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Effectiveness of Aromatherapy and Biofeedback in Promotion of Labour Outcome during Childbirth among Primigravidas

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Abstract

Background: Labour pain is the most severe form of pain that every woman may experience during intranatal life. Severe pain makes stress response which may lead to harmful effects on both mother and her fetus. This study was carried out to evaluate the effect of aromatherapy and biofeedback in promotion of labour outcome during childbirth among primigravidas.

Methods: This clinical trial was performed on 600 nulliparous women selected randomly who were expected to have a normal childbirth. Cases were randomly assigned to Aromatherapy group (n=200), biofeedback group (n=200) groups and control group (n=200). The investigator rated the pain by using visual pain analog scale.

Results: Sixty Nine percent (n=137) of cases in aroma massage group expressed it was helpful, provided pain relief and emotional wellbeing during labour. Our findings suggested, aromatherapy was helpful in reduction of duration of labour ($p<0.0001$). Biofeedback is also an effective in reducing pain and duration of labour during childbirth compared with the non-experimental group.

Conclusion: The results of this present study indicated that the use of Aromatherapy and Biofeedback were both effective methods of reducing pain perception and duration of labour among women during labor.

Keywords: Aromatherapy; Biofeedback; Childbirth; Labour pain; Primigravida

Introduction

Childbirth is considered a life-changing event for most women who are associated with great risks, and in certain cases it may cause disability and even death for the mother or child [1]. According to the World Bank report the maternal mortality ratio in India was high as 200 maternal deaths per 100000 live births in 2013 [2]. Maternal mortality ratio (MMR) is defined as the death of a woman while pregnant or within 42 days of termination of pregnancy and is received by dividing the number of maternal deaths per 100 000 live births. Women with adequate psychological support and relaxation techniques had reduced the incidence of caesarean section. Relaxation techniques, mainly breathing exercises, had brought 50% reduction in caesarean section for psychological indications [3].

During labour conflicting emotions are present; fear and unease that can be coupled with anticipation and gladness. Tension, anxiety and fear are factors contributing towards women's perception of pain and may also affect their labour and birth experience. Pain associated with labour has been described as one of the most intense forms of pain that can be experienced [4]. Many women would like to avoid invasive methods of pain management during labour and this may contribute to the development of complementary or non-pharmacological methods for pain management. This study examined the use of aromatherapy and biofeedback as non-pharmacological methods for pain management in labour [5].

In aromatherapy therapy, essential oils from plants were massaged in the skin, in a form of bath or inhalation using a steam or burner. Literature revealed that essential oils were used to heal various ailments by therapeutically stimulating the nasal/olfactory senses (smell) via mental responses, circulatory and respiratory functions. Moreover it enhances physical and mental wellbeing of patients [6]. Biofeedback or biological feedback

encompasses a therapeutic technique where an individual will be trained to improve their own health and wellbeing through signals coming from their own bodies (temperature, heart rate, muscular tension, etc.) [7]. The underlying principle is that changes in thoughts and emotions may result in changes in body functioning. The present study was carried out to compare the reduction of pain and duration of labour between the aromatherapy therapy and biofeedback therapy group during childbirth among primigravidas.

Method and Material

The data collection was done from Dec 2012 to Sep 2013 at selected hospitals in Coimbatore Dist, Tamil Nadu, South India. Inclusion criteria comprised only nulliparous women, with a singleton pregnancy of gestation age >36 weeks, singleton pregnancy with cephalic presentation, cervical dilatation ≥ 4 cm and having three uterine contractions in 10 minutes at least with a duration of 30 seconds. Exclusion criteria included, third trimester bleeding, intrauterine fetal growth retardation, multiple pregnancy, breech presentation, being athletic, addiction (alcohol and cigarettes), using analgesic during 3 hours before and during the intervention, the use of sedative drugs, history of infertility, allergic to lavender oil during skin test.

This was a post-test only experimental group design. Information was gathered in the form of a short questionnaire to elicit maternal feedback about receiving & administering the experiment. After explanation and obtaining written consent of women, they were randomly assigned to three groups:

Group 1 Aromatherapy application

The oil used for aromatherapy was lavender oil and was applied by massage during labour by the investigator. Before the therapy, skin allergies were checked by conducting a patch test on the skin. Randomly selected subjects (n=200) received aromatherapy where oil was applied over the back and abdomen with a slight massage. The massage was continued till the end of first stage of labour.[8] The pain was assessed in Latent phase, active phase and transitional phase. Routine intrapartum care also given for the mother by the midwives [9,10]. No family members were involved in this study.

Group 2 Biofeedback application

The investigator personally explained the purpose of the study with the randomly selected subject (n=200). Cardiotokograph, an electronic machine was used for biofeedback study. In this, mother asked to experience both fetal heart sound and variation in uterine contractions. It helped her to consciously regulate both psychological and physical processes, such as pain, which were not usually under conscious control [5]. The pain was assessed in Latent phase, active phase and transitional phase. The routine intrapartum care also given for the mother by the midwives. No family members were involved in this study. Neonatal outcome data included APGAR scores at 1 and 5 minute.

Group 3 Control group (n=200)

Received only routine interventions according to hospital policies. The routine care was given by the midwives and the investigator has recorded the pain intensity level and duration of labour as like experimental group.

Ethical Considerations

This trial was approved by the Research Ethics Committee (Protocol no: 2013/PhDN/KG/006) of concerned selected hospital in Coimbatore, India. Women completed informed written consent form. Each woman was assigned an ID code, ensuring data set anonymity. Women could withdraw from the study at any point.

Limitations of the Study

The study was limited to primigravida mothers only with two variables like pain and duration of labour. The study was conducted in few teaching hospitals in the city.

Results

The results of the present study are based on the findings obtained from statistical analysis of collected data. The women under study were primigravidas. Majority of mothers under study were had age between 21-25 yrs (41% in aromatherapy group, 48% in Biofeedback group and 46% in Control group). Most of the mothers were the house wife in all three groups 50%, 53% and 53% - aromatherapy group, Biofeedback group and Control group respectively. Remaining mothers were the coolie, technical and professional workers.

In this study the mean pain score (Table 1) for aromatherapy group and biofeedback was reduced when compared with control group. Similarly the mean length of duration of labour also reduced in first stage and Second stage of labour (Table 2). But 't' test demonstrated that there was a significant difference between aromatherapy and biofeedback group in pain score (Table 3) during latent phase, active phase and transitional phase. When considering the length of labour it was found significant difference between aromatherapy and biofeedback group in first stage of labour ($p<0.0001$). But no difference (Table 4) were found in second and third stage of labour ($p=0.0518$, $p=1.000$ respectively). The association of findings with demographic and obstetrical score was assessed by using chi-square test. It was reported that body mass index($\chi^2=35.8$), nature of onset of labour pain($\chi^2=6.9$), analgesics($\chi^2=43.7$), and history of dysmenorrhea($\chi^2=43.7$) were having association with labour pain (Table 5). But nature of conception ($\chi^2=0.011$) and regular antenatal checkup ($\chi^2=3.15$) is not having association with labour pain.

Table 1 Mean and standard deviation of pain score

Time of Assessment	Aromatherapy Group		Control group		Biofeedback Group	
	Mean	SD	Mean	SD	Mean	SD
Latent phase	6.2	0.13	8.6	0.5	7.8	0.15
Active phase	7.5	0.21	9.0	0.34	8.2	0.19
Transitional phase	8.3	0.47	9.6	0.21	9.2	0.01

Table 2 Mean and standard deviation of Duration of labour

Stages of labour in hours:mts	Aromatherapy Group		Control group		Biofeedback Group	
	Mean	SD	Mean	SD	Mean	SD
First stage	11:55	2.4	14:58	2.9	13:52	2.6
Second stage	1:5	0.33	1:58	0.37	1:55	0.15
Third stage	0:28	0.02	0:30	0.05	0:28	0.03

Table 3 Comparison of Pain score between aromatherapy and biofeedback group

Pain assessment	Groups	Mean	SD	value of 't'	P value	Result
Latent phase	Aromatherapy group	6.2	0.13	113.95	P<0.0001	S
	Biofeed back group	7.8	0.15			
Active phase	Aromatherapy group	7.5	0.21	34.96	P<0.0001	S
	Biofeed back group	8.2	0.19			
Transitional phase	Aromatherapy group	8.3	0.47	27.07	P<0.0001	S
	Biofeed back group	9.2	0.01			

Table 4 Comparison of Duration of labour between aromatherapy and biofeedback group

Stages of labour	Groups	Mean	SD	value of 't'	P value	Result
First stage	Aromatherapy group	11.55	2.4	7.87	P<0.0001	S
	Biofeed back group	13.52	2.6			
Second stage	Aromatherapy group	1.5	0.33	1.95	P=0.0518	NS
	Biofeed back group	1.55	0.15			
Third stage	Aromatherapy group	0.28	0.02	0.000	P=1.000	NS
	Biofeed back group	0.28	0.03			

Table 5 Association of Pain score with selected obstetrical variable

S. No.	Selected obstetrical variables	Pain score		Value of χ^2	P value At 5% Level of significance	Result
		Below Median	Above Median			
1.	Quetelet's Body mass index a) < 24 b) ≥ 24	132 183	189 96	35.8401	0.	S
2.	Nature of onset of labour pain a) Spontaneous b) Induced	181 134	133 152	6.9879	0.008206	S
3.	Nature of conception a) Assisted b) Natural	05 285	05 305	0.0113	0.915298	NS
4.	Analgesics given a) Yes b) No	225 75	30 270	259.335.	0.	S
5	History of Dysmenorrhea a) Yes b) No	53 142	175 130	43.7265	0	S
6	Regular antenatal check up a)Yes b)No	138 152	170 140	3.1547	0.07571	NS

Individual reviews showed that there is no significant difference between aromatherapy group and Biofeedback Group. Although more women in aromatherapy group were satisfied with pain relief (p=0.6443) and caesarean section (p=0.0304) was reduced (Table 6). No women in either group had a postpartum haemorrhage (p=1.000). The findings of the study were concluded that aroma therapy and biofeedback were found effective when compared with control group.

Discussion

This study has evaluated the effectiveness of aromatherapy and biofeedback in reduction of pain and duration of labour during childbirth. Overall there was a slight difference between aroma therapy and biofeedback therapy. But when compared with aroma therapy there was a limited pain reduction in biofeedback therapy. However biofeedback therapy also found effective when compared with control group. Duchene, 1998 reported that

Table 6 Results by individual review- Aromatherapy therapy versus Biofeedback group

Outcome	No of women in Aromatherapy Group (n=200)		No of women in Biofeedback Group (n=200))		RR	95%CI	p value
	Positive outcome	Negative outcome	Positive outcome	Negative outcome			
Pain intensity	152	48	148	52	1.0270	0.9171 to 1.1501	0.6443
Satisfaction with pain relief	148	52	150	50	0.9737	0.8695 to 1.0904	0.6443
Satisfaction with childbirth experience	137	63	135	65	1.0148	0.8871 to 1.1609	0.8303
Assisted vaginal birth	125	75	130	70	0.9615	0.8294 to 1.1148	0.6032
Caesarean section	178	22	180	20	1.0909	1.0083 to 1.1803	0.0304
Adverse effect for women (PPH)	200	00	200	00	1.000	0.9903 to 1.0098	1.000
Post natal depression	190	10	189	11	1.0442	0.9873 to 1.1043	0.1300
Adverse effect of infants	178	22	180	20	1.0053	0.9600 to 1.0528	0.8226
APGAR Score <7 at first 5 minute	179	21	172	28	1.0407	0.9671 to 1.1199	0.2865

women who practiced biofeedback, had significant reduction in labor pain according to the Mc Gill Pain Questionnaire scale and also reduction in duration of labour [10].

Aroma therapy is a cost effective non pharmacological pain relief method. The present study showed that, aromatherapy was effective in reduction of pain and duration of labour. No maternal and neonatal adverse effects were associated with aroma therapy. The majority of women reported satisfaction about their labour experience. To confirm this, Chang et al., [11] demonstrated a study in which aroma therapy massage was effective on pain reduction and alleviation of fear during labor. Our finding also showed that mean pain intensity in first stage of labor was reduced when comparing with non-experimental group. It was also supported by another study conducted by Burns et al., [12] where, they concluded that aromatherapy was useful to relieve pain and also strengthen the uterine contractions during labor. The recent study by Abbaspoor, [13] also confirmed that, lavender oil massage was a cost effective intervention during childbirth to decrease pain and duration of labour during the first and second stage of labour. Similarly Jennings [14] reported that lavender oil promotes relaxation, and it may give soothe effect to the skin and stimulate the nerve endings when applying like a massage.

Lavender massage used in aromatherapy can reduce the pain during first stage of labor and it can reduce a wide range of worst labour outcomes. Aromatherapy is an alternative treatment during labour in reduction of pain, instead of using pharmacological methods of pain relievers [15]. However, the final result of our study also showed that aromatherapy was more useful than biofeedback therapy and it was compared with control group. A research study reported that linalool which is present in lavender oil is having sedative and local anesthetic effect. This constituent may reduce the perception of labour pain. It also increase the secretion of epinephrine which may responsible for the reduction of pain perception by the mother [16].

Biofeedback is also a valuable tool in reduction of labour pain which facilitates psychological interventions that aid developing greater skills for coping and improved functioning on measures of pain intensity, adaptive beliefs about pain and the level of depression [17]. During biofeedback therapy, electrodes were attached to the patient's skin, which sends data to a scrutinizing carton. The biofeedback therapist reads the dimensions and through trial and error signals out mental undertakings that helps to normalize the patient's whole body processes [18].

Giardino et al., [19] stated that, biofeedback is to make a person who is in an anxious state to become aware of the physiological changes and sleds manipulate to be in a relaxed state. Sutarto et al., [20] examined the effect of resonant breathing biofeedback teaching for decreasing stress among constructing operators. Outcomes demonstrated that despondency, anxiety, and stress significantly declined after the training in experimental group. Moreover when used as an adjunct to other therapeutic interventions it shown as an effective treatment for reducing or eliminating symptoms of several pain-related conditions, including low back pain [21]. As a non-pharmacological nursing intervention, biofeedback therapy is easy to administer, cost effective, harmless, does not require much training, and it is appealing to the mother [22]. The present study results showed that biofeedback therapy also a good and effective non pharmacological method for reduction of pain and duration of labor when compared with control group whereas, when compared with aromatherapy, it has less significant effects on the both variables.

Conclusion

The results of this present study suggest the use of aromatherapy and biofeedback as an effective method of reducing pain perception and duration of labour among women during labor. As a non-pharmacological nursing intervention, these are easy to administer, cost effective, harmless, do not require more training, and appealing to the mother. This intervention may be used by health care practitioners (midwives, medical and nursing staff, student nurses) as part of their routine when providing care with women during the labor process.

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