

# The Effect of Selected Antenatal Exercises in Reduction of Labor Pain among Primigravid Women: Implication for Practice

<sup>1</sup>Emi John Prince, <sup>2</sup>Vidya Seshan

## ABSTRACT

**Purpose:** Labor is a physiological event, but it is a painful event. The agony and stress a woman suffers are beyond description. Primigravid women must be prepared during the antenatal period itself for safe and natural childbirth. The purpose of this study was to determine the effect of antenatal exercise in pain management during labor.

**Materials and methods:** A quasi-experimental study was conducted with 600 primigravid women. Education on antenatal exercises provided with the help of three-dimensional (3D) animation and the practice was monitored. Visual analog scale (VAS) was used to assess the perception of the pain of these primigravid women during labor.

**Results:** The primigravid women performed exercise for a minimum of 15 to a maximum of 34 days. In the experimental group, 74% of the primigravid women had moderate pain, and only 26% of them had severe pain. Whereas in the control group, 95.7% of the primigravid women had severe pain and only 4.4% of women had mild to moderate pain. Experimental group women had better pain bearing capacity due to exercise as compared to control group.

**Conclusion:** Nurses and childbirth educators must be willing to provide sensitive, continuous care that is a collaborative effort with the woman to assist her in coping with pain and mastering the experience of childbirth. Greater attention needs to be paid to promote and implement the antenatal exercise program from the onset of pregnancy in the absence of any medical and obstetrical complications. Healthcare providers should appreciate and strongly recommend the exercise program as nonpharmacological pain relief measure during labor.

**Keywords:** Antenatal exercise, Labor pain, Primigravid women.

**How to cite this article:** Prince EJ, Seshan V. The Effect of Selected Antenatal Exercises in Reduction of Labor Pain

among Primigravid Women: Implication for Practice. *J South Asian Feder Obst Gynae* 2015;7(3):185-190.

**Source of support:** Nil

**Conflict of interest:** None

**Date of received:** 15 September 2015

**Date of acceptance:** 7 October 2015

**Date of publication:** December 2015

## INTRODUCTION

Safe motherhood and reproductive health are a global issue in today's world. Women's preferences for health related outcomes are playing an important role in modern healthcare practice and policy.<sup>1</sup> Women's autonomy in healthcare decision-making is extremely beneficial for better maternal, child health outcomes and as an indicator of women's empowerment.<sup>2</sup> Women's health issues have attained higher international visibility and renewed political commitment in recent times. While targeted policies and programs have enabled women to lead a healthier life, however significant gender-based health disparities remain in many countries.<sup>3</sup> Limited access to education or employment, low illiteracy rates and increasing poverty levels are making health improvements for women exceedingly difficult.<sup>4</sup>

Labor is a physiological event. Pain is a common phenomenon and is an inevitable part of the childbirth process.<sup>5</sup> The agony and stress a woman suffers are beyond description. Stress of pain disturbs the maternal autonomic functions and liberates catecholamine, which predisposes to dysfunctional labor and compromise fetal oxygenation.<sup>6</sup> Continuous labor pain has effect on respiratory system, blood circulation, endocrine glands and other body activities.<sup>7</sup> A recent review by Lowe<sup>8</sup> focuses on methods for measuring pain experience and physiologic and environmental factors that influence labor pain.

Effective control of the labor pain like other acute pain is very important for the health and society.<sup>9</sup> There are two different methods to reduce the labor pain, pharmaceutical and nonpharmaceutical groups. Nonpharmaceutical methods in labor pain reduction are frequently simple and cost effective, and can be used as a successor or ancillary treatment with other drugs.<sup>10</sup>

<sup>1</sup>Clinical Facilitator, <sup>2</sup>Assistant Professor and Assistant Dean (Training and Community Services)

<sup>1</sup>Sessional Academic at Australian Catholic University, School of Nursing, Queensland University of Technology, Brisbane Queensland, Australia

<sup>2</sup>Department of Maternal and Child Health Nursing, College of Nursing, Sultan Qaboos University, Al-Khoudh, Muscat Oman

**Corresponding Author:** Vidya Seshan, Assistant Professor Assistant Dean (Training and Community Services), Department of Maternal and Child Health Nursing, College of Nursing Sultan Qaboos University, Sultanate, Oman, Phone: +968-967-396-95, e-mail: akshayaka2003@yahoo.co.in, vidya69@squ.edu.om

Wide arrays of nonpharmacological pain relief measures are presently available to women in labor. Relaxation, breathing techniques, positioning or movement, massage, hydrotherapy, hot or cold therapy, music, guided imagery, acupressure, and aromatherapy are some self-help comfort measures, that women may initiate during labor to achieve an effective coping level for their labor experience. Lamaze<sup>20</sup> childbirth preparation classes teach the majority of these techniques.<sup>12</sup>

Research has long recognized women's education as a central determinant of maternal and childbirth. Childbirth education has been accepted by the healthcare committee as a part of healthcare system, especially in developed countries. If a mother is prepared physically and mentally to participate in labor, she helps herself to have a normal delivery and healthy child.<sup>13,14</sup> For several decades, childbirth educators have focused on the alleviation or reduction of pain and suffering during the childbearing experience.<sup>15</sup> The components included in most childbirth preparation classes are education to help a woman to understand some techniques mostly about breathing exercises, relaxation techniques and visualization to prepare her body for pregnancy and labor.<sup>16,17,21</sup> The three main goals of this are prevention of discomforts, preparation for childbirth technique and restoration of health.

Exercise has become an integral part of the life styles of many women. However, many women stop exercising during pregnancy because of concerns regarding the well-being of the fetus.<sup>18,19,22</sup> Exercise can be beneficial to the pregnant woman in the absence of obstetric or medical complications.<sup>16,17</sup> There are certain contraindications to exercise during pregnancy, including pregnancy-induced hypertension, preterm rupture of membranes, preterm labor, incompetent cervix, and persistent second or third trimester bleeding. In addition, certain guidelines should be followed in order to prevent harmful effects on the fetus.<sup>16,19</sup>

During labor when women are instructed, they are not able to follow the instruction because they experience the pain. Women must be prepared during the antenatal period itself for safe and natural childbirth.<sup>19</sup> Even though pain is a personal experience, it can be analyzed by means of quantitative pain measures. Verbal reports using standardized instruments, such as the McGill pain questionnaire and the visual analog scale (VAS), have been the most common methods of pain assessment in both clinical practice and research.<sup>11</sup>

The aim of the study presented in this paper is to determine the effect of selected approved antenatal exercises during labor among primigravid women. Selected antenatal teaching techniques refers to the techniques that are to be practiced by the primigravid

women during pregnancy, labor and delivery to reduce the pain perception and promote the labor outcomes. It includes different types of breathing techniques like cleansing breathing, slow rhythmic breathing, shallow breathing, passive relaxation, modified breath holding technique and pelvic floor exercises, which help the mother to relieve the labor pain with significant maternal and fetal well-being.

## MATERIALS AND METHODS

### Study Design, Setting and Sample

The research design adopted in this study was quasi-experimental. Karnataka is one of the major states of South India, and is the eighth largest states in India in terms of population (World Health Issues, 2010). According to Population Census of India 2001, the population is 5.273 crores with female population of 2.595 (49.1%). The total fertility rate of this state is 2.1. The maternal mortality rate stands [sample registration system (SRS) 2004–2006] at 213 per lakh live births and infant mortality rate at 45 per 1000 live births. This study was conducted in one of the hospitals in Karnataka, India, which had average of 1300 deliveries in a year.

Samples were selected from antenatal clinic using convenient sampling technique. The inclusion criteria for selecting the sample were primigravid women; age limit of 18 to 30 years; no medical complication or obstetric complications; at 34 weeks of gestation with vertex presentation. The sample size determined as 600

by adopting the formula  $n = \frac{[(a + b)^2 (p_1q_1 + p_2q_2)]}{\chi^2}$ . The

sample was selected for the control and experimental group using random sampling method by tossing the coin. The mothers who have had structured teaching program (300) were considered as the experimental group (group I) and those did not received structured teaching program (300) but routine health education from the obstetricians were considered as control group (group II).

### Ethical Consideration

The research committee of the University has given Ethical clearance to conduct the study. The hospital had given permission to conduct the study. The study purpose was explained and informed consent was obtained from the study participants. The pregnant women were assured that they could withdraw from the study at any point of time and, if desired their questionnaire would be destroyed. Questionnaires were assigned with an identification number, and names were not attached to them.

## Measurements

The questionnaire consists of sociodemographic obstetric data. The data include: age, education, income, residence, obstetrical score and present obstetrical history. Antenatal women were provided a record sheet, where they record their practice of exercise. The research assistants checked the record sheet during follow-up visits. During labor with the help of VAS, the pain was assessed and scored as mild: 1 to 3, moderate: 4 to 7 and severe: 8 to 10.

## Data Collection (Table 1)

The data collection was done from April 2006 to March 2007. The trained research assistants approached the primigravid women who come to the outpatient department for the routine visit. The study details were explained and those who have agreed to participate in the study were asked to fill the questionnaire on demographic and obstetric data. The data include age, education, income, residence, obstetrical score and present obstetrical history. After completing the questionnaire, the women in the experimental group were taught the selected antenatal exercises with the help of the video assisted program. The selected antenatal techniques that includes were breathing exercises, relaxation exercises and pelvic floor muscle exercise. The content that includes in the video assisted program are information about pregnancy and labor, benefits of selected antenatal exercise, types of exercises, selected exercises during pregnancy and labor. The video was done with lot of animation to make it easily understandable to the women. Content validity of the video was obtained from 11 experts. The session scheduled for 45 minutes and was asked to do a return demonstration by the primigravid women.

**Table 1:** Assessment of exercises pattern of primigravid women in the experimental group

Sl. no.	In terms of hours	f (%)
Assessment of breathing exercises in terms of time		
1	<200	69 (23%)
2	200–400	146 (48.7%)
3	≥400	85 (28.3%)
Assessment of relaxation exercises in terms of time		
1	<200	75 (25%)
2	200–400	137 (45.7%)
3	≥400	88 (29.3%)
Assessment of pelvic floor exercises in terms of time		
1	<200	69 (23%)
2	200–300	74 (24.7%)
3	≥400	157 (52.3%)

Each primigravid women was given a record sheet to record the exercises performed at home with relevant instructions and a compact disk (CD) was provided for their practice. The research assistants checked the record sheet during follow-up visits. This record sheet clearly states whether the women have practiced the exercise and the frequency and duration. As it is not possible to have preassessment of labor process, post-test alone is adhered to determine the effectiveness of exercise on labor pain. During labor with the help of VAS, the pain was assessed and scored as mild: 1 to 3, moderate: 4 to 7 and severe: 8 to 10.

## Data Analysis

The data were analyzed through using Statistical Package for the Social Sciences (SPSS) 17.0 (Chicago USA). Assessment of exercise performed by primigravid women and their tolerance of pain were presented in frequency and percentage of occurrence. Chi-square was applied to compare the groups again the tolerance of pain. Similarly, the t-test was also applied to show the significant difference between the groups. All the tests were considered with a maximum error rate of 5%.

## RESULTS

### Sociodemographic Characteristics of the Participants (Table 2)

The age of the women ranged from 18 years to 28 years. Among this 28 (9.3%) women were between 18 and 20 years in the experimental group and 31 (10.3%) in the control group. Majority of women were between the age group of 20 and 25 years in experimental and control group (42.7%). Regarding education, more than half of the women had no formal education; 20% of them had primary education and rest of them are secondary, graduates and professionals. A total of 79% of the women were residing in semiurban area.

### Obstetrical Characteristics of the Participants

All mothers were primigravid women and were without any medical or obstetrical complications. Placenta previa, anemia, antepartum hemorrhage, intrauterine growth retardation, gestational diabetes, multiple pregnancy, pregnancy-induced hypertension, and fibroid uterus are considered as obstetrical complications.

### Effect of Selected Antenatal Exercises on Reduction of Pain

The primigravid women performed exercise for a minimum of 15 to maximum of 34 days. In experimental group, 74% of women had moderate pain and 26% of

**Table 2:** Participants' sociodemographic characteristics

Variables	Experimental group (n = 300)	Control group (n = 300)	Total (n = 600)	$\chi^2$	p-value
	f (%)	f (%)	f (%)		
<b>Age in years</b>					
18–20 years	28 (9.3%)	31 (10.3%)	59 (9.8%)	3.57	0.312
21–22 years	118 (39.3%)	138 (46.0%)	256 (42.7%)		
23–25 years	140 (46.7%)	119 (39.7%)	259 (43.2%)		
26–28 years	14 (4.7%)	12 (4.0%)	26 (4.3%)		
<b>Religion</b>					
Hindu	96 (32.0%)	81 (27.5%)	177 (29.5%)	3.71	0.156
Muslim	99 (33.0%)	121 (40.3%)	220 (36.7%)		
Christian	105 (35.0%)	98 (32.7%)	203 (33.8%)		
<b>Education</b>					
No formal education	156 (52%)	162 (54%)	318 (53%)	3.88	0.423
Primary	55 (18.3%)	68 (22.7%)	123 (20.5%)		
Secondary school and higher secondary	45 (15%)	37 (12.3%)	82 (13.7%)		
Graduate	19 (6.3%)	15 (5%)	34 (5.7%)		
Professional/technical	25 (8.3%)	18 (6%)	43 (7.2%)		
<b>Residence</b>					
Urban	17 (5.7%)	20 (6.7%)	37 (6.2%)	3.02	0.221
Semiurban	230 (76.7%)	242 (80.7%)	472 (78.7%)		
Rural	53 (17.7%)	38 (12.7%)	91 (15.2%)		
<b>Income</b>					
< 3000	53 (17.7%)	50 (16.7%)	103 (17.2%)	0.11	0.745
3001–6000	247 (82.3%)	250 (83.3%)	497 (82.8%)		

women had severe pain. Where as in control group 95.7% of them had severe pain and only 4.4% had mild to moderate pain. Labor pain is characterized as physiological in nature as compared to other pain. It is the pain bearing capacity and perceived pain that was considered in this study. Chi-square value of 335.115 at  $p < 0.000$  shows highly significant. Similarly, the t-test of significance between the groups also shows that the difference is significant ( $p < 0.01$ ). The mean pain score of experimental group ( $M = 7.0$ ,  $SD = 1.0$ ) is lesser than the mean pain score of control group ( $M = 8.8$ ,  $SD = 1.3$ ). The above statistical result shows the woman in the experimental group had reduction in labor pain than the control group (Table 3). This interprets that comparatively experimental group women had better pain bearing capacity due to exercise as compared to control group.

## DISCUSSION

The results showed that the perception of pain in the primigravid women during labor showed significant difference between the experimental group (structured exercises) and the routine care groups. This shows that the severity of the pain in the experimental group is less than the control group, and the structured exercises reduces the severity of the perception of pain in primigravid women. Similarly, in another study effectiveness of a birth ball exercise program revealed that there is a statistically significant improvement in childbirth self-efficacy and pain. The result further suggest that confidence is greater after prenatal preparation and powerfully related to decreased pain perception and decreased medication/analgesia use during labor.<sup>23</sup>

**Table 3:** Assessment of labor pain among primigravid women

Pain score	Experimental group (M = 7.0, SD = 1.0)	Control group (M = 8.8, SD = 1.3)	$\chi^2$	t-value	p-value
	f (%)	f (%)			
Mild	0 (0%)	8 (2.7%)	335.0	19.65**	0.000
Moderate	222 (74%)	5 (1.7%)			
Severe	78 (26%)	287 (95.7%)			

\*\*Significant at 0.01 level

In the 1940s, the focus was on physical exercise as a way to remain fit in spite of the physical changes of pregnancy. The British Obstetrician Dick-Read focused on labor pains and how these were affected by muscle tension triggered by fear.<sup>24</sup> By giving information about the process of labor and practical training in relaxation, fear and tension would be reduced. About the same time, the French obstetrician introduced psychoprophylaxis.<sup>25</sup> The method was developed in Russia and emphasized relaxation as a conditioned response to labor contractions, coupled with a variety of patterned breathing techniques designed to improve oxygenation and interfere with the transmission of pain signals from the uterus to the brain. During the 1970's this method was spread more widely in many Western societies.

The components included in most childbirth preparation classes are education to help woman to understand some techniques mostly about breathing exercises, relaxation techniques and visualization to prepare her body for pregnancy and labor. The three main goals of this are prevention of discomforts, preparation for childbirth technique and restoration for health. Exercise has become an integral part of the life styles of many women. However, many women stop exercising during pregnancy because of concerns regarding the well-being of the fetus. Although pregnancy is associated with several physiologic changes and response to exercise is different in the pregnant state than in the nonpregnant stage. Exercise can be beneficial to the pregnant woman in the absence of obstetric or medical complications.

Antenatal education has been sensitive to opinions and trends and has undergone dramatic changes without knowing much about its effects on relevant outcomes. It represents considerable costs, but is poorly evaluated. The significance of doing antenatal exercises during antenatal period by mothers are vital factor to be remembered by all the women as well as by all the healthcare providers. Nurses and childbirth educators must be willing to provide comprehensive childbirth education that introduces women to a variety of pain management options. Nurses and childbirth educators must also be willing to provide sensitive, continuous care that is a collaborative effort with the woman to assist her in coping with pain and mastering the experience of childbirth. Exposure to a variety of pain management strategies in childbirth education classes can allow more options for clients to use in the childbirth experience. The responsibility of educating the antenatal mothers on childbirth preparation methods and the selected teaching program are in the hands of the nurses and midwives as healthcare personnel, who considerably influences pain relief during I stage of labor. Healthcare providers have

a favorable opportunity to educate pregnant women on selected teaching program and labor outcomes.

## LIMITATION

The results of the study have to be interpreted with caution because the study had limitation in the following aspects: The researcher has no control over the primigravid women doing the selected approved antenatal exercises for a fixed period as they delivered at different time ranging from 14 to 28 days after the teaching. Pain threshold level and stress level of the primigravid women is not included in this study.

## CONCLUSION

The study concludes that primigravid women who received structured teaching program had better labor pain reduction as compared to those women under routine care. Therefore, it is strongly recommended that antenatal exercise program should be a routine activity and a service to be delivered by the healthcare providers in the antenatal outpatient department and in the labor unit. Greater attention should be paid to promote and implement active exercise programs among all women in general and necessarily during commence from the onset of pregnancy in the absence of any medical and obstetrical complications. Under the National Health Rural Mission (NRHM), Maternal and Child Health (MCH) care, the government in coordination with private sector should make it a protocol to encourage the healthcare providers to appreciate and strongly recommend these exercise program as a measure to achieve the millennium development goals (MDG), and bring out good maternal and fetal well-being.

## ACKNOWLEDGMENT

The authors would like to appreciate the study participants, the experts who reviewed the teaching program and research tools and the guidance provided by Dr K Rajalakshmi.

## REFERENCES

1. Spanglar SA. To open oneself is a poor woman's trouble: embodied inequality and childbirth in south-central tanzania. *Medical Anthropology Quarterly* 2011;25(4): 479-498.
2. Al-Riyami AM. Determinants of women's fertility in Oman. *Saudi Med J* 2003;24(7):748-753.
3. Braveman PA, Egerter SA, Mockenhaupt RE. Broadening the focus: the need to address the social determinants of health. *Am J Prevent Med* 2011;40(1S1):4-18.
4. Broding HC, Weber A, Glatz A, Bünger J. Working poor in germany: dimensions of the problem and repercussion for the healthcare system. *J Public Health Policy* 2010;31(3):298-311.

5. Abushaikha L, Oweis A. Labour pain experience and intensity: a Jordanian perspective. *Int J Nursing Prac* 2004;11(1):33-38.
6. McGrady E, Litchfield K. Epidural analgesia in labour. *Continuing education in anaesthesia, critical care and pain* 2004;4(4):114-117.
7. Loeser JD, Bonica JJ. Bonica's management of pain. 3rd ed. Philadelphia: Lippincott Williams and Wilkins; 2001.
8. Lowe NK. The nature of labor pain. *Am J Obstet Gynecol* 2002;186(5):16-24.
9. Bonica JJ. The management of pain. 2nd ed. Philadelphia: Lea and Febiger; 1990.
10. McKinney ES. Maternal-child nursing. 2nd ed. Philadelphia: Elsevier Saunders; 2005.
11. Simkin P, Bolding A. Update on nonpharmacologic approaches to relieve labour pain and prevent suffering. *J Midwifery Women's Health* 2004;49(6):489-504.
12. Mbekenga CK, Pembe AB, Christensson K, Darj E, Olsson P. Informal support to first-parents after childbirth: a qualitative study in low-income suburbs of Dar Es Salaam, Tanzania. *BMC Pregnancy Childbirth* 2011;11(98):1-10.
13. Hildingson I. Women's perspectives on maternity services in Sweden: processes, problems and solutions. *J Midwifery Women's Health* 2007;52(2):126-133.
14. Fenwick J. Pre-and postpartum levels of childbirth fear and the relationship to birth outcomes in a cohort of Australian women. *J Clin Nursing* 2009;18(5):667-677.
15. Eden KB, Hashima JN. Childbirth preferences after cesarean birth: a review of the evidence. *Birth* 2004;31(1):49-60.
16. Chang MY, Chen SH, Chen CH. Factors related to perceived labour pain in primiparas. *The Kaoshiung J Medical Sciences* 2002;18(12):604-609.
17. Bergstrom M, Kieler H. Effects of natural childbirth preparation versus standard antenatal education on epidural rates, experience of childbirth parental stress in mothers and fathers: a randomised controlled multicentre trial. *Br J Obst Gynaecol* 2009;116(9):1167-1176.
18. Zavorsky GS, Longo LD. Exercise guidelines, in pregnancy: new perspectives. *Sports Medicine* 2011;41(5):345-360.
19. Young B, Takoudes T, Lim KH, Rana S. Rupture of the posterior cul-de-sac during spontaneous labour. *Obstet Gynecol* 2010;115(2):414-417.
20. Lothian JA. Lamaze breathing: what every pregnant woman needs to know. *J Perinatal Education* 2011;20(2): 118-120.
21. Ezmerli NM. Exercise in pregnancy: primary care update. *Obstet Gynaecol* 2000;7(6):260-265.
22. Avery M, Jennings E, Sherwood N, Martinson B, Crain AL. The effect of exercise during pregnancy on maternal outcomes: practical implications for practice. *Am J Lifestyle Med* 2008;2(5):441-455.
23. Gau ML, Chang CY, Tian SH, Lin KC. Effects of birth ball exercise on pain and self efficacy during childbirth: a randomised controlled trial in Taiwan. *Midwifery* 2011;27(6):293-300.
24. Dick-Read G. Childbirth without fear: the principles and practice of natural childbirth. New York, London: Harper and Brothers Publishers; 2000.
25. Lamaze F. Painless childbirth: The Lamaze Method. Chicago, IL: Contemporary Books; 984.