = severe pain) was used to assess the level of labor pain of
primipara mothers during first stage of labor.

Mothers in the experimental group were given a back massage with
jasmine oil (extra pure), diluted with grapeseed carrier oil. Back
massage was given by using routine back massage techniques such
as Effleurage (gliding strokes) and Petrissage (Kneading strokes)
in between contractions; and during contractions, obstetrical
back rub was performed. Effleurage was performed by gliding
a flat palm smoothly over the entire back in a slow circular
motion followed by Petrissage, which was performed by using
kneading and knuckling movements. Kneading was performed by
squeezing fleshy mass of lower back between fingers and thumb
and knuckling was performed by using knuckles of fingers to
knead and lift in a circular and upward motion. Obstetrical
back rub was performed during contractions by placing the palm of
the hand against the spot identified by the mother. That spot and
the adjacent area was massaged by moving the palm in a circular
manner without lifting. Mothers received 20 back massages, i.e.,
13 times in the latent phase and 7 times in the active phase of
labor, every half an hour for 10 min. Mothers in the control
group received only routine care.

Labor pain was assessed in terms of pre-test and post-test
amongst mothers. In the experimental group, pain was assessed
20 times before and after every back-massage session. In the
control group, pain was assessed 20 times pre and post routine
care.

Statistical analysis
Data was analyzed using R v386 3.6.0 software. The pain
levels and comparison between duration of first stage of labor
demographic data of mothers were assessed by one-way
ANOVA and two independent samples t-test and represented
as mean ± SD. The level of significance was set at \( P \leq 0.05 \).

Results
The study included mostly primipara mothers –9 (45%) in
experimental and 7 (35%) in control group, aged 22–25 years.
The demographic data of the study participants is represented
in Table 1.
During labor assessment of mothers, majority of them, i.e., 19 (95%) in experimental and 18 (90%) had no cervical dilation. The fetal membranes were still intact in all mothers. During the latent phase of labor, most of the mothers experienced 4-5 contractions in a span of 10 min (14 [70%] in experimental group; 15 [75%] in control group); and uterine contractions for 20-40 s (18 [90%] in experimental group; 15 [75%] in control group). During the active phase of labor, most of them experienced 4‑5 contractions in a span of 10 min (18 [90%] in experimental group; 16 [80%] in control group); and also uterine contractions >40 seconds (17 [85%] in experimental group; 17 [85%] in control group) \[\text{Table 2}\].

The average mean pain scores for pre‑test in the experimental and control groups were 5.04 and 5.72, respectively. The average mean pain scores for post‑test were 2.71 and 6.457 in the experimental and control groups, respectively. A significant difference in the post‑test pain score was noted between the experimental and control groups when assessed all 20 times ($P < 0.0001$) \[\text{Table 3}\].

The mean duration of the first stage of labor in the experimental and control groups was $12.95 \pm 0.938$ and $13.3 \pm 1.07$ hours, respectively, but the difference was insignificant ($P = 0.243$). On comparing the mean duration of first stage labor with that of the demographic data of primipara mothers, statistical insignificance ($P > 0.05$) was noted within the experimental and control groups as also between the two groups ($P > 0.05$) \[\text{Table 4}\]. Similar insignificance ($P > 0.05$) was also noted when the mean duration of first stage labor was compared with the labor assessment proforma of mothers \[\text{Table 5}\].

**Discussion**

Childbirth is a physiologic and a natural process that women have undergone over several centuries. Although it has no underlying pathological process, labor is linked with a painful experience, causing women to worry on how to soothe the pain.$^{[19]}$ In our study, we aimed to reduce the pain experienced by primipara women during the first stage of labor by providing them with a back massage, which is a useful technique for rehabilitation and relaxation.

In our study, the age group was comparable to our study have been reported earlier.$^{[20‑22]}$

Massage around the lower back with jasmine, clary sage, rose, and lavender oils has been reported to provide subjective benefit in labor.$^{[23,24]}$ It stimulates the body to release endorphins, which are natural pain‑killing and mood‑lifting substances.$^{[25]}$ Massaging is therefore recommended by child‑birth experts as it has been shown to ease pain and reduce anxiety in the first stage of labor.

| **Table 1: Demographic data of study participants** |
|---------------------------------|------------------|------------------|
| **Variables**                  | **Experimental (n=20)** | **Control (n=20)** |
| Age (years)                    |                   |                   |
| 18‑21                          | 3 (15)            | 6 (30)            |
| 22‑25                          | 9 (45)            | 7 (35)            |
| 26‑29                          | 8 (40)            | 7 (35)            |
| Education                      |                   |                   |
| Primary to middle school       | 5 (25)            | 5 (25)            |
| High School                    | 3 (15)            | 4 (20)            |
| Diploma and above              | 12 (60)           | 11 (55)           |
| Religion                       |                   |                   |
| Hindu                          | 15 (75)           | 16 (80)           |
| Other                          | 5 (25)            | 4 (20)            |
| Occupation                     |                   |                   |
| Heavy                          | 2 (10)            | 0                 |
| Moderate                       | 4 (20)            | 6 (30)            |
| Sedentary                      | 14 (70)           | 14 (70)           |
| Monthly Family Income          |                   |                   |
| Rs. 6,327‑18,949/-             | 8 (40)            | 12 (60)           |
| Rs. 18,953‑31,589/-            | 7 (35)            | 6 (30)            |
| Rs. 31,591‑47,262/-            | 5 (25)            | 2 (10)            |

| **Table 2: Labor assessment proforma of primipara mothers** |
|---------------------------------|------------------|------------------|
| **Variables**                  | **No. of Mothers n (%)** |
|                                | **Experimental (n=20)** | **Control (n=20)** |
| Cervical dilation (cm)          |                   |                   |
| No.                            | 19 (95)           | 18 (90)           |
| 1                              | 1 (5)             | 1 (5)             |
| 2                              | 0                 | 1 (5)             |
| >3                             | 0                 | 0                 |
| Fetal membrane                 |                   |                   |
| Intact                         | 20 (100)          | 20 (100)          |
| Rupture                        | 0                 | 0                 |
| Latent phase                   |                   |                   |
| Frequency of contractions in 10 min |                   |                   |
| 3-4                            | 6 (30)            | 5 (25)            |
| 4-5                            | 14 (70)           | 15 (75)           |
| Duration of uterine contractions (seconds) |                   |                   |
| <20                            | 2 (10)            | 5 (25)            |
| 20-40                          | 18 (90)           | 15 (75)           |
| Active phase                   |                   |                   |
| Frequency of contractions in 10 min |                   |                   |
| 3-4                            | 1 (5)             | 1 (5)             |
| 4-5                            | 18 (90)           | 16 (80)           |
| >5                             | 1 (5)             | 3 (15)            |
| Duration of uterine contractions (seconds) |                   |                   |
| 20-40                          | 3 (15)            | 3 (15)            |
| >40                            | 17 (85)           | 17 (85)           |
In the present study, on assessing the progress of labor after hospital admission, it was noted that majority of the mothers in both the groups had no cervical dilation. All the mothers had intact fetal membranes. In contrast to our findings, Bolbol-Haghighi et al. reported a cervical dilation of 2–3 cm in both the experimental and control groups.\cite{13} Chauhan et al. reported intact fetal membranes in 36.67% and 26.6% mothers in the experimental and control groups, respectively.\cite{27}

Majority of the women in the study conducted by Chauhan et al. (83.3% experimental group; 86.75% control group) were reported to have 3 contractions, and the duration of the contractions was of 20–40 s in 83.3% mothers in the experimental and 90% in the control groups during the active phase of labor.\cite{28}

The significant difference pain score was similar with previously conducted studies.\cite{16,28} In our study, we observed that all mothers experienced all levels of pain, i.e., mild, moderate, and severe. However, the study signifies the effect of back massage in reducing the labor pain during the first stage. Previously conducted studies corroborate our findings, highlighting the advantages of back massage (rhythmic massage, circular strokes, stoking the lower back, relaxing the pelvic region, lateral strokes, etc.) to reduce labor pain.\cite{29,30}

Bolbol-Haghighi et al. reported significant findings ($P < 0.0001$), contradictory to our observations, because massaging was not restricted only to the back but included shoulders, legs, upper belly, and thighs for over 30 min.\cite{13}

The limitations of our study included smaller sample size and only primipara mothers in a single tertiary care center. Future recommendations would be to conduct a similar study in a larger population.
Table 5: Comparison of mean duration of first stage of labor with the labor assessment of mothers

| Variables                     | Duration (hours) (Mean±SD) | P     |
|-------------------------------|----------------------------|-------|
|                               | Experimental (n=20) | Control (n=20) |       |
| No cervical dilation (cm)     | 13±0.956         | 13.3±1.10       | 0.422 |
| Intact fetal membrane         | 12.93±0.938      | 13.33±1.07      | 0.243 |
| Latent phase                  |                |                  |       |
| Frequency of contraction in 10 min | 13±0.973 | 13±0.976 | 0.776 |
| Duration of uterine contractions (seconds) | <20    | 20‑40       | 0.224 |
| Active phase                  |                |                  |       |
| Frequency of contraction in 10 min | 12.93±0.989 | 13.39±1.136 | 0.221 |
| Duration of uterine contractions (seconds) | >5     | 40‑>40     | 0.256 |

P-values have been calculated by one-way ANOVA and two independent samples t-test

Conclusion

Our study proved that back massage was effective in reducing pain during the first stage of labor in primipara mothers in comparison to those who were subjected to routine care and could be made as routine practice in primary care. Although the difference in the duration of labor among mothers in both the experimental and control group was insignificant, the massaging technique can be successfully implemented as a non-pharmacological method in reducing labor pains in the clinical area, thereby making it tolerable to a certain extent during childbirth.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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