Effectiveness of Biofeedback as a Tool to Reduce the Perception of Labour Pain among Primigravidas: Pilot Study

Janula Raju[1], Mahipal Singh[2]

[1] Research scholar, JJT University, Jhunjhunu, Rajasthan, India.
[2]Principal, Akhil Bharati Vidyapeeth Nursing College, Sikar, Rajasthan, India

ABSTRACT

Background: Labour pain is the most undesirable and unpleasant aspect of experience during childbirth. It is a challenging issue for nurses designing intervention protocols. Thus, the purpose of this study was to identify the effect of biofeedback on the perception of pain during labour among labouring women. **Methodology:** A quasi-experimental design with random assignment was utilized in this investigation. Fifty subjects were assigned into either biofeedback (n=25) or control group (n=25). Participants' levels of pain were measured utilizing the Visual Analogue Scale (VAS) for pain and the behavioural rating scale (BRS) for pain. The control group was provided with the usual standard routine of care, while the biofeedback group was provided with the usual standard routine of care and was exposed to biofeedback therapy throughout the labour. **Results:** Findings revealed that those in the biofeedback group had statistically significant reduction in reported pain levels compared to those in control group [VAS (t=2.85, p=0.0064) and BRS (t=5.2, p=0.0001)]. **Conclusion:** The study showed that biofeedback therapy during labour can reduce pain and it can be used as a part of routine care for women during labour.

Keywords: Biofeedback, Labour Pain, Childbirth, Visual Analogue Scale, Behavioural Rating Scale.

Raju J, Singh M. Effectiveness of Biofeedback as a Tool to Reduce the Perception of Labour Pain among Primigravidas: Pilot Study. TJFMPC 2013; 7(4)87-90. DOI: 10.5455/tjfmpc.41373

Introduction

Labour pain is the most severe pain experienced by the women. Parity also influences labour pain, that is, primigravida women experience more pain during labour than multigravida mothers.[1] The incidence of caesarean sections is high and continues throughout the developed and developing countries.[2] Majority of women (68%) are requesting for caesarean section because of psychological indications. Women with adequate psychological support and relaxation techniques had reduced the incidence of caesarean section and 38% of them agreed for normal vaginal delivery. Relaxation techniques, mainly breathing exercises, had brought 50% reduction in caesarean section for psychological indications.[3]

Corresponding author: Janula Raju,
Research scholar, JJT University, Jhunjhunu, Rajasthan, India.
Phone: 91-7415159891
E-mail: janular@gmail.com
Received Date: July 21, 2013
Accepted Date: October 03, 2013

In most maternity hospitals, pharmacological and non- pharmacological methods are used to relieve pain. The aims of all these methods are to reduce or mitigate labour pain without any harmful effects on mother and child.[4] Non-pharmacological treatments are often simple and inexpensive and can be used as replacement or complementary therapy associated with medications treatment where pregnant women are the decision-makers, so they feel strengthened and it is effective on their labour progress.[5] Non pharmacological methods for pain relief include: hypnosis, massage, heat and cold, aromatherapy, percutaneous nerve stimulation, music therapy and changing the mother status during the labour such as walking, breathe control, and accompanied by a person during labour.[6]

For several decades, childbirth educators have focused on the alleviation or reduction of pain and suffering during the child birth experience. A wide variety of non pharmacological pain relief measures, as well as pharmacological interventions, are presently available to women in labour. Relaxation, breathing techniques, positioning/ movement, massage, hydrotherapy, hot/cold therapy, music, biofeedback, guided imagery, acupressure, and aromatherapy are some

self-help comfort measures women may initiate during labour to achieve an effective coping level for their labour experience. Lamaze childbirth preparation classes teach the majority of these techniques.[7]

Biofeedback or biological feedback encompass a therapeutic technique by which individuals receive training to improve their health and well being through signals coming from their own bodies (temperature, heart rate, muscular tension, etc). The underlying principle is that changes in thoughts and emotions may result in changes in body functioning. It consists of an alternative treatment that aims to gain control over physiological responses with the aid of electronic instruments, under the supervision of experts in biofeedback technique. This includes measuring muscle tension; skin temperature gauges showing changes in the amount of heat given off by the skin indicating a change in blood flow. Biofeedback may be useful in relieving an overly rapid heartbeat and controlling high blood pressure. Respiration feedback devices concentrate on the rate, rhythm, and type of breathing to help lessen symptoms of asthma, anxiety and hyperventilation, and also promote relaxation.[8]

As biofeedback is a non-invasive therapy which should be administered after a medical consultation has ruled out serious symptoms or an underlying chronic disorder. It is given to women during labour to reduce the perception of pain during labour. At the first session, the woman is asked a few questions about her health and that of family members and shown how to use and apply the biofeedback equipment.[9]

Prenatal lessons are generally delivered by healthcare professionals such as clinicians, nurses, physiotherapists, midwives or birth instructors. There is a need to study the effectiveness of biofeedback as a tool to reduce the perception of pain as well as the costs associated with its application.[10]

Materials and Methods

Subjects

The study was conducted between March 2013 and June 2013 at selected hospitals in Coimbatore Dist, Tamil Nadu, 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 and history of infertility, allergy to essences and use of herbal oil.

Procedure

This was a quasi experimental research design. Information was gathered in the form of a short questionnaire to elicit maternal feedback about receiving and administering biofeedback therapy. After explanation and obtaining written consent of women, they were randomly assigned to two groups. The first group (n=25) received only routine interventions like antiseptic dressing, encouragement, enema with soap and water, bladder care, assessment of abdominal and vaginal findings, recording pulse, respiration, blood pressure and fetal heart rate. The second group (n=25) received the routine intervention along with biofeedback Therapy. In biofeedback therapy the uterine contraction and fetal heart rate were monitored and instructed the mother to feel the variations through Cardiotokograph. Following this session, relaxation exercises and practice were conducted. Participants were instructed to practice this continuously. Biofeedback was initiated upon admission to the labour and continued until delivery. Biofeedback therapy was administered for one of the following reasons: to alleviate pain (reduction of level pain intensity) or to improve the wellbeing of mother and to promote active participation for labour process.

Ethical considerations

This study was approved by the Research Ethical Committee of concerned selected hospital in Coimbatore (Protocol Number: 2013/PhD N/KG/006). Women those who completed informed written consent form were assigned a specific ID code, ensuring data set anonymity. The committee allowed the women to withdraw from the study at any point.

Statistical analyses

The data were entered in Microsoft excel and were computed by SPSS version19. Descriptive statistics used include percentage mean and frequency. Chi-square test was used to determine the difference of demographic variables of the subjects in both

groups. Independent t-test after ensuring normality and homogeneity of the samples was used to detect significant difference in the baseline and post test scores. The level of confidence was set at 95%.

Results

Fifty subjects (50) were recruited to participate in the investigation. The mean age was 26±2 years. Majority of the respondents received pre-natal services in both control (96%) and study groups (100%). The result showed in table 1 described that both groups were found to be non significant in aspects of age, family income, history of prenatal check up.

Significant differences found between the Control and Study group are shown in Table 2. Both the scores of VAS and BRS were statistically significant when compared with control group. Significant values of VAS and BRS were t=2.85, p=0.0064, t=5.2, p< 0.0001 respectively.

Table1.Demographic characteristics of the subjects in two groups

Characteristics		Control group	Study group	X^2	P value
		n%	n%		
Age	18-22 yrs 23-26 yrs 27-30yrs 31-34 yrs	21 (84%) 03 (12%) 01 (04%) 00	18 (72 %) 05 (20%) 01 (04%) 01 (04%)	3.633	0.304
Family monthly Income	5000-10000 10001-15000 15001-20000 >20001	13 (52%) 3 (12%) 5 (20%) 4(16%)	7 (28%) 5 (20%) 5(20%) 8(32%)	1.173	0.630
History of Prenatal check up	Yes No	24 (96%) 01(4%)	25 (100%) 00	1.020	0.3124

Table 2. Baseline difference on control and study group utilizing two scales

Variables	Control group		Study group		Confidential Interval	T value	P value
	Mean	SD	Mean	SD			
Visual Analogue Scale	80.35	12.64	70	13	95%	2.85	0.0064
Behavioral Rating Scale	8.4	0.8	6.9	1.2	95%	5.2	0.0001

Discussion

Biofeedback is a valuable tool in reducing 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.[11]

Moreover when used as an adjunct to other therapeutic interventions it is shown as an effective treatment for reducing or eliminating symptoms of several pain-related conditions, including low back pain.[12]

Biofeedback has focused on the acquisition of control over some physiological responses with the aid of electronic devices, allowing individuals to regulate some physical processes (such as pain) which are not usually under conscious control. The role of this behavioural approach for the management of pain during labour, as an addition to the standard prenatal care, has been never assessed systematically.[13]

Duchene 1989 reported that women in the biofeedback group had statistically significantly lower pain levels according to the McGill Pain Questionnaire scale. Pain in labour was measured using the Visual Analogic Scale (VAS). It is one of the most commonly used measures of pain intensity scale in pain research. It also reported that women in the biofeedback group had significantly lower in VAS pain ratings at admission, delivery and after delivery. Furthermore; the small sample size might have affected the statistical power and effect size of the study. Thus, future studies may be conducted to increase statistical power and effective sample size. This pilot study also revealed that using the biofeedback can effectively reduce the pain during labour.

Conclusions

The results of this present study clearly indicated that the use of biofeedback therapy is an effective method of reducing pain perception among women during labour. 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. This intervention may be used by health care practitioners (medical and nursing staff, student nurses) as part of their routine when providing care with women during the labour process. It is hoped that the findings added knowledge to the existing body of literature on research related to non-pharmacologic management during labour and childbirth.

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