Natural Methods for Relieving Labor Pain and Anxiety during the First Stage among Primigravida Mothers

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Abstract

Labor pain is a universal experience among primigravida during pregnancy. Failure to manage labor pain may lead to abnormal labor. There are many complementary nonpharmacological methods used to cope with labor pain such as back massage and breathing exercises. **Aim:** To evaluate the effect of natural methods for relieving labor pain and anxiety during the first stage of labor among primigravida mothers. **Design:** A quasi-experimental design was utilized to accomplish this study. **Sample**: A Purposive sample included 80 primigravida mothers were recruited and divided into two equal groups as a group (A) refers to the back massage group (n=40) and group (B) which refers to the breathing exercises group (n=40). **Setting**: The study was applied in the Obstetrics and Gynecology Department at Sohag University Hospital. **Three tools were used for data collection** (1) A structured interviewing questionnaire, (2) a visual analog pain scale, (3) a State-Trait Anxiety Inventory scale. **Results:** Revealed that there was a highly significant difference between mean and SD of pretest level and posttest regarding labor pain level in back massage and breathing exercises groups at P=0.001 level. There was a highly significant difference between mean and SD of pretest level and posttest regarding anxiety level in back massage and breathing exercises groups at P=0.001 level. **Conclusion:** Back massage and breathing exercises were effective in relieving and reducing the intensity of pain and reduce anxiety during the first stage of labor among primigravida mothers. **Recommendation**: Applying back massage and breathing exercises are recommended to relieve pain and reduce anxiety.

Keywords: Anxiety, labor pain, natural methods, primigravida mothers

Introduction

Pain experienced during labor is probably the most painful event in the lives of women. Labor pain is often described as the worst pain in a women's life, but the experience is highly variable. Although many factors have been linked to labor pain, it is difficult to assess the individual effects of these factors because labor is a dynamic process, and pain intensity changes throughout labor (**Smith et al., 2018).**

Labor pain is a universal experience among primigravida during pregnancy. Failure to manage labor pain may lead to abnormal labor and severe consequences for women, such as prolonged labor, which may increase the risk of fetal distress, head compression, intrauterine fetal death, low Apgar scores, and physical injuries to neonates. Prolonged labor results in an increased risk of cesarean section, induced labor, and assisted delivery using vacuum and forceps (**Nystedt & Hildingsson, 2014**).

The main cause of pain during labor is due to cervical dilation, contractions of the uterus, and the uterine extension for vaginal delivery **(Gholipour, et al, 2017).** Labor pain is more severe and longer in primiparous women, which can lead to invert effects such as fear, anxiety, and loss of self-confidence **(Rajeshwari, 2013)**. Fear and anxiety increase the hormones as epinephrine that further intensify the labor pain and potentially prolong the labor, thus resulting in a very unpleasant experience of childbirth. Also, anxiety and stress during labor may decrease the frequency of uterine contractions and thus, increase the labor duration, the likelihood of assisted delivery, bleeding, delayed lactation, and others **(Mello, Nobrega, & Lemos, 2010).**

Appropriate labor pain management and interventions are important aspects of obstetric care to ensure optimum outcomes for mothers and babies. There are many complementary nonpharmacological methods used to cope with labor pain such as back massage and breathing exercises (**Dekker, 2021**).

These methods prepare a pregnant woman to deal actively with contractions. It includes various techniques such as effleurage, thermal stimulation, sacral pressure, positioning, distraction, aromatherapy, breathing techniques, massage, guided imagery, music **(Sriasih et al., 2019).**

Massage contains influencing soft tissues of the body. It is used to help relax muscles tense and to help calm. Different massage techniques may help to benefit to reduce pain during labor such as lower back massage, smooth strokes, also called effleurage, counter pressure, and hip squeeze. Massage stimulates body to release endorphins, the natural pain-killing, mood-lifting chemicals produced in the brain. In the first stage of labor, massage may reduce anxiety and ease the pain. It also helps to cope with contractions by making feel less intense and more manageable (**Thomson et al., 2019**).

Massage therapy is helping in pain relief and reducing emotional stress. Several theories explain the mechanism by which massage might relieve pain, such as reduction in cortisol and norepinephrine levels, increasing serotonin levels, stimulation of endorphin release in addition to enhancing circulation with a consequent increase in oxygen transmission to the tissues, and the facilitation of toxin excretion through the lymphatic system **(Gallo et al., 2017)**.

The physiological mechanism of breathing is a protective action as it is a fight-or-flight reflex triggered by the central nervous system. Physiologically, deep abdominal breathing stimulates the parasympathetic nervous system (**Ma et al., 2017).** As a result, the blood circulation in pregnant women will undergo oxygenation, which will trigger the release of endorphins associated with a decrease in heart rate and an increase in feelings of calmness. At the same time, endorphins can also suppress the sympathetic system, leading to a decrease in the release of stress hormones such as cortisol (**Bordoni et al., 2017**).

Significance of the study:

Pharmacological interventions used in labor pain management include sedatives, analgesics, and regional anesthesia. Some of these are expensive and may be associated with side effects on primigravida mothers, the labor process, and newborns **(Smith et al., 2018).**

Back massage and breathing exercises cause pain relief and reduce anxiety. It is very effective, nonpharmacological, accessible, cost-effective and it is a non-invasive technique that helps to reduce the intensity of labor pain and anxiety. Hence, the researchers conducted the study to evaluate the effect of natural methods for relieving labor pain and anxiety during the first stage of labor among primigravida mothers.

Aim of the study:

To evaluate the effect of natural methods on relieving labor pain and anxiety during the first stage of labor among primigravida mothers through:

- Assessing labor pain and anxiety among primigravida mothers during the first stage of labor in both groups pre-intervention.
- Applying back massage and breathing exercises during the first stage of labor among primigravida mothers.
- Evaluating the effect of back massage and breathing exercise on labor pain and anxiety among primigravida mothers during the first stage of labor in both groups.
- Investigating the correlation between the labor pain and anxiety during the first stage of labor in both groups.

Hypothesis

- Primigravida mothers' labor pain & anxiety during the first stage of labor will be relieved after applying back massage and breathing exercise.

Subjects and Methods:

Research design:

A quasi-experimental design was utilized to accomplish this study. Quasi-experimental research is a prospective or retrospective study in which patients self-select or are selected into one

of some different treatment groups to compare the real effectiveness and safety of non-randomized treatments **(Maciejewski, 2020).**

Settings:

The study was applied in the obstetrics and gynecology department at Sohag University Hospital. This setting was selected due to the high prevalence of patients in the selected settings and also, it serves the biggest region of the population from both rural and urban areas.

Sample:

Included 80 primigravida mothers were recruited and divided into two equal groups as a group (A) refers to back massage group (n=40) and group (B) which refers to breathing exercises group (n=40).

Sample type:

A Purposive sample was used in this study.

Sample size:

The sample size was calculated through Open episoft ware, version 3, open-source calculator.

Inclusions criteria: The primigravida mothers were selected regarding the following criteria:

- Primigravida mothers aged from 20 to 35
- Primigravida mothers agree to participate in the study.
- Primigravida mothers with gestational age from 36 to 40 weeks.
- Primigravida mothers in the first stage of labor.

Exclusion Criteria:

- Primigravida mothers who had high-risk pregnancies such as abortion, ectopic pregnancy.
- Primigravida mothers who have medical complications such as hematological diseases, thyroid diseases, diabetes
- Primigravida mothers who having obstetrical complications such as obstructed labor, meconium aspiration, fetal distress, etc.
- Primigravida mothers who getting analgesics to relieve pain during 1st stage of labor.

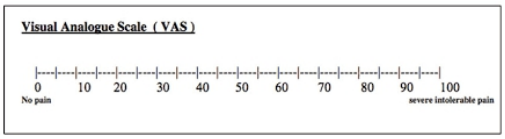
Tools for data collection:

Tool I: A structured interviewing questionnaire was developed by the researchers after reviewing the related literature and research studies **(Dekker, 2020; Bordoni et al., 2018; and Smith et al., 2018),** and consisted of two parts:

Part (1): This tool was used to collect demographic characteristics of pregnant mothers (age, residence, education, occupation)

Part (2): This tool was used to collect obstetrical data included gestational age and cervical dilatation.

Tool II: The visual analog scale (VAS) is a pain rating scale first used by **Hayes and Patterson**, **(1921).** Scores are based on self-reported measures of symptoms that are recorded with a single handwritten mark placed at one point along the length of a 10-cm line that represents a continuum between the two ends of the scale—"no pain" on the left end (0 cm) of the scale and the "worst pain" on the right end of the scale (10 cm). Measurements from the starting point (left end) of the scale to the patients' marks are recorded in centimeters and are interpreted as their pain. Figure-1, (**Asimina & Berde, 2018**)



Tool III: State-Trait Anxiety Inventory (STAI) questionnaire: it was developed by Spielberger, 1977 in the English language and translated into the Arabic language by Abdel-Khalek (1992). The State-Trait Anxiety Inventory (STAI) used a measure of trait and state anxiety. It consisted of 20 items used for assessing trait anxiety and 20 for state anxiety. State anxiety items include: "I am tense; I am worried" and "I feel calm; I feel secure." Trait anxiety items include: "I worry too much over something that doesn't matter" and "I am content; I am a steady person." All items are rated on a 4-point scale (e.g., from "Rarely" to "Almost Always"). Higher scores indicate greater anxiety. The STAI is appropriate for

those who have at least a sixth-grade reading level.

Scoring system:

Score ranges of the STAI questionnaire were from 20 to 80 points and it was divided into three groups: no anxiety (less than or equal to 20), mild (20–40), moderate (41–60), and severe anxiety (61–80). Internal consistency coefficients for the scale have ranged from .86 to .95; test-retest reliability coefficients have ranged from .65 to .75 over a 2-month interval. Test-retest coefficients for this measure in the present study ranged from .69 to .89. Considerable evidence attests to the construct and concurrent validity of the scale.

Validity of the tools:

Tools were submitted to five experts in the field of the Obstetrics and Gynecology nursing Department to test for face validity and the necessary modifications were carried out.

Reliability of the tools:

The reliability of tools was tested using Cronbach's alpha. The reliability coefficient for a tool I was (0.87) and tool II was (0.84), which means all tools were reliable.

Methods:

An official letter from the Faculty of Nursing was obtained and directed to the general director of Sohag University Hospital and to the Head of the obstetrics and gynecology department after a complete explanation of the study aim to obtain permission to carry out the study.

Pilot Study:

A pilot study was done on 10% of the sample (8 primigravida mothers to test the feasibility and applicability of different items of the tool to establish the most practical and comprehensive way of obtaining necessary data. Primigravida mothers included in the pilot study were excluded from the actual study.

Data collection procedures:

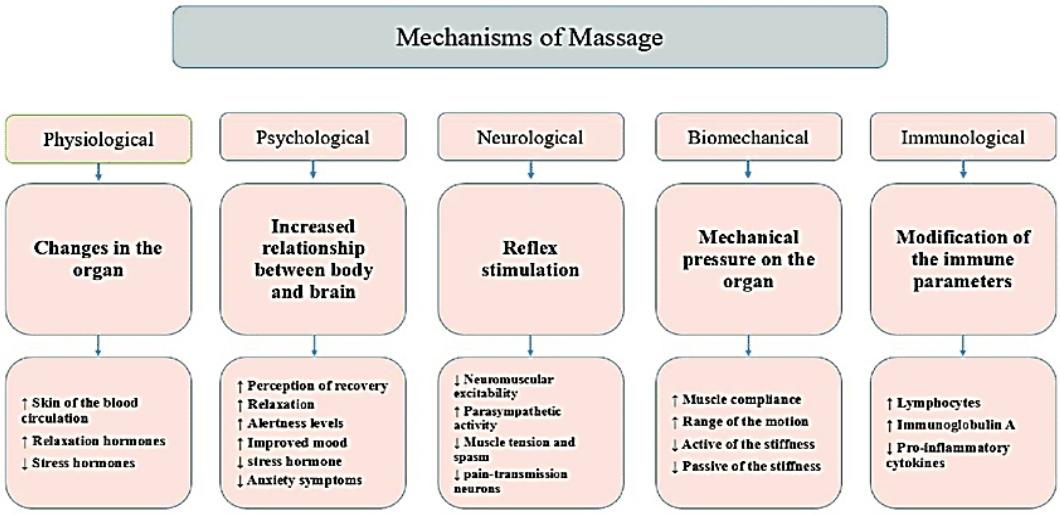
- Approval of the Ethical Research Committee of the Faculty of Nursing was obtained before conducting the study.
- After obtaining the administrative approval, data were collected from March to June 2019. Researchers attended the previously mentioned setting two days per week, from 9 am to 1 pm.
- The study was carried out: Assessment, implementation, and evaluation.

I- Assessment phase:

- Data was collected by all the researchers and they introduced themselves to the primigravida mothers. Clear and simple explanations about the aim and nature of the study were discussed by the researchers with primigravida mothers. The structured interviewing questionnaire was used to collect primigravida mothers' characteristics.

II- **Implementation phase:**

- In group A, lower back massage was given for 15 min
- Effleurage massage from the sacrum to the shoulders and deltoids three times
- Thumb kneading and pressure over the lateral sides of the lumbar area of the spine three times.
- Apply fist knuckling motion and thumb kneading on the lower back, side by side, three times.
- Then, proceed to the upper back massage. The upper back massage was given for 15 min
- Effleurage massage followed by palm kneading from the lumbar region to trapezius laterally three times.
- Thumb kneading over both sides of erector spinae, then draining between the ribs towards the armpit areas three times.
- Apply squeeze on the deltoid muscle with draining towards the armpit three times.
- Apply finger kneading on trapezius muscle, followed by fist scooping three times.
- Finally, press on the neck and shoulder area on both sides three times.



In group B, breathing exercises was given every two hourly.

- Explain the procedure to the primigravida and advise her to lay on her left side* with a pillow on the side of her stomach.
- Breathing exercise intervention for 3-5 min. Ask the primigravida to perform deep breathing by inhaling slowly through the nose for 2 s and then consciously release the air by breathing out for another 2 s during contractions.
- Meanwhile, the progress of the labor was assessed by doing a vaginal examination every four hours. Labor Pain was marked with the help of a visual analog pain scale and anxiety was assessed by State-Trait Anxiety Inventory scale. A post-test was taken by the researchers because it is an acceptable tool and relatively easy to administer to women in labor.
- Pain intensity and anxiety were measured before the intervention and multiple times during and after contractions.
- During the intervention, pain intensity and anxiety were measured after the breathing exercise and through the back massage during and after contraction.

III-Evaluation phase:

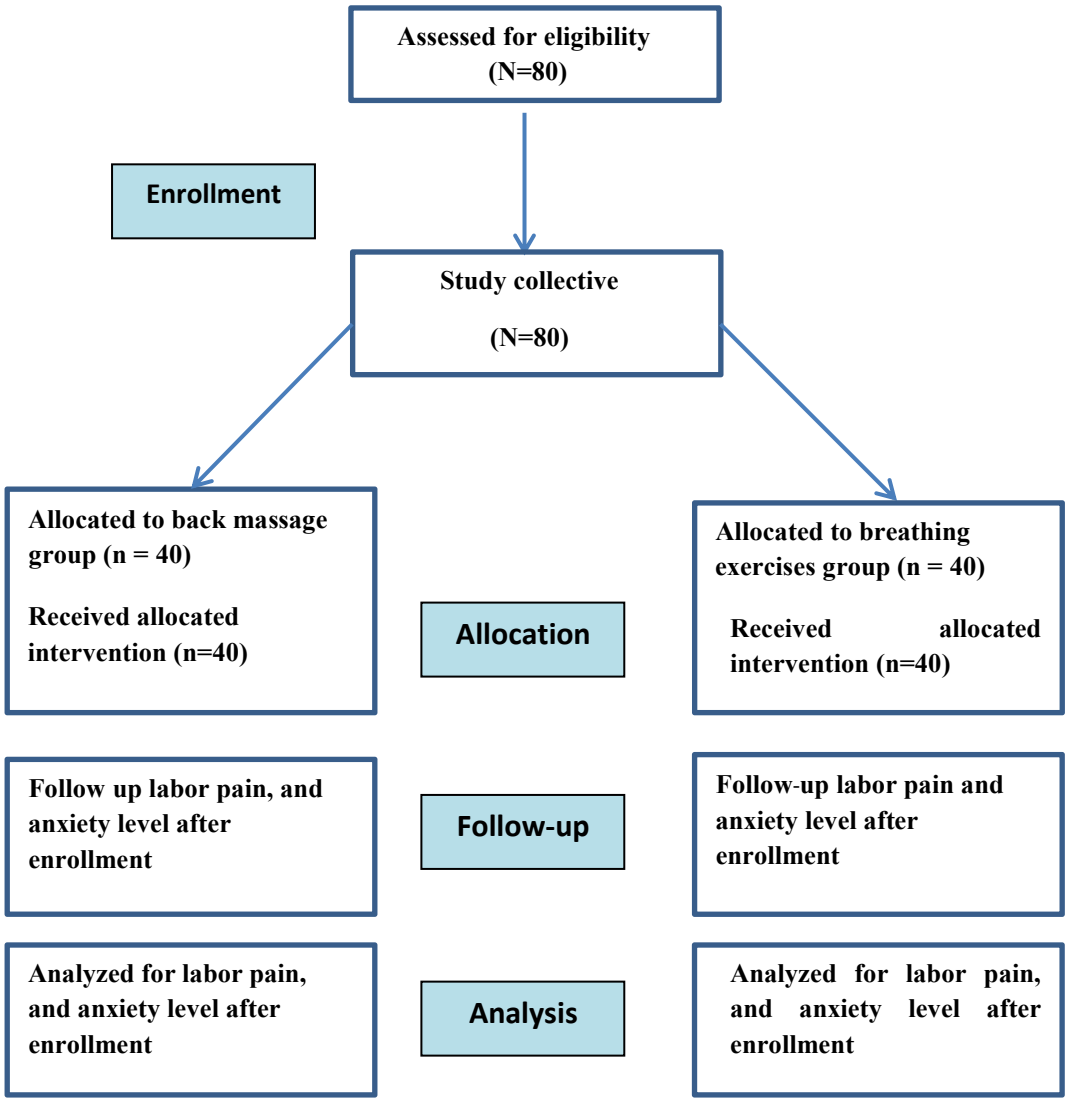
- Pain intensity and anxiety were measured for every participating primigravida mother in both groups till end of the first stage of labor.

Ethical considerations:

Written informed consent was obtained from each Primigravida mother after explaining the aim of the study. Privacy and confidentiality for each Primigravida mother were assured. The Primigravida mother's right to be withdrawn at any time from research participation.

Statistical analysis:

After data were collected and transferred into specially design formats, to be suitable for computer feeding. Data were processed and analyzed using personal computer with Statistical Package for Social Sciences (SPSS ver. 21" Chicago. the USA). Categorical variables were described by number and percent, where continuous variables were described by the mean and standard deviation (Mean, SD). A person's correlation is used to determine significance between variables in the same group. Significance is considered when $P< 0.05$ while $P>0.05$ is considered not significant.



Result:

Table (1): Illustrated that primigravida mother's ages in back massage and breathing exercises groups were between 20-30 years respectively, 52% and 58% of back massage and breathing exercises group respectively were residing in rural areas. Concerning the educational level of primgravida mothers, 48% and 50 of back massage and breathing exercises group respectively had primary education. Regarding occupation 65% and 81% of them were housewives in back massage and breathing exercises respectively.

Concerning the obstetrical data of primigravida mothers in both groups, **Table (2)** portrayed that, 57% of primigravida mothers in the back massage group, their gestational age were between 36-38 weeks, 82% of them had cervical dilatation from 4 to 5 cm. In the same table, in the breathing exercises group, it is obvious that 52% of primigravida mothers in the back massage group, their gestational age were in 36-38 weeks, and 78% of them, the cervical dilatation was between 4to5cm of cervical dilatation.

Table (3) Showed that there was a highly significant difference between mean values of labor pain among primigravida mothers pre and

post-back massage intervention at P=0.001. Also, it is illustrated that there was a highly significant difference between mean values of anxiety level among primigravida mothers pre and post-back massage intervention at P=0.001 level.

Table (4): illustrated that (20%) of primigravida mothers had moderate pain score and (72%) of them had severe pain in breathing exercises which improved after breathing exercises intervention and become 57% of them had mild pain and only 20% of them become had severe pain. It was observed from the same table that (70%) had severe pain score and (22%) of them had moderate pain and 9% of them had mild pain score in back massage which improved after back massage intervention and become 60% of them had mild pain and only 10% of them become had severe pain.

Table (5): illustrated that (60%) of primigravida mothers had moderate anxiety score and (22%) of them had severe anxiety in breathing exercises which improved after breathing exercises intervention and become 57% of them had mild anxiety and only 10% of them become had sever anxiety. The same table showed that (60%) had severe anxiety score and (31%) of them had moderate anxiety and 7% of them had mild anxiety score in back massage which improved after back massage intervention and become 60% of them had mild anxiety and only 7% of them become had sever anxiety.

Table (6): Showed that there was a highly significant difference between mean values of labor pain among primigravida mothers pre and post-breathing exercises intervention at P=0.001. Also, it is illustrated that there was a highly significant difference between mean values of anxiety level among primigravida mothers pre and post-breathing exercises intervention at P=0.001 level.

Table (7): Indicated that, there was a statistical significance difference found in labor pain among primigravida mothers in back massage and breathing exercises at P=0.01 post back massage and breathing exercise intervention. Concerning anxiety of primigravida mothers, in back massage and breathing exercises, there was a significant difference detected at the P=0.01 post back massage and breathing exercise intervention.

Table (8): Revealed that, a moderate positive correlation was found r=0.53 and was statistically significant relation between the labor pain and anxiety of primigravida mothers in the back massage group at 0.01 levels. Regarding the breathing exercises group, there was a moderate positive correlation r = 0.42 was found between the labor pain and anxiety of primigravida mothers at 0.01 level.

Table (1): Distribution of primigravida mothers in back massage and breathing exercises groups regarding their demographic data

Items	Back massage group A (n=40)		Breathing exercises group B (n=40)		x^2	P
	No.	%	No.	%		
Age						
20-< 30	23	58.5	21	52	1.074	1.463
30- ≤ 35	17	41.5	19	48		
Residence						
Urban	21	52	23	58.5	1.037	1.642
Rural	19	48	17	41.5		
Educational level					1.077	1.475
Illiterate	2	5%	4	10%		
Primary school	19	48%	20	50%		
Secondary school	19	47%	16	40%		
Occupation					1.297	574
Working	14	35%	8	19%		
Housewife	26	65%	32	81%		

Table (2): Distribution of primigravida mothers in back massage and breathing exercises groups regarding their obstetrical data

Items	Back massage group A (n=40)		Breathing exercises group B (n=40)	
	No.	%	No.	%
Gestational age				
36-< 38	23	57	21	53
38- ≤ 40	17	43	19	47
Cervical dilatation.				
More than 4 cm	33	82	31	78
Less than 4 cm	7	18	9	22

Table (3): Comparison of mean values of labor pain and anxiety among primigravida mothers pre and post back massage intervention

Variables	Pre back massage intervention	Post back massage intervention	Paired 't' test	P-value
Labor pain	7.2 ± 1.8	3.06 ± 2.87	21.23	0.001
Anxiety	130.4 ± 5.81	136 ± 7.09	6.74	0.001

Table (4): Relation between labor pain among primigravida mothers' pre and post breathing exercises intervention

Anxiety level	breathing exercises intervention				Back massage intervention			
	Pre		Post		Pre		Post	
	No	%	No	%	No	%	No	%
- Mild		8.0		57.0		9.0		60.0
-Moderate		20.0		23.0		22.0		30.0
-Sever		72.0		20.0		70.0		10.0
X2-p-value	7.56- 0.001*				14.23- 0.001*			

*A statistically significant difference

Table (5): Relation between anxiety level among primigravida mothers' pre and post breathing exercises intervention

Anxiety level	breathing exercises intervention				Back massage intervention			
	Pre		Post		Pre		Post	
	No	%	No	%	No	%	No	%
- Mild		18.0		57.0		9.0		60.0
-Moderate		60.0		33.0		31.0		33.0
-Sever		22.0		10.0		60.0		7.0
X2-p-value	0.944- 0.001*				34.4- 0.001*			

*A statistically significant difference

Table (6): Comparison of mean values of labor pain and anxiety among primigravida mothers' pre and post breathing exercises intervention

Variables	Pre breathing exercises intervention	Post breathing exercises intervention	Paired 't' test	P-value
Labor pain	7.23±2.04	4.03±2.47	7.85	0.001
Anxiety	131.3±6.54	147.16±10.34	24.33	0.001

Table (7): Comparison of post mean values of labor pain and anxiety among primigravida mothers in back massage and breathing exercises interventions groups

Variables	Post back massage intervention	Post breathing exercises intervention	Paired 't' test	P-value
Labor pain	3.06 ± 2.87	4.03±2.47	2.45	0.001
Anxiety	136 ± 7.09	147.16±10.34	10.23	0.001

Table (8): Correlation between labor pain and anxiety score among primigravida mothers in back massage and breathing exercises groups

	Correlation coefficient	
	Labor pain versus anxiety	
	r	P
Back massage group	0.53	P=0.01**
Breathing exercises group	0.42	P=0.01**

Discussion:

A variety of non-pharmacologic methods for pain, anxiety, and discomfort are taught in many different types of classes. These techniques teach to relieve pain, anxiety, and discomfort during labor such as breathing techniques, massage, guided imagery, music **(Sriasih et al., 2019).**

Findings of the current study presented that there was improvements and reduction in the pain level and anxiety level among primigravida mothers post-breathing exercises and back massage intervention. These results reflected the positive effect of using these natural methods in reducing pain and anxiety level among primigravida mothers.

Findings of the current study presented that, there was a highly significant difference between mean values of labor pain among primigravida mothers pre and post-back massage intervention at P=0.001 level. This result is supported by the study done by **Suman et al., (2021)** about "Effect of back massage on relieving pain during labor" and concluded that back massage had a positive effect on pain reduction during labor in all the primigravida mothers.

Similarly, this result is in the same line with **Gallo et al (2017)** who studied "Massage reduced severity of pain during labor" and found that massage therapy is helping in pain relief and reducing emotional stress.

The findings of the current study illustrated that there was a highly significant difference between mean values of labor pain among primigravida mothers pre and post-breathing exercises intervention at P=0.001 level. This result comes in agreement with the study done by **Nilima (2016)** who studied "Assess the effectiveness of selected aspects of lamaze method on pain among primigravida mothers during the first stage of labour in selected hospitals of sangli" and found that proving breathing exercises and the massage was effective in the reduction of labor pain.

This result is supported by the study done by **Yuksel et al., (2017)** about "Effectiveness of breathing exercises during the second stage of labor on labor pain and duration" and found breathing exercises in pregnant women are effective in reducing the labor pain and also shortening the duration of the second stage of delivery.

The findings of the current study showed that there was a statistical significance difference found in labor pain among primigravida mothers in back massage and breathing exercises at P=0.01 level. From the researchers' point of view, this is attributed to the importance of back massage and breathing exercises and indicates the success of these interventions were used to decrease labor pain among primigravida mothers.

This finding matches with **Bharti, (2021)** who conducted a study in Pravara Rural Hospital titled "Effectiveness of back massage versus breathing exercises on labour pain and anxiety among primigravida mothers during the first stage of labour" and conclude that back massage and breathing exercises provided more persistent pain relief and reduce anxiety.

Similarly, **Choudhary, et al., (2018)** studied "Effectiveness of labor support measures on the pain perception of mothers in labor" and observed that back massage, deep breathing exercise, and positioning were effective in reducing labor pain.

This result is supported by **Czech et al., (2018)** who found in their study titled "Pharmacological and non-pharmacological methods of labor pain relief establishment of effectiveness and comparison" and stated that non-pharmacological methods such as water birth, transcutaneous electrical nerve stimulation, aromatherapy, acupuncture and

acupressure, massage techniques can help in reducing labor pain.

Also, the results are in the same line with **Smith et al., (2018)** who studied "Massage, reflexology and other manual methods for pain management in labor" and found that manual methods like reflexology and massage are effective for the management of labor pain, and help reduction of tension is turn may relieve labor pain.

A study was done by **Thomson et al (2019)** titled "Women's experiences of pharmacological and non-pharmacological pain relief methods for labor and childbirth" also demonstrated that women have mixed experiences of different non-pharmacological and pharmacological pain relief methods and were more effective in relieving pain during labor.

Similary, **Boateng, et al., (2019)** who studied Nurses and midwives' experiences of using non-pharmacological interventions for labor pain management and observed that the methods of non-pharmacological interventions help to relieve pain during labor with no harm or minimal effect to the fetus as well as a mother also and labor progress.

Results of the current study highlighted that a moderate positive correlation was found and was statistically significant between the labor pain and anxiety of primigravida mothers in the back massage group and the breathing exercises group at 0.01 levels. From the researchers' point of view, this reflected the positive effects of back massage and breathing exercises and their associated roles in reducing labor pain and anxiety of primigravida mothers.

Conclusion:

Based on the findings and hypotheses of the current study, it was concluded that back massage and breathing exercises were effective in relieving and reducing the intensity of pain and reduce anxiety during the first stage of labor among primigravida mothers. A positive correlation was found and was statistically significant between the labor pain and anxiety of primigravida mothers in the back massages group and breathing exercises at 0.01 levels.

Recommendation:

In light of the current study results, the following recommendations are proposed:

- Training programs regarding applying back massage and breathing exercises should be educated for all nurses.
- Applying back massage and breathing exercises are recommended to relieve pain and reduce anxiety during the first stage of labor.
- Future research includes replication of the current study on a large group to be generalized.

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