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***Original Research Article***

# THE IMPACT OF BREATHING EXERCISES ON LABOR DURATION AND MATERNAL ANXIETY IN PREGNANT WOMEN

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**Abstract:** *Maternal anxiety during labor can negatively impact the birthing process and the overall experience of childbirth. Breathing exercises, such as Lamaze techniques, are believed to help reduce anxiety and potentially shorten labor duration, but evidence supporting these claims remains limited.* ***Objective:*** *This study aimed to evaluate the impact of Lamaze breathing exercises on labor duration and maternal anxiety in pregnant women.* ***Methods:*** *A case-control study was conducted in the Gynecology and Obstetrics department of Nishtar Hospital, Multan, from June 2023 to June 2024. The study included 100 nulliparous pregnant women with a gestational age of 38-42 weeks, healthy vertex fetal presentation, and uncomplicated spontaneous vaginal delivery. Participants were divided into two groups: the control group (n=50) received routine checkups. In contrast, the cases group (n=50) was instructed to perform four stages of Lamaze breathing techniques during each phase of labor for at least 30 minutes. Maternal anxiety during labor was assessed using a 20-item State Anxiety Inventory. Statistical analysis was performed to compare anxiety levels and labor duration between the two groups.* ***Results:*** *In the early latent phase, anxiety scores were similar between the cases group (36.51 ± 2.09) and the control group (36.32 ± 3.49), with no significant difference (p=0.811). In the late latent phase, anxiety scores remained comparable between the groups (37 ± 2.66 vs 37.18 ± 1.95, p=0.768). However, in the late active phase, a statistically significant anxiety reduction was observed in the cases group compared to the control group (37.93 ± 2.08 vs 43.18 ± 2.27, p<0.001). Additionally, the duration of the first stage of labor was significantly shorter in the cases group compared to the control group (682.95 ± 189.74 minutes vs 1038.07 ± 263.05 minutes, p<0.05). There was no statistically significant difference in the duration of the second stage of labor between the groups (20.08 ± 11.50 minutes vs 25.53 ± 15.28 minutes, p=0.140).* ***Conclusion:*** *Lamaze breathing techniques are effective in reducing maternal anxiety during the active phase of labor and significantly shortening the duration of the first stage of labor in pregnant women. These findings support incorporating breathing exercises into prenatal care to enhance maternal comfort and potentially improve labor outcomes.*

**Keywords:** Anxiety, Breathing Exercises, Pregnancy, Pregnant Women

## Introduction

Labor during delivery has been described as one of the most painful conditions that causes stress and anxiety in women. Fear and anxiety tense the pelvic muscles, which are significant during childbirth, and elevate the pain levels. Breaking the fear-tension-pain cycle during delivery is necessary to improve labor experience and outcomes. Anxiety also increases cortisol levels, decreasing uterine blood flow and, in turn, inhibiting or slowing contractions and prolonging labor (1) .

Various drug and non-drug treatments have been used to alleviate anxiety and pain both antepartum and during labor (2-4). Breathing techniques are a non-pharmacological method helpful in reducing anxiety and pain during labor and improving concentration (5). Literature has shown that breathing exercises are a lead factor in reducing state and continuous anxiety and pain, shortening labor duration. (6). Breathing techniques training is the future of prenatal care which can be administered antepartum or when labor starts. Nurses and midwives must also be equipped to instruct women on practicing these techniques. This study was conducted to evaluate the impact of breathing techniques on labor duration and maternal anxiety in pregnant women.

## Methodology

A case-control study was conducted in the Gynecology and Obstetrics department of Nishtar Hospital, Multan, from June 2023 to June 2024. A total of 100 nulliparous adult pregnant women with gestation age 38-42 weeks with healthy vertex fetal presentation, estimated to have an uncomplicated spontaneous vaginal delivery and dilated 0-1 cm, were selected for study by consecutive sampling. The sample size was calculated by G-power software 3, keeping 0.05 α, 95% CI, and 80% power.

Women who underwent cesarean section and vacuum-assisted vaginal birth and those who attended birth preparation training were excluded. All women provided their informed consent to become a part of the study. The hospital's ethical committee approved the study. Women were divided into two groups, the control group (n=50) and the cases group (n=50). Patients were followed up until delivery. The cases group was instructed on performing four stages of Lamaze breathing techniques during each phase of labor for a total of half an hour or more (Figure I). No intervention was conducted in the early latent phase, and then in the late latent phase, the first and second techniques

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were practiced. The third technique was practiced in the active phase, and the fourth was during the transition phase. The control group was only given routine checkups. Both groups had no history of breathing training before. Midwives and nurses regularly monitored the cervical dilations. Data, including age, qualification, employment and marital status, gestation age, and training sessions, was collected through face-to-face interviews during the early latent phase. Labor information was noted on the labor observation form and included the duration of labor, start of the latent phase, duration of labor phases, and birth time.

A 20-item State Anxiety Inventory was used to measure maternal anxiety during labor. The questions could be answered on a Likert scale from 1-4, with one being least or never and four being highest or severe. The possible minimum score obtained was 20, and the maximum score was 80. Patients were graded from not anxious or average to very severely anxious based on the SAI score (Figure II). A 0.95-0.97 test-rest reliability score of SAI was noted with Cronbach's alpha of 0.905 to >0.71 during different phases of labor. SAI was administered three times during labor; before breathing technique training in the early latent phase, in the late latent phase after breathing technique, and the late active phase.

All data was analyzed using SPSS version 24. The chi-square and Fisher's exact tests were performed to compare sociodemographic features and pregnancy data between both groups. The duration of the first and second labor phases and the mean SAI score were compared by performing a paired t-test. A p-value of less than 0.05 and 0.001 was considered significant.

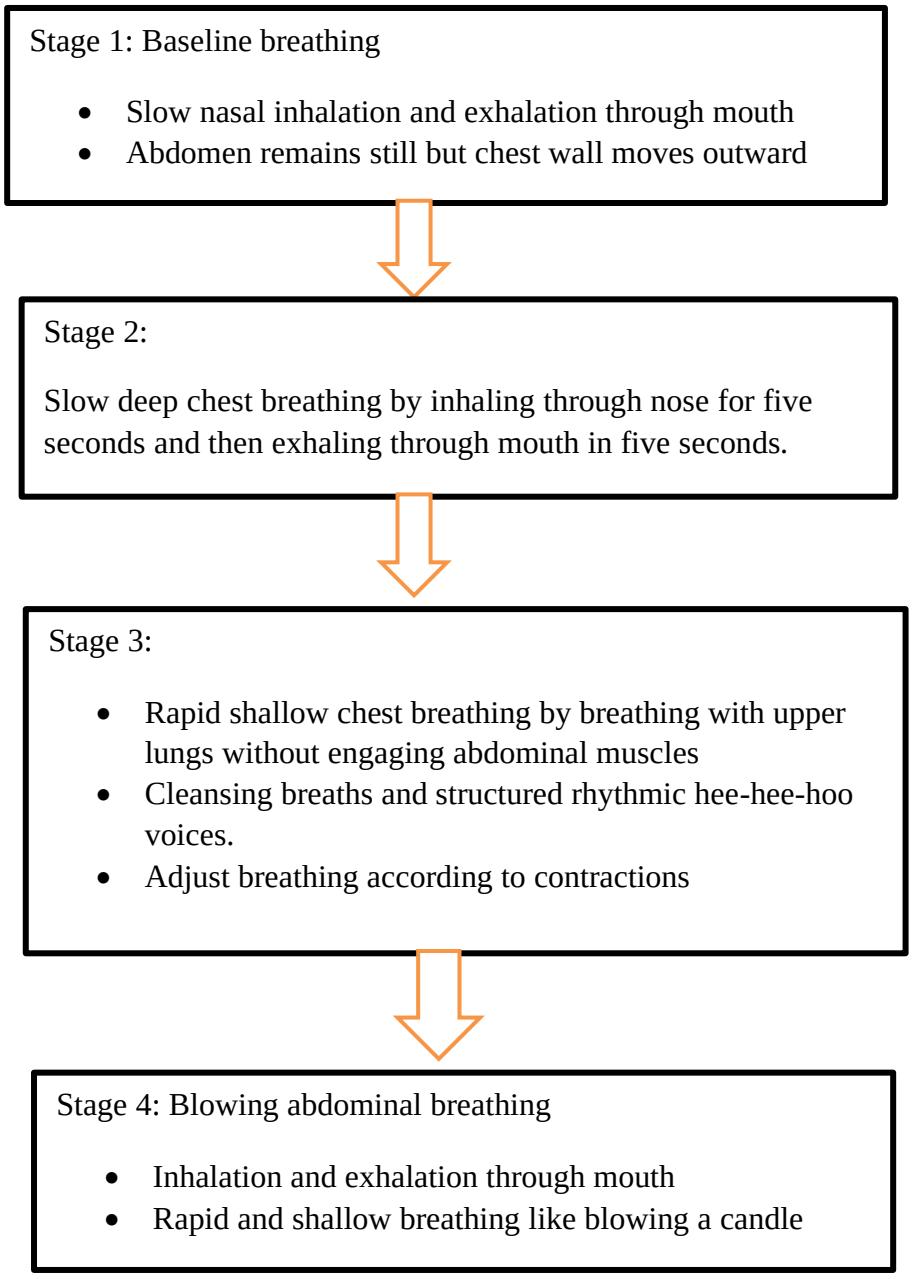


**Figure 1: Stages of Lamaze breathing**

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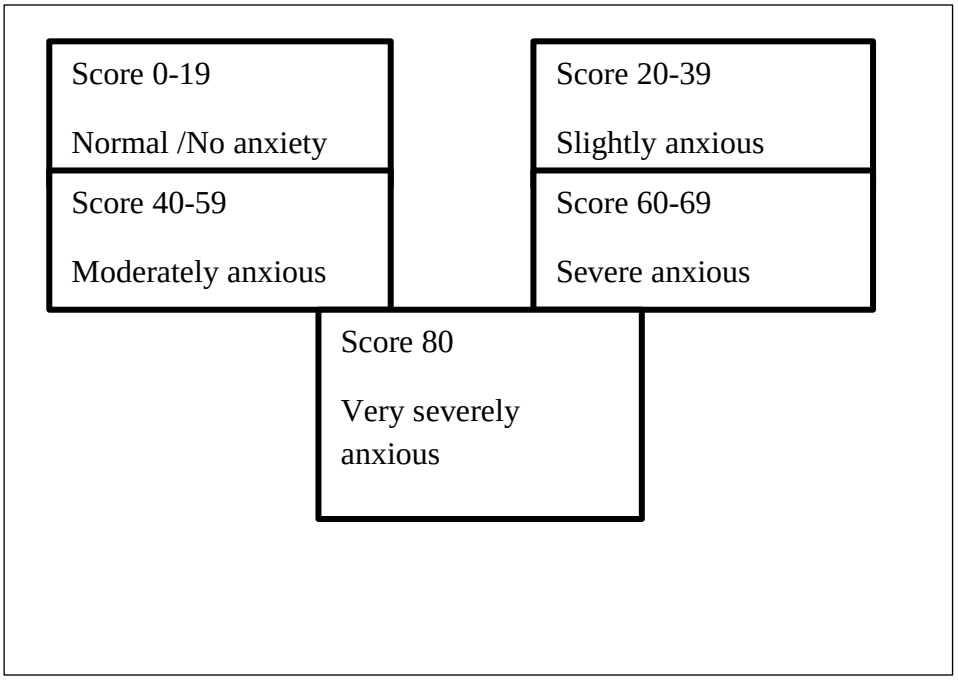


**Figure 2: Grading according to SAI score**

**Results**

A total of 100 women were included in the analysis, 50 in the cases group and 50 in the control group. The mean age of the study population was 20.33 ± 4.11 and did not differ significantly between both groups (22.34± 3.9 vs 21.35 ± 4.62 years). Women in both groups were similar with respect to secondary qualification (60% vs 50%), employment status (10% vs 6%) and marital status (96% vs 94%). The mean gestation age was 39 weeks (Table I).

There was no statistical difference between mean SAI scores in labor phases except in the late active phase. In the early latent phase, the mean score was 36.51 ± 2.09 in the cases group and 36.32 ± 3.49 in the control group (p=0.811). In the late latent phase, the mean score was 37 ± 2.66 in the cases group and 37.18 ± 1.95 in the control group (p=0.768). In the late active phase, there was a statistically significant difference between both groups (37.93 ± 2.08 vs 43.18 ± 2.27, p<0.001) (Table II).

There was a statistically significant difference between the duration of the first labor stage between both groups (682.95 ± 189.74 vs 1038.07 ± 263.05, p<0.05). However, there was no statistical difference between the duration second stage of labor (20.08 ± 11.50 vs 25.53 ± 15.28, p=0.140) (Table III).

**Table 1: Sociodemographic features and obstetrics data**

| Features | Cases group (n=50) | Control group (n=50) | X2/t | P |
|---|---|---|---|---|
| Mean age | 22.34± 3.9 | 21.35 ± 4.62 | T= 0.79 | 0.5 |
| **Qualification** | | | | |
| Secondary school | 30 (60%) | 25 (50%) | 1.87 | 0.588 |
| High school | 15 (30%) | 20 (40%) | | |
| Bachelors or higher | 5 (10%) | 5 (10%) | | |
| **Employment status** | | | | |
| Employed | 5 (10%) | 3 (6%) | 0.65 | 0.667 |
| Unemployed | 45 (90%) | 47 (94%) | | |
| **Marital status** | | | | |
| Married | 48 (96%) | 47 (94%) | 0.26 | 0.4 |
| Single | 2 (4%) | 3 (6%) | | |
| Mean gestation age | 40.22 ± 1.10 | 40.30 ± 1.13 | T= -0.27 | 0.733 |
| Planned pregnancy | 25 (50%) | 30 (60%) | 1.37 | 0.436 |

**Table 2: Mean SAI score in labor phases**

| Labor phases | Cases group | Control group | t | P |
|---|---|---|---|---|
| Ealy latent phase | 36.51 ± 2.09 | 36.32 ± 3.49 | 0.19 | 0.811 |
| Late latent phase | 37 ± 2.66 | 37.18 ± 1.95 | -0.32 | 0.768 |
| Late active phase | 37.93 ± 2.08 | 43.18 ± 2.27 | -5.61 | <0.001 |

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**Table 3: Mean duration of labor phases**

| Labor phases | Cases group X̄±SD | Control group X̄±SD | t | P |
|---|---|---|---|---|
| First stage | 682.95 ± 189.74 | 1038.07 ± 263.05 | -7.12 | <0.001 |
| Latent phase | 399.66 ± 100.82 | 659.64 ± 170.70 | -8.08 | <0.001 |
| Active phase | 173 ± 70.83 | 265.62 ± 163.82 | -2.91 | 0.005 |
| Transition phase | 109.61 ± 80.56 | 100.51 ± 109.59 | 1.12 | 0.284 |
| Second stage | 20.08 ± 11.50 | 25.53 ± 15.28 | -1.48 | 0.140 |

## Discussion

This study was conducted to assess the impact of breathing techniques on maternal anxiety and labor duration in pregnant women. The results revealed a significant difference between anxiety score and labor duration in patients who practiced breathing techniques.

Before the breathing training, the groups did not differ in SAI score in the early latent phase ($p>0.05$). This can be because labor had just started, and no intervention had been provided for any patient. Issac et al. also conducted a study to evaluate relaxation training to alleviate stress and anxiety in pregnant women and reported similar SAI scores in cases and control groups before training.(7) The anxiety levels in our study increased during labor which were higher in the control group (43.18 ± 2.27) as compared to cases (37.93 ± 2.08). At the start of training in the late latent phase, the mean SAI score did not differ significantly between both groups due to limited practice of the techniques (cases: 37 ± 2.66 vs controls: 37.18 ± 1.9). However, after training, the anxiety levels in cases declined significantly because of increased adaptability to techniques ($p<0.001$). Other studies also reported that breathing techniques improved anxiety levels in the active phase of labor than women who did not receive any relaxation training.(8-10) A recent study showed that state anxiety was reduced in the cases group after two hours of practicing breathing techniques in the first round, but the methods worked after four hours in the second round. (11).

The labor duration was also shorter in the cases group than in the control group. The mean duration of the first stage was 682.95 ± 189.74 minutes in cases which is significantly lower than 1038.07 ± 263.05 minutes in control ($p<0.001$). Amru et al. assessed women in the third trimester in whom breathing exercises were administered; the labor duration was approximately 6 hours as compared to a significantly higher duration of 9 hours in women who did not perform any exercises (12). Majeed et al. evaluated the same effect in primiparous women, who were provided with video instruction to perform breathing exercises at the start of labor. A statistical difference of one hour was recorded between the labor duration of cases (9 hours) and controls (10 hours) (13). These results are similar to those of our study, in which a labor duration of 11.3 hours was recorded in cases and 17.3 hours was recorded in controls. A Canadian study also reported a labor duration of 5.8 hours in women practicing Lamaze breathing during the onset of labor compared to 8.8 hours in the control group. However, this difference was regarded as statistically insignificant (14).

In our study, there was also a significant difference between the latent and active phases of labor in both groups, which is similar to other reported studies.(15, 16) The second phase of labor was shorter in cases, but the difference between groups was insignificant (20.08 ± 11.50 vs 25.53 ± 15.28 minutes). These findings comply with previous literature (17, 18).

Our study has some limitations. First, we only included nulliparous women, which limits the generalizability of results to all pregnant women. Second, the administration of oxytocin induction in all women may have affected labor duration.

## Conclusion

The study concluded a significant prevalence of upper cross syndrome in female physiotherapists. Variables like working hours posed severe risks for initiating UCS among professionals. Upper Cross Syndrome (UCS) prevalence was 27% in working physiotherapists; however, females and people working long hours were likelier to develop Upper Cross Syndrome (UCS). It was also discovered that there is a strong correlation between Upper Cross Syndrome and Work-Related Musculoskeletal Disorders (WRMDs.

## Declarations

**Data Availability statement**

All data generated or analyzed during the study are included in the manuscript.

**Ethics approval and consent to participate**

Approved by the department concerned. (IRB-NHM-9237/22)

**Consent for publication**

Approved

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Not applicable

## Conflict of interest

The authors declared the absence of a conflict of interest.

## Author Contribution

***MUSSARAT YASMIN*** *(*Head Nurse)
*Coordination of collaborative efforts.*
*Data entry and data analysis, as well as drafting the article.*
***MALEEHA YASMEEN*** *(*Charge Nurse)
*Conception of Study, Final approval of manuscript.*
***RIFFAT YASMIN*** *(*Charge Nurse)
*Study Design, Review of Literature.*
*Conception of Study, Development of Research Methodology Design, Study Design, Review of manuscript, and final approval.*

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