



**A study to evaluate the effect of antepartum exercise on the labor pain
length and mode of delivery**

Usha Bai*¹, Dr. Bhartendra Sharma²

Affiliation

¹Obstetrics and Gynecological Nursing, Mahatma Gandhi University of Medical Science and Technology, Jaipur, Rajasthan

²Medical and Surgical Nursing, Mahatma Gandhi University of Medical Science and Technology, Jaipur, Rajasthan

*correspondence: ukumawat000@gmail.com



Abstract

Objective: The objective of this study was to evaluate the effect of antepartum exercise on labor pain duration and the mode of delivery.

Methods: A randomized controlled trial was conducted with 60 primigravida mothers recruited from the outpatient clinic of the obstetric department of Prakash hospital, Jaipur. Participants were randomly assigned to either an exercise group (n=30) or a control group (n=30). The exercise group received regular antepartum exercise sessions, consisting of aerobic exercises, stretching, and pelvic floor muscle training, tailored to their gestational age. The control group received standard prenatal care without any structured exercise intervention. Labor pain duration, assessed using a visual analog scale, and mode of delivery were recorded for all participants.

Results: According to the findings of this study, participating in antenatal exercise for 45 minutes three times per week between the 28th and 30th week of pregnancy can significantly reduce the duration of labor pain and the likelihood of having a caesarean section.

Conclusion: Antepartum exercise was found to have a positive effect on labor pain duration and the mode of delivery. Women who engaged in regular antepartum exercise experienced shorter labor pain duration and had a reduced risk of instrumental deliveries and cesarean sections. These findings suggest that incorporating antepartum exercise into prenatal care may contribute to a smoother labor process and improved maternal outcomes. Further research is warranted to explore the long-term effects and optimal exercise protocols for pregnant women.

Keywords: Antepartum exercise; Primigravida Mothers; Labor Pain Duration, Mode of Delivery



Introduction

One of the most wonderful moments in a woman's life is when she is pregnant. Pregnancy is a normal process that results in physiological and psychological, metabolic and social changes occur in mothers [1]. These changes take place from the time of conception until the time of delivery and affect every system in the body. In addition, they assist pregnant women in adjusting to their new status and contribute to the development of the foetus [2]. Both the mother's body and her mind are going to go through a lot of changes while she is pregnant, so she has to be ready to take care of both her mental and her physical health [3]. Women go through a very difficult and traumatic experience during childbirth. Both pregnancy and labour involve a variety of complicated processes that are specific to each particular woman [4]. Normal pregnancy may be accompanied by some problems and complications that are potentially life threatening to the mother health and the foetus. Most common complication are high blood pressure, gestational diabetes, preeclampsia, preterm labour, a loss of pregnancy, or miscarriage [5]. Women of all ages can benefit from fitness, and some of them may even want to keep working out while they're expecting a child. The positive effects of exercise on health and happiness are widely acknowledged. It's associated to enhanced functioning and reduced risk of both mental and physical illness [6]. Pain during labour is an inescapable aspect of childbirth, and despite the significant advancements in midwifery, the effective management of labour pain remains one of the most significant difficulties relating to the health of women [7]. Antenatal exercise has many advantages, including a lower chance of caesarean section and a shorter first stage of labour [8]. Exercise throughout pregnancy will assist enhance flexibility,



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endurance, and muscular control, all of which are essential for labour and delivery and will, as a result, make labour simpler [9].



Need of the study

There are a variety of situations that can lead to psychological and physiological changes that can occur during pregnancy that impact the development of the woman and her foetus. Although pregnancy is a great and joyful time, there are a number of circumstances that can lead to these changes [10]. In today's world, reproductive health and safe parenthood are issues that affect people all over the world. Women's preferences for health-related outcomes are playing an essential part in the practise and policy of modern healthcare [11]. The agony of labour is widely regarded as one of the most excruciating experiences a person may go through in their lifetime. It has two aspects: the first is a sensory or physical dimension, which involves the transmission of pain stimuli to the brain; the second is an affective dimension, which arises after the interpretation of these stimuli through the combination of emotional, social, cultural, and cognitive factors that are specific to the individual [12]. Patients are reporting lower and lower pain thresholds, which is leading to an increased demand for elective caesarean sections. According to information obtained through the Health Management Information System (HMIS) by the Union Ministry of Health and Family Welfare in 2018-19, more than 14% of the total births that took place in that year were carried out via C-section [13]. The most recent numbers available from the National Family Health Survey 2015-16 (NFHS-4) indicate that the overall caesarean rate in India is 17.2% [14]. The American College of Obstetrics and Gynaecology (ACOG) currently recommends that pregnant women accrue 30 minutes or more of exercise at a moderate intensity on most days of the week, provided that there are no medical or obstetric issues present in the individual [15]. Studies (Jehdi et al.) suggest that practising asanas throughout pregnancy can help ease the discomfort of labour and speed up the child



birth efficacy. According to Chetna et al., asanas are useful in alleviating labour pain and improving birth outcomes. Additionally, many research studies indicated that practising asanas throughout pregnancy resulted in the growing infant receiving more oxygen. This preliminary research was carried out to investigate the impact of antenatal exercises on the duration of labour pain as well as the mode of delivery that occurred. We came up with the hypothesis that primigravida mothers who participated in antenatal exercise for a period of at least 12 weeks would have favourable outcomes in terms of the duration of labour pain and the mode of delivery during the pregnancy.

Methodology

Using a randomised controlled trial design, this study evaluated the outcomes of women in two groups: group A (experimental) who received routine prenatal care plus antepartum exercise between weeks 28 and 30, and group B (control) who received routine antenatal care alone during this time. Before taking part in the trial, each primigravida mother gave her informed consent and the researchers carried out the study's design and sampling procedures only after receiving approval from the Prakash hospital ethics committee in Jaipur.

Block randomization was used to allocate primigravida mothers from the outpatient clinic of the obstetric department of Prakash hospital, Jaipur, to either the experimental group or the control group during the recruitment period, which lasted from April 2022 until August 2022. The primigravida mothers were all diagnosed by an obstetrician and confirmed by ultrasonography to be between 28 and 30 weeks of pregnancy at the time of their selection. Primigravida women who had any known medical complications linked to pregnancy as well as any physical limitations were not included in the study. Participants in the experimental



group were provided with an intervention consisting of antepartum activities. Exercises such as pelvic tilts, hip rotation, kegal exercises, progressive squatting, breathing exercises, and an instant relaxation technique were included in the intervention. The Antenatal exercises were taught to experimental group at antenatal visit. At the time of their antenatal visits at 28, 29, and 30 weeks of pregnancy, in the Out Patient Department (OPD) of the obstetrics clinic, they participated in a series of practices exercise sessions that each lasted 30 minutes.

After the initial antenatal exercises practise session, individuals in the experimental groups were instructed to continue practising at home at least three times per week for a total of 10 to 12 weeks. Participants in the experimental group were given an antepartum exercise booklet to take home for the purpose of self-study and practise. The booklet describes the fundamentals of each antepartum activity as well as the advantages associated with performing that exercise. Compliance was achieved in both groups by having participants sign in at the beginning of the initial practise session, having participants make frequent phone calls, and having participants maintain a record in diary format.

Results

The research involved a total of 60 participants, with 30 people serving as members of the experimental group and 30 serving as members of the control group. Prior to participant participation, informed consent was obtained from each and every participant, and the inclusion and exclusion criteria were reviewed. In this study, a wide variety of demographic factors for both the experimental group and the control group were analyzed (Table 1).

Table: 1.1 Demographic Details

***P-value were obtained by employing the Student's t-Test**

N=60



Variables	Experimental Group n =30		Control Group n=30		t value	P value	df
	Mean	SD	Mean	SD			
Age (Years)	24.7	2.39	23.93	2.34	1.26	0.212	58
Height (CM)	154.93	2.72	153.86	3.01	1.44	0.155	58
Weight (KG)	59.06	3.24	57.76	4.24	1.33	0.188	58
Years of Marriage (Years)	1.9	0.80	1.8	0.76	0.496	0.621	58

Table 1.1 shows, When compared to the control group, the experimental group had a mean age of 24.7 ± 2.39 years, while the control group had a mean age of 23.93 ± 2.34 years. This indicates that there is no difference between the two groups and that the difference is not statistically significant (>0.05).

Mean Height (CM) of the experimental group 154.93 ± 2.72 and for control group 153.86 ± 3.01 , data showed that no difference and statistically not significant when compare to the control group (>0.05). Homogeneity of the data was demonstrated by the extent to which there was uniformity between sample units within a population. The comparison of the experimental group's mean weight (in kilogrammes) of 59.06 ± 3.24 to the control group's mean weight (in kilogrammes) of 57.76 ± 4.24 revealed no difference and was not statistically significant ($p > 0.05$). The average number of years married for the test group was 1.9 ± 0.80 , while the average number of years married for the control group was 1.8 ± 0.76 ; this difference was not statistically significant ($p > 0.05$).

Table 1.2: Types of Family *P-value were obtained by employing the Student's t-Test				N=60	
Variable	Type	Experimental Group n=(30)	Control Group n=30	P Value	df



		f	%	f	%		
Family	Nuclear	19	63.33	15	50	0.50	58
	Joint	11	36.66	15	50		

Table 1.2 shows, From the experimental group, 19 were from nuclear families (63.33%) and 11 were from joint families (36.67%). The control group also has an equal number of nuclear and joint families, with 15 people each. When compared to the control group, the data revealed that there was neither a difference nor one that was statistically significant ($p > 0.05$). The level of uniformity among sampling units within a population showed *homogeneity of the data*.



Table 1.3: Socioeconomic status of the families *P-value were obtained by employing the Student's t-Test			N=60	
Category	Experimental Group n=(30)		Control Group n= (30)	
	f	%	f	%
Upper Class	08	26.66%	07	23.33%
Upper Middle	15	50%	13	43.33%
Lower Middle	07	23.33%	09	30%
Upper Lower	00	0.00%	01	3.33%
Lower	00	0.00%	00	0.00%
Total	30	100%	30	100%
P Value	0.50			
df	58			

Table 1.3 shows the socioeconomic status of the families of the people who participated in the study is shown in the table. Within the experimental group, there were simultaneously eight families (26.66%) that belonged to the top class, fifteen families (50%) that belonged to the middle class, seven families (23.33%) that belonged to the lower middle class, zero (0.00%) families that belonged to the lower class, and zero (0.00%) families that belonged to the lower class. When compared to the control group, the data revealed that there was neither a difference nor one that was statistically significant ($p > 0.05$). Homogeneity of the data was shown to exist when there was a high level of uniformity among sample units within a population.

Table 1.4: Employment Status of the participants *P-value were obtained by employing the Student's t-Test						N=60						
Groups	Self-Employment		Private job		Govt. job		No job		Total		P value	df
	f	%	f	%	f	%	f	%	f	%		



Experimental Group n=(30)	4	13.33	5	16.66	4	13.33	17	56.66	30	100	0.50	58
Control Group n=(30)	1	3.33	7	23.33	6	20	16	53.33	30	100		

Table 1.4 shows the employment status of the participants. In the experimental group, four (13.33%) participants were self-employed, five (16.66%) were working on private employment, four (13.33%) were government employees, and seventeen (56.66%) were unemployed or housewives. Similarly, 1 (3.33%) of participants in the control group were self-employed, 7 (23.33%) were engaged in private jobs, 6 (20%) were government employees, and 16 (53.33%) were unemployed or housewives. When compared to the control group, the data revealed no difference and was statistically insignificant (>0.05). The level of consistency among sample units within a population demonstrated data homogeneity.

Effect of antepartum exercise on labour pain length and mode of delivery

The table 2.1 shows mean Labour pain length for experimental group was 9.1 ± 1.72 and for control group 11.3 ± 1.55 hours. This difference was statistically significant ($P < 0.001$).

Table 2.1: Labour Pain Length					
P-value as obtained on applying Student's t-Test					
Groups (n=60)	Labour Pain Length (Hours)		t - Value	P - Value	df
	Mean	SD			
Experimental Group (n=30)	9.1	1.72	5.204	P<0.001	58
Control Group (n=30)	11.3	1.55			

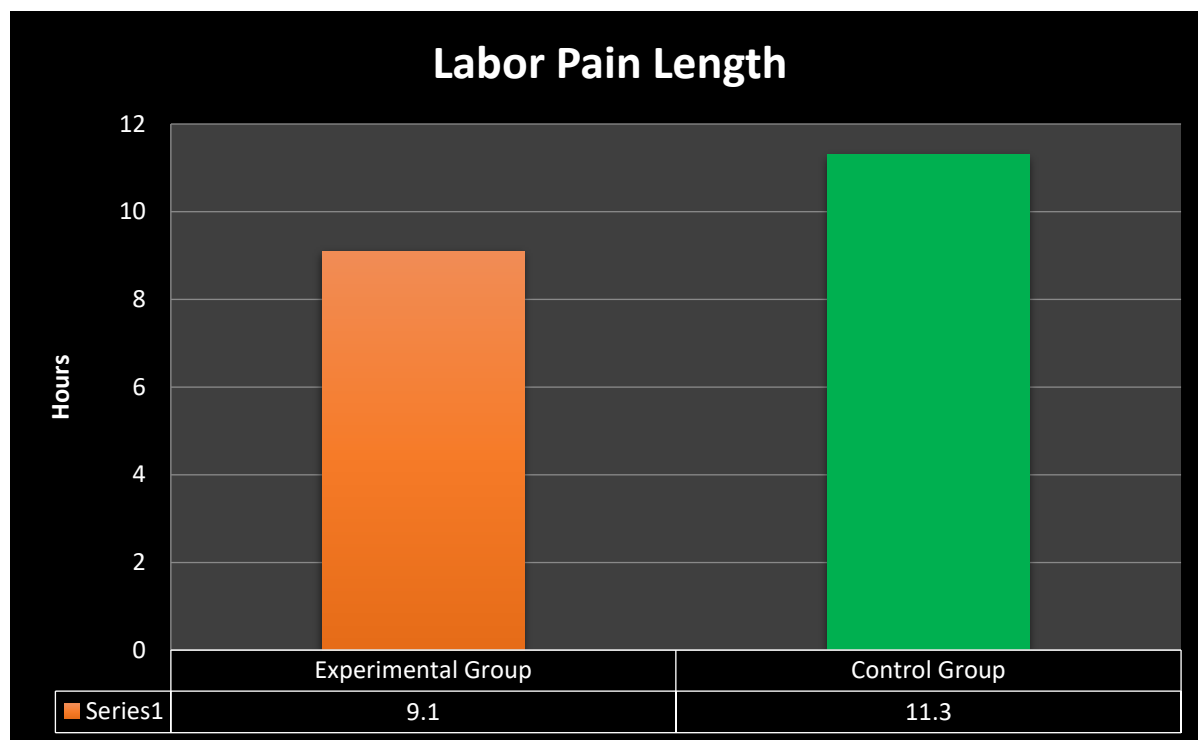


Figure 1: Labor Pain Length in the experimental and control group shows the significant reduction of labour pain length in the experimental group

The average (%) manner of birth is shown in table 2.2, with 56.66% being normal delivery, 23.33% being induced delivery, and 3.33% being intervention. 16.66% of patients and spontaneous delivery Caesarean delivery was performed in both the experimental and control groups. Normal birth accounted for 33.33% of the participants, induced delivery accounted for 10%, instrumental delivery accounted for 13.33%, and caesarean delivery accounted for 43.33%. This was a statistically significant difference (P0.001).

Table 2.2: Mode of Delivery P-value as obtained on applying Student's t-Test						
Mode of Delivery	EXPERIMENTAL GROUP n= (30)		CONTROL GROUP n= (30)		df	P Value
	f	%	f	%		



Normal delivery	17	56.66	10	33.33	58	P<0.001
Induced delivery	7	23.33	3	10		
Spontaneous delivery	1	3.33	0	0.00		
Instrumental delivery (forceps or vacuum)	0	0.00	4	13.33		
Cesarean delivery	5	16.66	13	43.33		
Total	30	100	30	100		

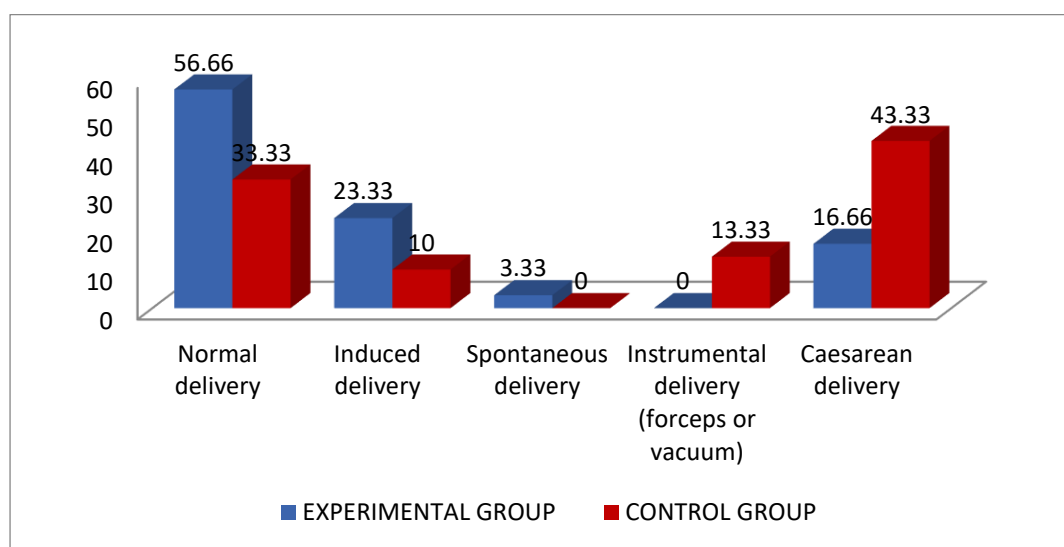


Figure 2: Mode of Delivery in the experimental and control group

Discussion

The American College of Obstetricians and Gynaecologists (ACOG) recommends that pregnant women engage in some form of physical activity for at least thirty minutes on most days of the week [5]. Despite this, there is a lack of compliance with this guideline because of the widespread fear that physical activity during pregnancy can result in harm to both the mother and the baby [16]. This was a prospective study that was carried out for the purpose of assessing the effects of antenatal exercise on the duration of labour pain as well as the delivery method. The findings indicated that the participants who participated in antenatal



exercise had a shorter duration of labour pain and a reduced rate of having to have a cesarean section. In relation to the findings of this research, the average duration of labour pain for women in the experimental group was 9.1 ± 1.72 hours, while women in the control group experienced 11.3 ± 1.55 hours. This difference was statistically significant ($P < 0.001$). Those primigravida mothers who engaged in antenatal exercise throughout their pregnancies experienced shorter labour pains than those who were in the control group. These results are consistent with the result of Haakstad lene et al (2020), which showed that women who exercised regularly during pregnancy had shorter labour durations than women who did not exercise regularly throughout pregnancy and who were in the control group [17]. According to the findings of a number of studies, the non-pharmacological method of labour pain management involves the modification of nociceptive stimuli and the modification of the processing of nociceptive input at the central level. This results in an overall improved sense of comfort and well-being, which ultimately leads to stronger coping capabilities by the mothers who are giving birth. Some research has shown that labour pain can be alleviated without the use of pharmaceuticals by altering nociceptive stimuli and modifying the processing of nociceptive input at the central level. This, in turn, leads to an enhanced sense of comfort and well-being and better coping mechanisms on the part of the labouring mothers. In addition, deep abdominal breathing stimulates the parasympathetic nervous system, which in turn causes oxygenation of the blood in pregnant women. This causes the production of endorphins, which are linked to a reduction in heart rate and an increase in feelings of calmness[21-43].

Conversely, endorphins can inhibit the sympathetic nervous system, reducing the production



of stress hormones like cortisol [18]. Consequently, this results in shorter experimental labour time. Pregnant women who learn to relax and breathe deeply on a daily basis are more likely to give birth to healthy, happy babies without any complications. Exercise during pregnancy is beneficial because it improves the strength, endurance, and coordination of the muscles that are essential for labour and delivery [9]. In this study, the average mode of delivery among participants in the experimental group was normal delivery (56.66 %), followed by induced delivery (23.3 %), spontaneous delivery (3.3 %), and cesarean section (16.66 %). In contrast, the control group, 33.33% of the participants had normal deliveries, 10.33 % had induced deliveries, 13.33 % had instrumental deliveries, and 43.33 % had Cesarean sections. This difference was statistically significant ($P < 0.001$). This study supports the findings of Khatri AK et al, who reported that females who practised prenatal exercise during pregnancy had a lower risk of cesarean section [19-20]. According to the findings of this study, being involved in antenatal exercise commencing between the 28th and 30th week of pregnancy for a total of 45 minutes, three times per week, can have a significant impact on shortening the duration of labour pain and decreasing the likelihood of having a cesarean section. This study has some limitations, such as its small sample size and the fact that it was conducted in only one Jaipur gynaecology clinic.

Conclusion

According to the study's findings, doing 45 minutes of antenatal exercise three times a week for 12 weeks can shorten the duration of labour pain and reduce the likelihood of a cesarean section.



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