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Impact of perineal massage during second-stage labor on episiotomy rates and perineal tears: A randomized controlled trial in a tertiary care hospital, western Maharashtra

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Abstract
The process of child birth is lauded by numerous psychological and physiological stressors which emerges from the beginning of first stage of labour and reaches its maximum at second stage. It is beneficial to minimize those stressful situations by reducing the duration of the climactic phase of labour. Perineal massage stimulates the Ferguson nerve plexus leading to a series of neuroendocrine response which induces oxytocin production. It also contributes to greater elasticity and softness of perineal muscles owing to reduction in the rate of episiotomy and perineal trauma and ensures the maximum joy and comfort in the postnatal period.
Objective: This study aims to evaluate the effectiveness of perineal massage during the second stage of labour on requirement of episiotomy and incidence of perineal tear among intra natal women
Methods: A randomized controlled trial was conducted in a tertiary care hospital in Western Maharashtra. Sixty participants were assigned into two blocks: primigravida (30) and multigravida (30). Each block was further divided into experimental and control groups through random allocation. The experimental group received perineal massage during the second stage of labour, while the control group received routine care. Outcome measure was the requirement of episiotomy and incidence of perineal tear among intra natal women. Data were analyzed using t test, F-tests and Chi-square tests.
Results: The findings showed that 53.33% of primigravida in the experimental group required an episiotomy compared to 86.67% in the control group ($p = 0.03$). However, the incidence of perineal tear did not show a statistically significant difference between groups. In multigravida women, perineal massage did not significantly impact the requirement of episiotomy or incidence of perineal tears.
Conclusion: Modern obstetric practice favors restricted use of episiotomy only when medically necessary. Perineal massage, warm compresses, and controlled delivery techniques are encouraged to reduce severe perineal trauma.

Keywords: Perineal massage, episiotomy, perineal tear, childbirth, randomized controlled trial

Introduction
A mother's joy begins when new life is stirring inside, when tiny heartbeat is heard for the first time and a playful kick reminds her that she is not alone. Becoming a mother for the first time is exciting at the same time scary too. Pregnancy can feel like a long memorable journey that culminates in the ultimate joy: motherhood. A 2017 Cochrane Review concluded that episiotomy is associated with more pain during recovery compared to natural tearing. The surgical incision takes longer to heal than natural tears, leading to prolonged discomfort and difficulty in postpartum activities.The act of giving birth is the only moment when both pain and pleasure converges in a moment of time. A study published in *Journal of American Association* found that routine episiotomies actually increase the risk of third- and fourth-degree perineal tears, leading to more severe injuries than natural tears. A study in *The Lancet* (2018) indicated that episiotomy sites are more prone to infections compared to natural tears.

Background: WHO guidelines (2018) emphasize that routine episiotomy should be abandoned and only used in specific cases, such as fetal distress or instrumental delivery.

Routine episiotomy is no longer recommended due to its associated risks and lack of clear benefits. Studies regarding the perineal massaging in the second stage of labor for relaxing the perineum and possibly preventing perineal laceration and episiotomy, have concluded that the perineal massaging increase possibility of childbirth with an intact perineum. Pirie *et al*. conducted a clinical trial on 195 nulliparous women with an intervention of 30 min perineal massage to examine the effect of perineal massage in the second stage of labor and concluded that perineal massage increased the possibility of intact perineum and reduced the need of episiotomy. Studies conducted with objective of verifying the effect of perineal massage showed a reduction in the rate of episiotomy practice, perineal laceration, significant reduction in duration of second stage of labor and higher rates of intact perineum.

Aim: To assess the effectiveness of Perineal Massage during the second stage of labour on requirement of episiotomy and incidence of perineal tear among intra natal women admitted in a selected tertiary care hospital of Western Maharashtra

Objectives

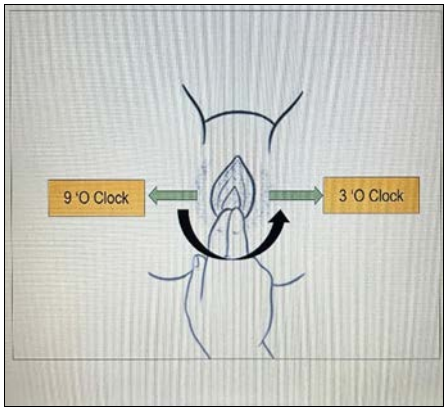
a) To assess the effectiveness of perineal massage on the requirement of episiotomy or incidence of degree of tear among experimental group.
b) To compare the effectiveness of perineal massage on the requirement of episiotomy or incidence of tear between experiment group and control group.
c) To associate the the requirement of episiotomy and incidence of tear with selected socio demographic variables.

Hypothesis

H0 (1): There is no difference in the requirement of episiotomy between experimental and control group.
H0 (2): There is no difference in the incidence of degree of tear between experimental and control group.

Operational Definition

Perineal Massage: It is the massage done (U-shaped reciprocating motion) on the vaginal introitus between 3 o'clock and 9 o'clock positions in the second stage of labour after full dilatation of cervix with a gentle up-down pressure toward rectum for 10-minute duration with lubricated sterile donned gloved index and middle finger.



Methodology

Study Design: This was a randomized controlled trial conducted in a tertiary care hospital in Western Maharashtra. The study followed a post-test-only control group design.

Participants

Sixty intranatal mothers were selected using consecutive sampling and were randomly allocated to experimental and control groups within primigravida and multigravida blocks.

Inclusion Criteria

- Pregnant women at ≥37 week's gestation.
- Singleton pregnancy with cephalic presentation.
- Low-risk pregnancy.

Exclusion Criteria

- High-risk pregnancy.
- Previous perineal trauma or surgery.
- Women undergoing elective cesarean section.

Description of the tool

Section A: Sociodemographic and Baseline data

It consists of Demographic data such as Age, Height, Weight, BMI, Obstetrical score, gestational age, expected foetal weight (Johnson's formula and USG)), working pattern during antenatal period, Exercise during antenatal period and any birth preparedness class attended or not.

Section B: Intrapartum Observation Proforma

The observation Proforma consists of seven aspects which mainly focus on the duration of second stage of labour and factors contributing to it, presence of episiotomy and perineal tear.

a) Mode of onset of the labour: whether the labour is spontaneous or induced, if it is induced mention the method of induction and time and frequency of induction
b) Augmentation of labour: labour augmentation and the drugs used
c) Rupture of membrane: method and time of rupture
d) Duration of first stage and second stage of labour in minutes

Method of Data Collection

In this study researcher selects the sample by consecutive sampling techniques and made two blocks: Block A - Primigravida and Block B - Multigravida. This is followed by random allocation of subjects in each block into experimental and control group by selecting sealed opaque envelope. Sociodemographic and baseline data from both blocks experimental and control group were collected by the researcher. Intrapartum observation proforma was filled after observing the parameters selected during second stage of labor. The perineal massage was given to all the samples in the experiment group whereas Control group subjects were given routine care. Researcher conducted the delivery of both groups and assessed rest of the observation proforma during delivery and after delivery.

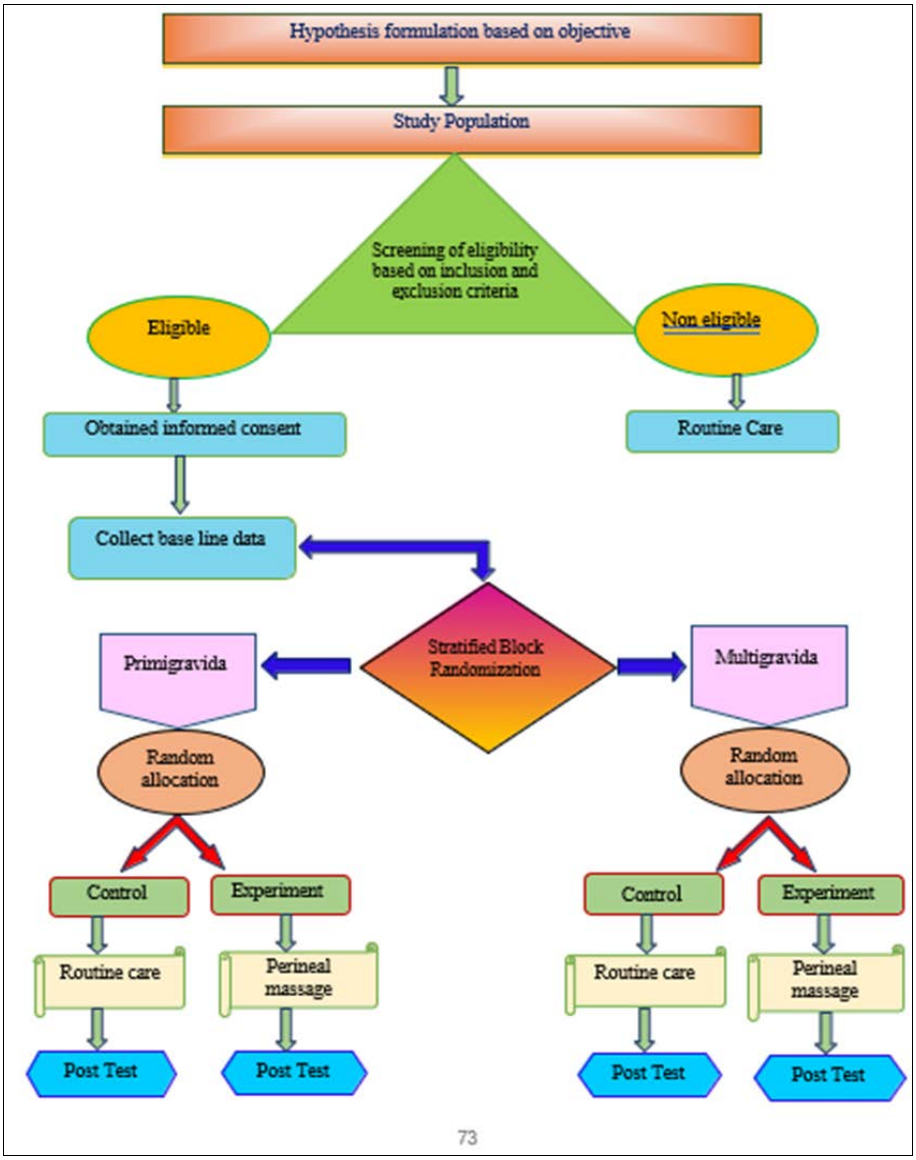


Fig 1: Schematic representation of Methodology

Statistical Analysis & Interpretation

Descriptive Statistics: Frequency and percentage for demographic variables.

Comparative Analysis: F test; Chi-square test for categorical variables.

Significance Level: $p<0.05$ was considered statistically significant.

Section I: Block A Primigravida Analysis

Table I.1: Block-A: Distribution of subjects as per socio demographic variables n = 30

Parameters	Parameter	Experiment (n=15)		Control (n=15)	
		F	%	F	%
Age (yrs)	19 - 25	11	73.33	8	53.33
	26 - 32	4	26.67	7	46.67
BMI	<25	10	66.67	6	40.00
	>25	5	33.30	9	60.00
Gestational age	<38	10	66.67	11	73.33
	>38	5	33.30	4	26.67
EFW (JF)	<2.5	7	46.67	5	33.30
	>2.6	8	53.33	10	66.67
Working pattern during antenatal period	Sedentary	15	100.00	15	100.00
	Moderate	0	0.00	0	0.00
	Heavy worker	0	0.00	0	0.00
Exercise pattern followed during antenatal period	Walking	7	46.67	5	33.30
	Exercise	0	0.00	1	6.67
	None	8	53.33	9	60.00
Any birth preparedness classes attended	Yes	0	0.00	0	0.00
	No	15	100.00	15	100.00

Table 1.2: Comparison of requirement of episiotomy in experiment and control group in primigravida n = 30

Requirement of	Experiment (n=15)	Control (n=15)	Z Value	p Value
Episiotomy	8 (53.33)	13 (86.67)	2.14	**0.03**

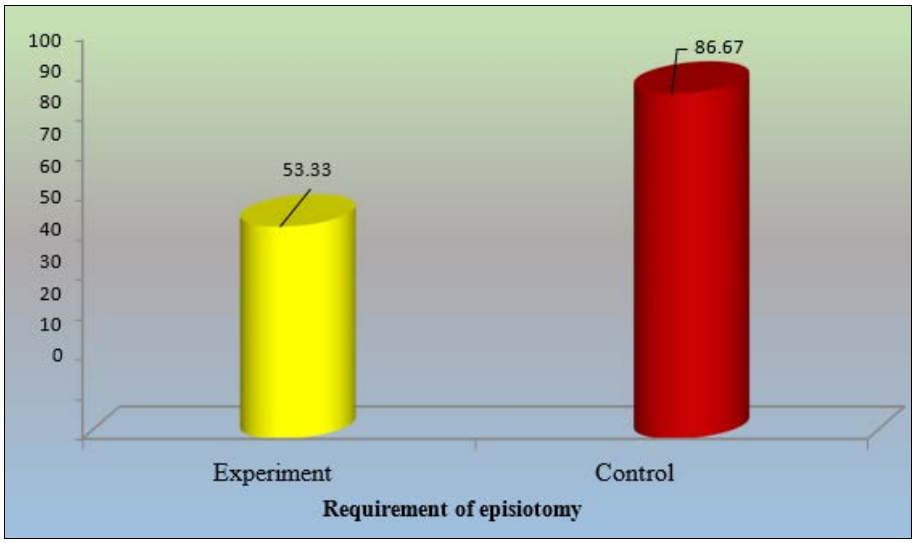


Fig I.1: Comparison of requirement of episiotomy in experiment and control group

Table I,2 and Fig I.1 shows the comparison of requirement of episiotomy in experiment and control group in primigravida. It reveals that the percentage of requirement of episiotomy is 53.33% in experiment as compared to 86.67% control group. As the Z value = 2.14 at p = 0.03, null hypothesis is rejected at $p<0.05$, projecting a statistically significant difference in the requirement of episiotomy in experiment and control group. Hence there is enough evidence to support the effectiveness of perineal massage on requirement of episiotomy in primigravida.

Table I.3: Comparison of incidence of perineal tear in experiment and control group in primigravida n = 9

Incidence of	Experiment (n=7)	Control (n=2)	Z Value	p Value
Perineal tear	3 (42.86)	1 (50)	1.10	0.27

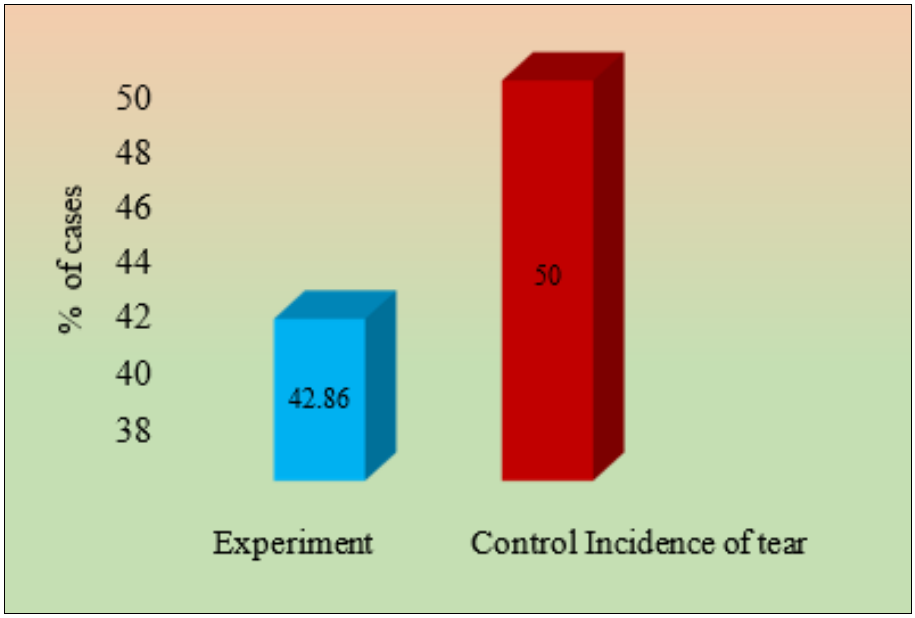


Fig I.2 Comparison of incidence of perineal tear in experiment and control group

Table I.3 and Fig I.2 shows the comparison of perineal tear in experiment and control group in Primigravida.
The analysis showed 42.86% (3) of the cases in experiment group had perineal tear, who delivered without episiotomy and 50% (1) of cases in control group had perineal tear who delivered without episiotomy. The Z value 1.10 at p = 0.27 suggests that null hypothesis is not rejected at $p<0.05$, hence that there is no statistical significance of incidence of perineal tear in experiment and control group.

Table I.4: Block A: Association of requirement of episiotomy with demographic and baseline variables in experiment group in primigravida n = 15

Parameters		Requirement of Episiotomy		p Value
		Yes (n=8)	No (n=7)	
Age (Yrs)	19 - 25	5	6	FET: p =0.57
	26 & above	3	1	
BMI	<25	5	5	FET: p =1
	25 & above	3	2	
EFW (JF)	<2.5	2	5	FET: p =0.13
	2.5 & above	6	2	
Exercise pattern	Walking + exercise	4	3	FET: p =1
	No	4	4	

The Fischer Exact test P value for age, BMI, EFW (JF), and Exercise pattern are more than 0.05, hence there is no statistically significant association of requirement of episiotomy with selected demographic variables. Null hypothesis is not rejected.

Table I.5: Association of requirement of episiotomy with intrapartum variables in experiment group in Primigravida n = 15

Parameters		Requirement of Episiotomy		p Value
		Yes (n=8)	No (n=7)	
Method of induction	Tablet	5	0	FET: p =0.026
	Dinoprostone	3	7	
Pitocin	Yes	7	1	FET: p =0.01
	No	1	6	

The calculated Fischer Exact Test p value is <0.05 ro4 Method of induction and augmentation, suggestive of statistically significant association of requirement of episiotomy with method of induction and augmentation in the primigravida experiment group.

Table I.6: Block A: Association of requirement of episiotomy with demographic and baseline variables in control group n = 15

Parameters		Requirement of Episiotomy		p Value
		Yes (n=13)	No (n=2)	
Age (Yrs)	19 - 25	6	2	FET: p =0.47
	26 & above	7	0	
BMI	<25	4	2	FET: p =0.14
	25 & above	9	0	
EFW (JF) (kg)	<2.5	3	2	FET: p =0.095
	2.5 & above	10	0	
Exercise pattern	Walking + exercise	5	1	FET: p =1
	No	8	1	

The Fischer Exact test P value for age, BMI, EFW (JF), and Exercise pattern are more than 0.05, hence there is no statistically significant association of requirement of episiotomy with selected demographic variables. Null hypothesis is not rejected in case of Control group

Table I.7: Association of requirement of episiotomy with intrapartum variables in control group n = 15

Parameters		Requirement of Episiotomy		p Value
		Yes (n=13)	No (n=2)	
Method of induction	Tablet	7	0	FET: p =0.47
	Dinoprostone	6	2	
Pitocin	Yes	8	2	FET: p =0.52
	No	5	0	

Calculated p value is >0.05, hence there is no statistically significant association between requirement of episiotomy with intrapartum variables in control group

Section II: Analysis of Block B - Multigravida

Table II.1: Block B: Distribution of subjects as per socio demographic variables n = 30

Parameters		Experiment (n=15)		Control (n=15)	
		F	%	F	%
Age (Yrs)	< 29	12	80.00	8	53.33
	>29	3	20.00	7	46.67
BMI	<25	8	53.33	3	20.00
	>25	7	46.67	12	80.00
GA	<38	11	73.33	9	60.00
	>38	4	26.67	6	40.00
EFW (JF)	<2.5	5	33.30	1	6.67
	>2.5	10	66.67	14	93.33
Working pattern during antenatal period	Sedentary	15	100.00	15	100
	Moderate	0	0.00	0	0.00
	Heavy worker	0	0.00	0	0.00
Exercise pattern followed during antenatal period	Walking	3	20.00	2	13.33
	Exercise	0	0.00	0	0.00
	None	12	80.00	13	86.67
Any birth preparedness classes attended	Yes	0	0.00	0	0.00
	No	15	100.00	15	100

Table II. 2: Block B: Comparison of requirement of episiotomy in experiment and control group n = 30

Requirement of	Experiment (n=15)	Control (n=15)	Z Value	p Value
Episiotomy	4 (26.67)	4 (26.67)	0	1

It reveals that the percentage of requirement of episiotomy is equal in both experiment and control group with Z value 0 at level of significance 1, not rejecting null hypothesis at $p<0.05$. Hence it is proved that there is no statistical difference of requirement of episiotomy in experiment and control group in multigravida.

Table II.3: Block B: Comparison of incidence of perineal tear in experiment and control group n = 30

Incidence of	Experiment (n=11)	Control (n=11)	Z Value	p Value
Perineal tear	1 (9.09)	3 (27.27)	1.10	0.27

The analysis showed only 9.09% (1) of the cases in experiment group had perineal tear, who delivered without episiotomy whereas 27.27% (3) of cases in control group had perineal tear who delivered without episiotomy. The Z value 1.10 at p = 0.27 suggests that null hypothesis is not rejected at $p<0.05$, hence that there is no statistical significance of incidence of perineal tear in experiment and control group in multigravida.

Table II.4: Association of requirement of episiotomy with demographic and baseline variables in experiment group n = 15

Parameters		Requirement of Episiotomy		p Value
		Yes (n=8)	No (n=7)	
Age (Yrs)	19 - 25	3	9	FET: p=1
	26 & above	1	2	
BMI	<25	2	6	FET:p=1
	25 & above	2	5	
EFW (JF)	<2.5	1	4	FET: p=1
	2.5 & above	3	7	
Exercise pattern	Walking + exercise	1	2	FET: p=1
	No	3	9	

The Fischer exact test p value for all the demographic and intrapartum variables listed are 1, do not reject the null hypothesis $p<0.05$ hence the analysis concluded that there is no association of requirement of episiotomy with age, BMI, expected fetal weight and exercise pattern followed during antenatal period in the experiment group in multigravidas.

Table II.5: Association of requirement of episiotomy with intrapartum variables in experiment group n = 15

Parameter		Requirement of Episiotomy		Chi-square p Value
		Yes (n=4)	No (n=11)	
Method of induction	Tablet	2	7	FET: p=1
	Dinoprostone	2	4	
Pitocin	Yes	1	2	FET: p=1
	No	3	9	

The Fischer Exact Test P value= 1, do not reject null hypothesis at $p<0.05$ suggests that there is no statistically significant association of requirement of episiotomy with induction or augmentation of labour in the experimental group in multigravida.

Table II.6: Association of requirement of episiotomy with demographic and baseline variables in control group n = 15

Parameter		Requirement of Episiotomy		Chi-square p Value
		Yes (n=4)	No (n=11)	
Age (Yrs)	19 - 25	4	4	FET: p=0.077
	26 & above	0	7	
BMI	<25	0	3	FET: p=0.52
	25 & above	4	8	
EFW (JF)	<2.5	0	1	FET: p=1
	2.5 & above	4	10	
Exercise pattern	Walking + exercise	0	2	FET: p=1
	No	4	9	

The Fischer Exact Test p value is > 0.05, there is no statistically significant association of requirement of episiotomy with selected demographic variables in control group in multigravida.

Table II.7: Association of requirement of episiotomy with intrapartum variables in control group n = 15

Parameter		Requirement of Episiotomy		P Value
		Yes (n=4)	No (n=11)	
Method of induction	Tablet	1	8	FET: p=0.24
	Dinoprostone	3	3	
Pitocin	Yes	3	0	FET: p=0.14
	No	1	11	

The Fischer Exact Test P value>0.05, do not reject null hypothesis at $p<0.05$ suggests that there is no statistically significant association of requirement of episiotomy with induction or augmentation of labour in the control group in multigravida

Hypothesis Testing

H0 (1): There is no difference in the requirement of episiotomy between experimental and control group.

Primigravida

The comparison revealed that the requirement of episiotomy was less in experiment group with 53.33% as compared to 86.67% in the control group with an Z value of 2.14 (>1.96) which is statistically significant at p = 0.03. As the p value is < 0.05, null hypothesis is rejected. Hence there is a statistically significant difference in the requirement of episiotomy between experimental and control group. This study illustrates the effectiveness of perineal massage in the requirement of episiotomy in Primigravida.

Multigravida

The comparison of requirement of episiotomy in experiment and control group in multigravida states that the percentage of requirement of episiotomy is equal in both experimental and control group with Z value = 0 at p = 1. The p value > 0.05, do not reject null hypothesis. Hence there is no statistically significant difference in the requirement of episiotomy between experimental and control group in multigravida. This study supports no evidence suggesting the effectiveness of perineal massage in the requirement of episiotomy in Multigravida.

H0 (3): There is no difference in the incidence of degree of tear between experimental and control group.

Primigravida

Data revealed the incidence of perineal tear with 3 perineal tears in experiment group and 1 in control group projecting an Z value of 1.10 (<1.96) at level of significance p =0.27, hence there is no statistically significant association with incidence of perineal tear in experiment and control group.

Multigravida

As the Z value is <1.96 and p value is >.0.05, there sufficient evidence that do not reject null hypothesis. This supports that there is no effect of perineal massage on the incidence of perineal tear.

Key Findings

This randomized controlled trial demonstrated that perineal massage during the second stage of labour significantly reduces the requirement for episiotomy, particularly among primigravida women. The findings showed that 53.33% of primigravida in the experimental group required an episiotomy compared to 86.67% in the control group (p = 0.03). However, the incidence of perineal tear did not show a statistically significant difference between groups. In multigravida women, perineal massage did not significantly impact the requirement of episiotomy or incidence of perineal tears.

Discussion

The findings align with previous research emphasizing the benefits of perineal massage. A study by Pirie *et al.* (2020) reported a significant reduction in episiotomy rates among nulliparous women receiving perineal massage (32.4% vs. 67.1% in the control group), which is consistent with the present study's results in primigravida women. Similarly, Deib *et al.* (2021) demonstrated that perineal massage effectively reduces episiotomy and postnatal pain, highlighting its role in improving maternal outcomes.

However, the study by Stamp *et al.* (2022) contradicts these findings, as it found no significant difference in episiotomy rates between the massage and control groups across both primigravida and multigravida women. This aligns with the current study's results in multigravida participants, where the requirement for episiotomy remained unchanged.

Implications

Given the non-invasive nature and benefits of perineal massage, its integration into routine intrapartum care should be considered. Midwives and obstetricians can incorporate this technique to enhance maternal outcomes, particularly for primigravida women, who are more likely to require episiotomy. Future research should explore long-term maternal benefits and assess variations in effectiveness based on different perineal massage techniques.

Limitations

Blinding was not opted in this study as enrollment of a coworker with equivalent skill and proficiency was not feasible for the entire duration of the study.

Recommendations

- Study can be replicated on large sample in different setting so that the study can be generalized to a large population.
- A qualitative study to assess the maternal satisfaction who received perineal massage during labor
- A double blinded study can be carried out to make the study more reliable.

Conclusion

This study highlights the effectiveness of perineal massage during the second stage of labour in reducing the requirement for episiotomy, particularly among primigravida women. The findings support its role in improving perineal elasticity and reducing maternal discomfort. However, no significant reduction in perineal tears was observed, and the impact on multigravida women was minimal. Given its non-invasive nature and potential benefits, perineal massage should be considered as a routine practice in obstetric care to enhance maternal outcomes and the joy in postpartum period.

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