

Impact of prenatal perineal massage and pelvic floor relaxing exercises on obstetric outcome: A prospective randomized controlled trial



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ABSTRACT

Background: Normal vaginal delivery is associated with a significant risk of perineal trauma and associated complications. This can be avoided by engaging in prenatal pelvic floor exercises, yoga, and perineal massage. Exercise and perineal massage significantly improve maternal and neonatal outcomes and reduce postpartum complications. **Aims and Objectives:** To study the impact of prenatal perineal massage and pelvic floor relaxing exercises on obstetric outcome, incidence of episiotomy, mode of delivery, duration of labor, and postpartum complications in women of both groups. **Materials and Methods:** This prospective randomized controlled trial study was conducted in a tertiary care hospital in Northern India. 200 primigravida antenatal women with uncomplicated singleton pregnancy at the period of gestation ≥ 32 weeks who attended the antenatal outpatient department, Post Graduate Institute Memory Scale were included in the study and were divided into two groups: Group A (performing perineal massage and pelvic floor exercises) and Group B (receiving routine antenatal care). Patients were followed till 6 days postpartum and data were collected regarding fetomaternal outcomes. **Results:** From Group A, 80% of participants had spontaneous onset of labor as compared to 64% in Group B ($P=0.012$). In the present study, the mean duration of the first stage of labor was 232.84 ± 29.88 min and 245.39 ± 26.13 min, respectively, which was significantly reduced in Group A ($P<0.004$). Similarly, the duration of the second stage of labor was significantly reduced in Group A, 44.2 ± 10.73 min in Group A, and 58.02 ± 20.81 min in Group B ($P<0.001$). A significant reduction was seen in the need for episiotomy and postpartum complications in Group A, ($P<0.0001$) and ($P=0.003$), respectively. **Conclusion:** The findings of this study suggest that engaging in perineal exercises and massage has contributed to shortening the duration of labor with a significant reduction in rates of episiotomy and 2nd perineal tear, hence leading to less number postpartum complications such as infection and episiotomy gaping.

Key words: Perineal massage; Pelvic floor exercises; Episiotomy and labor

INTRODUCTION

Normal delivery is a physiological process that can occur without any medical assistance and offers better healing, less perineal pain and discomfort, shorter hospital stay,

reduced infection rate, and low cost compared to cesarean sections.¹

However, due to the complexity of labor and stretching of the perineum as the fetus descends into the birth canal

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women often sustain perineal injuries. Numerous factors related to women and fetuses such as age, parity, health of mother and baby weight,² and the care she receives in the antenatal period significantly impact the rates of genital tract trauma during childbirth. The incidence in primigravida is 40% due to the increased tension and pressure on the perineum during delivery.³

Postpartum complications arising from perineal tears are accompanied with significant short-term and long-term morbidity. They cause discomfort, chronic pain, infection, urinary retention, anal inconsistency, delayed healing,⁴ and dyspareunia which can last up to 18 months postpartum making intimacy challenging.³ These complications can affect the emotional and psychological well-being of the mother, potentially straining the early relationship between a mother and her newborn.⁵

Episiotomy is given to prevent uncontrolled and more extensive tears, but research demonstrated episiotomy does not ensure perineal integrity and may not reduce pelvic floor issues. Instead, this increases the perineal trauma as it is similar to spontaneous second-degree perineal tear⁶⁻⁸ and associated with postpartum complications such as bleeding, dyspareunia, infection and extension to anal sphincter occur more frequently.⁴

According to WHO, the rate of episiotomy should be <10% as it causes more severe complications when compared to primary tears which can be sustained while episiotomy is not routinely performed.⁹ Selective use of episiotomy in comparison to its routine use is associated with a lower rate of posterior perineal trauma, less suturing, and fewer healing complications.⁹

Antenatal perineal massage and pelvis relaxing exercises have shown overwhelming improvement in perineal care during and post-delivery. Perineal massage relaxes the perineal muscles and increases flexibility and elasticity of perineal muscles which helps in the early delivery of the baby.¹⁰ Likewise, pelvic exercises also enhance the obstetric outcome by improving physical, psychological, and motor function, muscle strength, and flexibility.¹¹ These exercises prevent prolongation of the second stage of labor as well as diminish pain during delivery and less postpartum complications by perineal massage and exercises. Reduction in risk of cesarean section is also seen in women doing prenatal exercises.¹² Increased maternal-neonatal bonding is also seen in many studies.⁵

Aims and objectives

This study was carried out to demonstrate the combined effects of perinatal perineal exercises and massage on pregnant women and assess their overall impact on

obstetric outcomes and complications. The objectives of the study were to assess the effects on the incidence of episiotomy, mode of delivery and duration of first and second-stage labor, rate of spontaneous perineal tear, and postpartum complications.

MATERIALS AND METHODS

Study design and setting

A prospective randomized controlled trial study was conducted in a tertiary care institute in Haryana, India, after obtaining clearance from an Ethical Committee vide number BREC/23/TH-Obst. and Gynae/10 on November 15th, 2023.

Study period

The study spans for 1 year, from December 2023 to December 2024.

Study population

This study was conducted on 200 primigravida antenatal women ≥32 weeks after informed and written consent.

Sample size

Type I error (alpha, significance), α was 1.96, β was 0.84, power was 80%, percentage of effect (Δ) was 73% and standard deviation (σ) was 1.58 in reference formula. The sample size obtained was 74, considering a 25% loss to follow-up, the total size calculated was 100 participants for the study.

$$n = \frac{2(Z_{\alpha} + Z_{1-\beta})^2 \sigma^2}{\Delta^2}$$

Inclusion criteria

Antenatal women with uncomplicated singleton pregnancy at the period of gestation ≥32 weeks who attended the antenatal outpatient department (OPD), Post Graduate Institute Memory Scale (PGIMS) were included in the study.

Exclusion criteria

Patients with multiple pregnancies, previous cesarean section, contraindications of vaginal delivery, and patients unfit for pelvic floor relaxing exercises were not included in the study.

Methodology

Participants were divided based on random computer-generated numbers into two groups: Group A (performing perineal massage and pelvic floor exercises) and Group B (receiving routine antenatal care).

Group A patients were taught to perform prenatal perineal massage and pelvic floor relaxing exercises under yoga trainer guidance in antenatal OPD. Following pelvic floor

relaxing exercises were advised – Butterfly stretch, Child's pose, Quadrupled cat, and Kegel's exercise. She was asked to maintain a diary. Only those women who had completed at least 3 weeks of perineal massage and exercises were included otherwise she was excluded from the study.

Technique for perineal massage

They were asked to wash their hands and maintain a propped position and apply coconut oil on their hand, then insert the thumb inside the vagina, putting gentle pressure downward for 2 min and then sweeping downward and sideways for 3 min. They were counseled to do 5 min of perineal massage thrice a week.

Statistical analysis

Data were evaluated with statistical software. Descriptive statistics represented demographic and clinical features. The Chi-square test was used for categorical variables and analysis of variance for continuous variables to compare outcomes. $P < 0.05$ was regarded as statistically significant.

Ethical considerations

The study protocol was approved by the Institutional Biomedical Research Ethics Committee, Pt. BD Sharma PGIMS/UHS, Rohtak, Haryana, India, vide number BREC/23/TH-Obst. and Gynae/10. The study was conducted in accordance with ethical guidelines and standards. Informed consent was obtained from all participants.

RESULTS

There was no significant difference found between age, education, socioeconomic status, and gestational age at delivery between Group A and Group B ($P > 0.05$) (Table 1). A significant difference was seen in the incidence of pre-eclampsia between both groups (6% in Group A and 18% in Group B, $P < 0.05$), but no difference was noted in the incidence of other antenatal complications ($P > 0.05$).

Both the groups had comparable mean gestational age at delivery and no significant difference was found (38.8 weeks in Group A vs. 38.96 weeks in Group B) ($P = 0.316$). From Group A, 80% of participants had spontaneous onset of labor as compared to 64% in Group B ($P = 0.012$). The majority of participants in both groups had a normal vaginal delivery (86% in Group A and 76% in Group B), however, the difference was non-significant ($P = 0.157$). In our study, Group A had a lower number of cesarean sections as compared to Group B (14% vs. 20%, respectively) but no significant difference was seen ($P = 0.259$) (Table 2).

In the present study, the duration of the first stage was taken from 5 cm to full cervical dilation (active phase). The

mean duration of the first stage in Group A and Group B was 232.84 ± 29.88 min and 245.39 ± 26.13 min, respectively; it was significantly reduced in Group A participants ($P < 0.001$) (Figure 1). The mean duration of the second stage of labor was 44.2 ± 10.73 min in Group A and 58.02 ± 20.81 min, the difference was found to be significantly less ($P < 0.001$) (Figure 2).

In the present study, we observed that 43.02% of women in Group A delivered without episiotomy compared to only 7.50% in Group B. The difference in terms of the requirement of episiotomy in both groups was statistically significant ($P < 0.0001$). However, 1st tears were more frequent in Group A as compared to Group B (24.42% vs. 15% respectively, $P = 0.129$), and 2nd tears were found to be more in number in Group B (6.25% in Group B vs. 3.49% in Group A, $P = 0.484$), the difference was non-significant (Table 3 and Figure 3).

Table 1: Demographic profile of participants of both Group A and Group B

Demographic parameters	Group A (n=100) (%)	Group B (n=100) (%)	P-value
Mean age	23.66 $\pm$ 3.62	23.24 $\pm$ 3.52	0.406 [†]
Education			0.488 [†]
Middle school	3 (3)	7 (7)	
10 th grade	14 (14)	15 (15)	
12 th grade	26 (26)	32 (32)	
Graduate	46 (46)	37 (37)	
Postgraduate	11 (11)	9 (9)	
Socioeconomic status			0.122 [*]
Upper	0 (0)	0 (0)	
Upper middle	6 (6)	3 (3)	
Middle	81 (81)	74 (74)	
Lower middle	9 (9)	20 (20)	
Lower	4 (4)	3 (3)	
Mean BMI	21.31 $\pm$ 1.93	21.27 $\pm$ 1.79	0.891 [†]
Occupation			0.558 [†]
Heavy	4 (4)	7 (7)	
Moderate	87 (87)	82 (82)	
Sedentary	9 (9)	11 (11)	
Residential area			0.888 [†]
Rural	51 (51)	50 (50)	
Urban	49 (49)	50 (50)	

[†]Independent t test, ^{*}Fisher's exact test, [†]Chi-square test

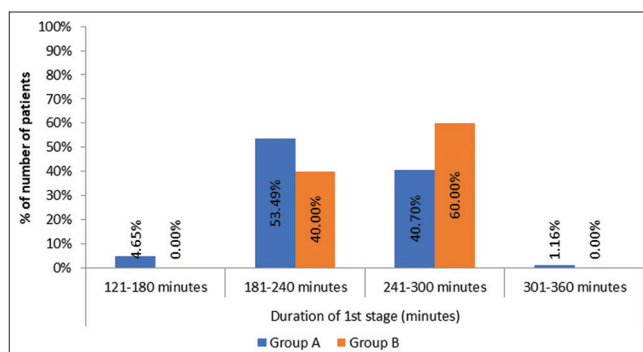


Figure 1: Duration of the first stage of labor of Group A and Group B

Table 2: Impact of prenatal perineal massage and exercises on various obstetric outcomes

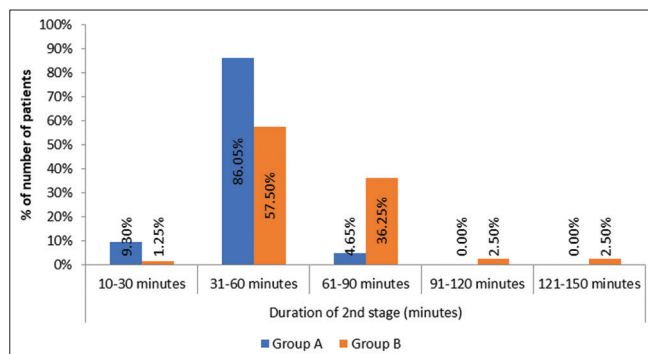
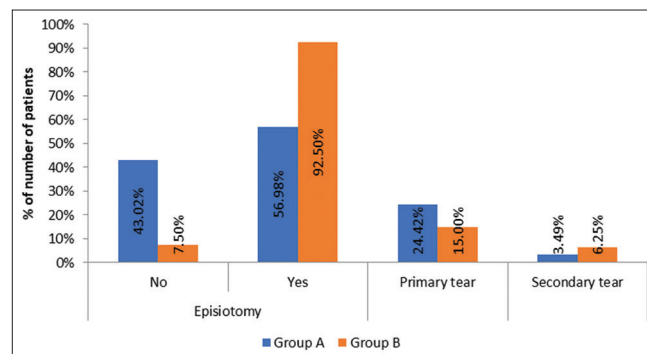
Outcomes	Group A (n=100) (%)	Group B (n=100) (%)	P-value
Incidence of ANC complication			
Pre-eclampsia	6 (6)	18 (18)	0.009 [†]
GDM	4 (4)	6 (6)	0.748 [*]
PROM	8 (8)	14 (14)	0.175 [†]
Hypothyroidism	6 (6)	6 (6)	1 [†]
Preterm	6 (6)	5 (5)	0.756 [†]
Mean POG of delivery	38.8±1.03 weeks	38.96±1.25 weeks	0.316 [‡]
Onset of labor			0.012 [†]
Induced	20 (20)	36 (36)	
Spontaneous	80 (80)	64 (64)	
Mode of delivery			
NVD	84 (84)	76 (76)	0.157 [†]
Cesarean section	14 (14)	20 (20)	0.259 [†]
Instrumental vaginal delivery	2 (2)	4 (4)	0.683 [*]
Mean duration of hospital stay	2.93±1.45	3.32±1.41	0.01 [§]
Postpartum complication			0.003 [†]
Nil	95 (95)	79 (79)	
Episiotomy gaping	2 (2)	9 (9)	
Infection	3 (3)	12 (12)	

[†]Independent t test, ^{*}Fisher's exact test, [‡]Chi-square test, [§]Mann Whitney test, NVD: Natural vaginal delivery, ANC: Antenatal care, POG: Period of Gestation, GDM: Gestational diabetes mellitus, PROM: Premature rupture of the membrane

Table 3: Duration of labor and rate of episiotomy in both groups

Variables	Group A (n=86) (%)	Group B (n=83) (%)	P-value
Mean duration of the first stage (in minutes)	232.84±29.84	245.39±26.13	0.004 [‡]
Mean duration of the second stage (in minutes)	44.2±10.73	58.02±20.81	<0.0001 [‡]
Episiotomy			
No	37 (43.02)	6 (7.50)	<0.0001 [†]
Yes	49 (56.98)	74 (92.50)	
Primary tear	21 (24.42)	12 (15)	0.129 [†]
Secondary tear	3 (3.49)	5 (6.25)	0.484 [*]

[†]Independent t test, ^{*}Fisher's exact test, [‡]Chi-square test

**Figure 2: Duration of the second stage of labor of Group A and Group B****Figure 3: Rate of episiotomy of Group A and Group B**

The majority of participants of Group A (95%) had no postpartum complications in the 1st week of delivery compared to Group B (79%) significant reduction was seen in postpartum complications in Group A (P=0.003).

The mean duration of hospital stay in our study was 2.93±1.45 days in Group A and 3.32±1.44 days in Group B. Duration of hospital stay of Group A was significantly

lower compared to Group B (P=0.01). This implies that engaging in antenatal physical activity enhances faster recovery in the postpartum period and shortens hospital stays.

There was no difference noted in terms of appearance, pulse, grimace, activity, and respiration (APGAR) score at 1 and 5 min, birth weight, and neonatal intensive care unit (NICU) admissions (P>0.05).

DISCUSSION

In our study, no significant differences were seen between Groups A and B in terms of age, body mass index, socioeconomic status, education, occupation, and residential area ($P>0.05$), the results were similar to studies conducted by Yekefallah *et al.*,¹³ and Wadhwa *et al.*,¹⁴ ($P>0.05$).

In the current study, we observed a significant reduction in the incidence of pre-eclampsia in the participants of Group A (6%) compared to Group B (18%) ($P=0.009$). Rakhshani *et al.*¹⁵ also had similar results in terms of incidence of pre-eclampsia ($P=0.02$). Similar to the study conducted by Biju *et al.*,¹⁶ this study also did not show any significant difference in terms of mean gestational age at delivery ($P=0.316$).

A significant difference was seen in terms of spontaneous onset of labor and need for induction of labor where 80% in Group A had spontaneous labor compared to 64% in Group B ($P=0.012$). These results were in line with the results of studies conducted by Wadhwa *et al.*,¹⁴ and Yekefallah *et al.*,¹³ ($P<0.05$). In the present study, we did not observe any significant difference in the mode of delivery between both groups ($P>0.05$), similarly, studies conducted by Mohyadin *et al.*,¹⁷ and Ugwu *et al.*,¹⁸ also did not find any significant difference ($P>0.05$).

In the present study, the duration of the first stage was taken from 5 cm to full cervical dilation (active phase). The mean duration of the first stage in Group A and Group B was 232.84 ± 29.88 min and 245.39 ± 26.13 min, respectively; it was significantly reduced in Group A participants ($P<0.001$). The mean duration of the second stage of labor was 44.2 ± 10.73 min in Group A and 58.02 ± 20.81 min, the difference was found to be significantly less ($P<0.001$). A meta-analysis conducted by Masoud *et al.*,¹⁹ also reported similar results ($P=0.002$). Similarly, studies conducted by Biju *et al.*,¹⁶ and Barakat *et al.*,²⁰ had shown similar results ($P<0.05$).

In the present study, we observed that 43.02% of women in Group A delivered without episiotomy compared to only 7.50% in Group B. The difference in terms of the requirement of episiotomy in both groups was statistically significant ($P<0.0001$). However, 1st tears were more frequent in Group A as compared to Group B (24.42% vs. 15% respectively, $P=0.129$), and 2nd tears were found to be more in number in Group B (6.25% in Group B vs. 3.49% in Group A, $P=0.484$). The difference was non-significant. In consistence with our results, the meta-analysis conducted by Yin *et al.*,²¹ and Hajela *et al.*,²² observed a reduced rate of episiotomy and an increased rate of intact perineum following perineal massage ($P<0.001$) and ($P=0.032$), respectively.

The majority of participants of Group A (95%) had no postpartum complications in the 1st week of delivery compared to Group B (79%) significant reduction was seen in postpartum complications in Group A ($P=0.003$). Similarly, Wadhwa *et al.*¹⁴ also reported early postpartum recovery in the exercise group compared to the control group ($P<0.05$).

The mean duration of hospital stay in our study was 2.93 ± 1.45 days in Group A and 3.32 ± 1.44 days in Group B. Duration of hospital stay of Group A was significantly lower compared to Group B ($P=0.01$). This implies that engaging in antenatal physical activity enhances faster recovery in the postpartum period and shortens hospital stays.

There was no difference noted in terms of APGAR score at 1 and 5 min, birth weight, and NICU admissions, similar to studies conducted by Mohyadin *et al.*,¹⁷ and Ugwu *et al.*¹⁸

Limitations of the study

The limitations of the study were small size of participants and shorter duration of postpartum follow up.

CONCLUSION

Engaging in prenatal perineal exercises and perineal massage has several benefits such as reduced incidence of preeclampsia, less requirement of induction of labor, short duration of labor and significant reduction in rates of episiotomy and 2nd degree perineal tear, short duration of hospital stay and lesser number of postpartum complications. Our findings suggest that antenatal exercises and perineal massage have several health benefits without increasing the rate of any complication in both mother and fetus.

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NL- Definition of intellectual content, literature survey, prepared the first draft of the manuscript, implementation of the study protocol, data collection, data analysis, and manuscript preparation; **SJ-** Concept, design, clinical protocol, manuscript preparation, submission of article, editing, and manuscript revision; **PD-** Review manuscript and definition of intellectual content.

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