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Randomized controlled trial to assess the effectiveness of perineal massage during the second stage of labour on duration of second stage among intra natal women admitted in a selected Tertiary Care Hospital, Western Maharashtra

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Abstract

Giving birth is a life-changing event and the care that a woman receives during labor has the potential to affect her both physically and emotionally. Prolonged second-stage labour is associated with increased maternal and neonatal morbidity, including postpartum hemorrhage, perineal trauma, and fetal distress. Perineal massage has been proposed as an effective intervention to reduce the duration of the second stage of labour by promoting perineal elasticity and stimulating oxytocin release.

Objective: This study aims to evaluate the effectiveness of perineal massage in reducing the duration of the second stage of labour among intranatal mothers.

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 duration of the second stage of labour. Data were analyzed using independent t-tests and Chi-square tests.

Results: There was no clinical and statistically significant difference in duration of first stage of labour between experimental and control group in primigravida and multigravida at $p=0.46$ and at $p = 0.22$ respectively. However the duration of second stage of labour was significantly lower in the massage group in primigravida block at level of significance $p<0.004$ and also in multigravida block at level of significance $p<0.0001$.

Conclusion: Perineal massage is an effective, non-invasive intervention to reduce the duration of the second stage of labour, thereby improving maternal outcomes. Routine incorporation of perineal massage in labour management is recommended.

Keywords: Second-stage labour, perineal massage, episiotomy, perineal tear, primigravida, multigravida

Introduction

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. In the second stage of labor, considered as the climax phase, the women will feel strong urge to bear down. This is caused by the baby being pressed onto the Ferguson Plexus of nerve, creating Ferguson's reflex: the urge to push. The Ferguson reflex is a neuro endocrine reflex in which the pressure of fetal distension on the cervix stimulates a series of neuroendocrine response, leading to oxytocin production. The additional oxytocin leads to strong uterine contractions to expel the viable product of conception, fetus.

A gentle massage on the vaginal introitus will in turn creates

a Ferguson reflex causing contraction of the uterus and aids in the delivery of baby. Perineal massage has been associated with benefits such as the reduction of stress, the increase of blood circulation and the relief of pain. More over the Perineal massage with obstetric cream contributes to greater elasticity and softness of perineal muscles surrounding the introitus, owing to reduction in the rate of perineal trauma.

Background

An extension of duration of second stage of labor causes maternal fatigue and exhaustion which leads to a poor maternal bearing down effort causing fetal hypoxia and fetal distress.

Albers *et al.* conducted a randomized study with 1,211

women in midwifery care and found that perineal massage increases blood supply and softens the perineum, helping mothers become familiar with sensations like burning and tingling, thereby reducing pressure and tension during childbirth. Similarly, Pirie *et al.*, in a clinical trial with 195 nulliparous women, examined the effects of a 30-minute perineal massage during the second stage of labor and concluded that it increased the likelihood of an intact perineum and reduced the need for episiotomy.

Aim

The present study aims to assess the effectiveness of perineal massage in both primigravida and multigravida intra natal women admitted in a selected tertiary care hospital of Western Maharashtra.

Objectives

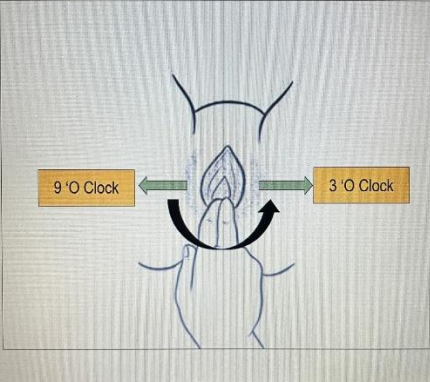
1. To assess the effectiveness of perineal massage in reducing the duration of the second stage of labour.
2. To associate the duration of second stage of labor with selected socio demographic variables.

Hypothesis

- **H₀(1):** There is no difference in the mean duration of second stage of labor between experimental and control group.
- **H₀(2):** There is no association of with mean duration of second stage of labor with selected baseline variable

Operational Definition

Perineal Massage

<p>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.</p>	
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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.

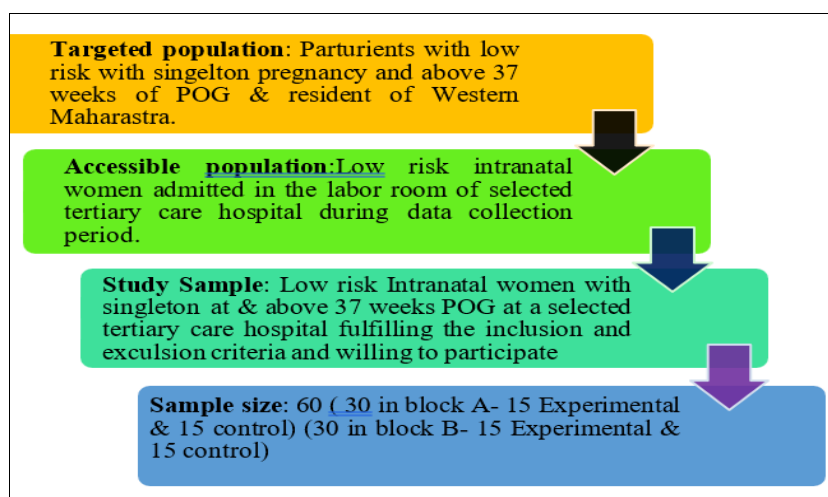


Fig 1: Selection of Sample: Schematic Representation

Inclusion Criteria

- Pregnant women at ≥ 37 weeks 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.

1. 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
2. Augmentation of labour: labour augmentation and the drugs used
3. Rupture of membrane: method and time of rupture
4. 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.

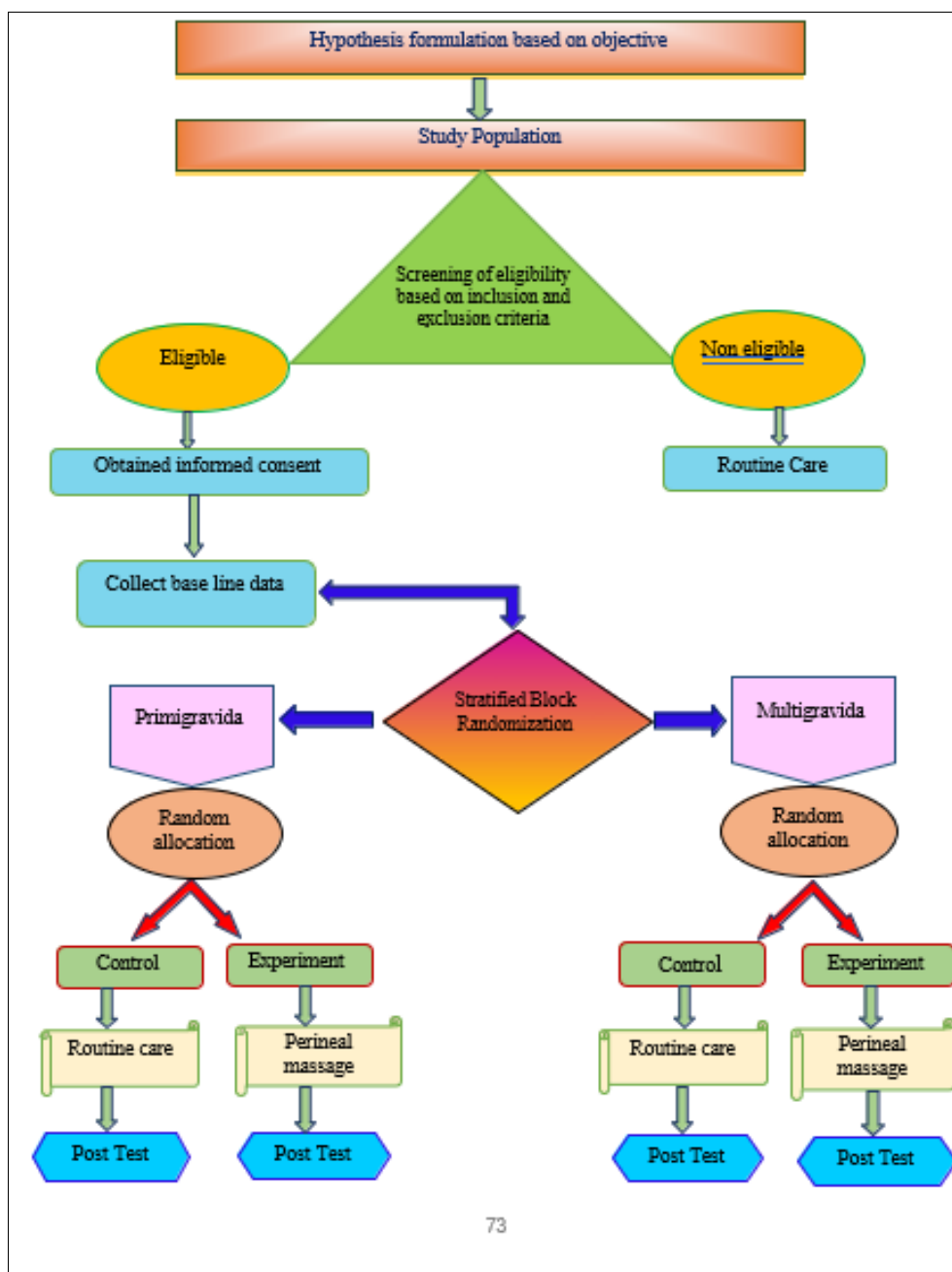


Fig 2: Schematic representation of Methodology

Statistical Analysis & Interpretation

- **Descriptive Statistics:** Frequency and percentage for demographic variables.
- **Comparative Analysis:** Independent t-test for continuous variables; Chi-square test for categorical

variables.

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

Section I : Block A Primigravida Analysis

Table 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 2: Comparison of duration of second stage of labour in experiment and control group in primigravida, n = 30

2 nd stage of labour	Experiment (n=15)		Control (n=15)		t Value	p Value
	Mean	SD	Mean	SD		
Duration (min)	37.73	13.210	54.67	16.277	3.13	0.004

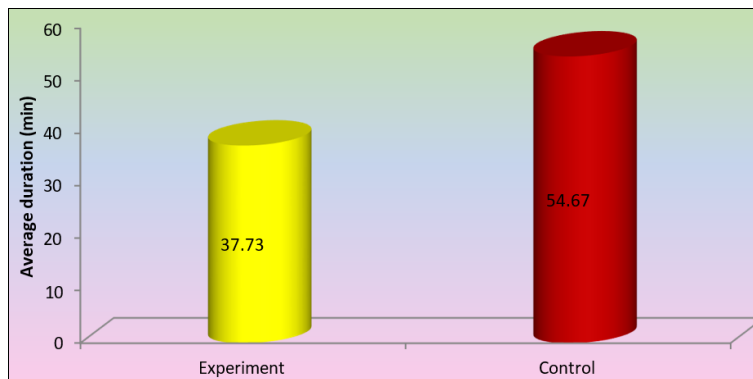


Fig 1: Comparison of duration of second stage of labour in experiment and control group, n = 30

The data reveals the duration of second stage of labor in primigravida experiment group is 37.73±13.21 and control group is 54.67±16.27. Mean duration is lesser in experimental group in comparison with control group. The analysis showed t value of 3.13 at $p = 0.004$, hence null

hypothesis is rejected at $p < 0.05$. ie., there is a statistically significant difference in duration of labor between experimental and control group. Hence there is sufficient evidence to support the effectiveness of perineal massage on duration of second stage of labor.

Table 3: Association of duration of second stage of labor with demographic variables in experiment group in primigravida n = 15

Parameters		Duration (min)			t Value	p Value
		No	Mean	SD		
Age (Yrs)	19 - 25	11	35.18	11.33	1.27	0.23
	26 & above	4	44.75	17.23		
BMI	<25	10	41.30	10.98	1.55	0.15
	25 & above	5	30.60	15.61		
EFW (JF)	<2.5	7	40.00	13.99	0.61	0.55
	2.5 & above	8	35.75	13.10		
Exercise pattern	Walking + exercise	7	34.75	14.69	0.93	0.37
	No	8	41.14	11.41		

Table 4: Association of duration of second stage of labor with intrapartum variables in experiment group in primigravida, n = 15

Parameters		No	Duration (min)		t Value	p Value
			Mean	SD		
Method of induction	Tablet	5	44.60	14.79	1.48	0.16
	Dinoprostone Gel	10	34.30	11.62		
Pitocin	Yes	8	41.00	11.75	1.03	0.32
	No	7	34.00	14.69		
Correlation between duration of 1st and 2nd stage of labour					r=0.60	0.018

Data depicts that there is no statistically significant association of duration of second stage of labor with selected demographic and baseline variables at p 0.05. The

correlation coefficient r=0.60 at p = 0.018 suggestive of a strong positive correlation between duration of first stage and second stage of labor.

Table 5: Association of duration of second stage of labor with demographic variables in control group in primigravida, n = 15

Parameter		no	Duration (min)		t Value	p Value
			Mean	SD		
Age (Yrs)	19 - 25	8	52.00	21.95	0.67	0.52
	26 & above	7	57.71	05.96		
BMI	<25	6	44.50	11.13	2.24	0.043
	25 & above	9	61.44	16.03		
EFW (JF)	<2.5	5	52.40	28.18	0.37	0.72
	2.5 & above	10	55.80	07.41		
Exercise pattern	Walking+ exercise	6	59.78	17.73	1.57	0.14
	No	9	47.00	11.03		

There is no statistical association of duration of second stage of labor with age, Expected FW and Exercise pattern in control group of primigravida. Since the computed t value for BMI is 2.24 at p = 0.043, null hypothesis is rejected at

p<0.05 and the analysis concluded that there is statistically significant association of duration of second stage of labor with BMI in the control group of primigravida.

Table 6: Association of duration of second stage of labor with intrapartum variables in control group, n = 15

Parameter		no	Duration (min)		t Value	p Value
			Mean	SD		
Method of induction	Tablet	7	56.71	6.80	0.44	0.67
	Dinoprostone Gel	8	52.88	21.96		
Pitocin	Yes	10	55	18.86	0.11	0.92
	No	5	54	11.23		
Correlation between duration of 1 st and 2 nd stage of labour					r=0.28	0.31

Tabular data illustrates that there is no statistically significant association of duration of second stage of labor with intrapartum variables in control group of primigravida.

Section II: Analysis of Block B - Multigravida

Table 7: 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 periods	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 8: Block B: Comparison of duration of second stage of labour in experiment and control group, n = 30

2nd stage of labour	Experiment (n=15)		Control (n=15)		t Value	p Value
	Mean	SD	Mean	SD		
Duration (min)	15.33	4.047	37.60	11.550	7.05	<0.0001

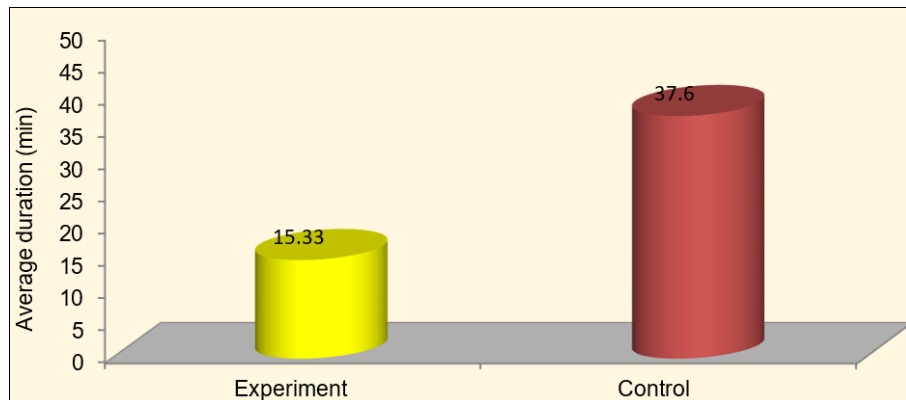


Fig 2: Comparison of duration of second stage of labour in experiment and control group, n = 30

The data reveals the duration of second stage of labor in multigravida experiment group is 15.33±4.05 and 37.60±11.55 in control group. Mean duration is lesser in experimental group in comparison with control group. Since the t value is 7.05 at $p < 0.0001$, null hypothesis is rejected at

$p < 0.05$ stating that there is a statistically strong difference in duration of second stage of labor between experimental and control group. Hence there is sufficient evidence to support the effectiveness of perineal massage on duration second stage of labor in multigravida.

Table 9: Association of duration of second stage of labor with demographic variables in experiment group, n = 15

Parameter		no	Duration (min)		t Value	p Value
			Mean	SD		
Age (Yrs)	19 - 25	12	14.75	3.52	1.13	0.28
	26 & above	3	17.67	6.03		
BMI	<25	8	14.88	3.52	0.46	0.66
	25 & above	7	15.86	4.81		
EFW (JF)	<2.5	5	14.40	3.85	0.62	0.55
	2.5 & above	10	15.80	4.26		
Exercise pattern	Walking + exercise	3	15.00	5.29	0.15	0.88
	No	12	15.42	3.97		

Table 9 depicts that there is no statistically significant association of duration of second stage of labor with

demographic variables in experiment group in Multigravida

Table 10: Association of duration of second stage of labor with intrapartum variables in experiment group = 15

Parameters		no	Duration (min)		t Value	p Value
			Mean	SD		
Method of induction	Tablet	9	15.11	3.79	0.25	0.81
	Dinoprostone Gel	6	15.67	4.76		
Pitocin	Yes	3	13.67	4.04	0.79	0.45
	No	12	15.75	4.12		
Correlation between duration of 1 st and 2 nd stage of labour					r=0.08	0.77

Table 10 illustrates there is no statistically significant association of duration of second stage of labor with intrapartum variables in experiment group in multigravida The $r=0.08$ with value = 0.018 suggestive of some positive correlation between duration of first stage and second stage

of labor in multigravida. The correlation coefficient $r=0.08$ at $p = 0.77$ suggestive of a weak positive correlation between duration of first stage and second stage of labor in multigravida experiment group.

Table 11: Association of duration of second stage of labor with demographic variables in control group n = 15

Parameter	no	Duration (min)		t Value	p Value	
		Mean	SD			
Age (Yrs)	19 - 25	8	37.75	11.47	0.05	0.96
	26 & above	7	37.43	12.56		
BMI	<25	3	34.67	15.14	0.48	0.64
	25 & above	12	38.33	11.19		
EFW (JF)	<2.5	1	50.00	0.00	NA	
	2.5 & above	14	36.71	11.45		
Exercise pattern	Walking + exercise	2	38.92	11.64	1.14	0.27
	No	13	29.00	8.48		

Table 11 depicts that there is no statistically significant association of duration of second stage of labor with

demographic variables in the control group in multigravida.

Table 12: Association of duration of second stage of labor with intrapartum variables in control group, n = 15

Parameter	no	Duration (min)		t Value	p Value	
		Mean	SD			
Method of induction	Tablet	9	34.56	12.31	1.28	0.22
	Dinoprostone Gel	6	42.17	9.45		
Pitocin	Yes	3	40.67	10.02	0.50	0.63
	No	12	36.83	12.18		
Correlation between duration of 1 st and 2 nd stage of labour				r=0.35	0.20	

Data illustrates that there is no statistically significant association of duration of second stage of labor with intrapartum variables in multigravida control group. The r=0.35 is suggestive of strong positive correlation between duration of first stage and second stage of labor in multigravida control group.

Hypothesis Testing

H0(1): There is no difference in the mean duration of second stage of labor between experimental and control group.

Table 1 and Fig 2 shows the comparison of mean duration of second stage of labor among experimental and control group in the primigravida. It revealed a mean duration of 37.73±13.210 in experiment group and 54.67±16.277 in control group at a calculated t value of 3.13 which was statistically significant at p = 0.004.

Table 8 and Fig 2 shows the comparison of mean duration of second stage of labor among experimental and control group in the multigravida. It depicted a mean duration of 15.33±4.05 in experiment group and 37.60±11.55 in control group at a calculated t value of 7.05 which was statistically significant at p = 0.0001.

Analysis of data pertaining to duration of second stage of labor revealed that there is a significant reduction in the duration of second stage of labor in experiment group as compared to control group at level of significance p = 0.004 and p= <0.001 in block A and Block B respectively, proving the effectiveness of perineal massage during second stage of labor in reducing the duration of second stage of labor. The analysis also proved that there is a positive correlation between duration of first stage of labor and duration of second stage of labor in block A and block B.

H0(2): There is no association of with mean duration of second stage of labor with selected baseline variable

Block A: Primigravida: Data depicts that there is no

statistically significant association of duration of second stage of labor with selected demographic and baseline variables in experimental group at p 0.05. The correlation coefficient r=0.60 at p = 0.018 suggestive of a strong positive correlation between duration of first stage and second stage of labor.

There is no statistical association of duration of second stage of labor with age, Expected FW and Exercise pattern in control group of primigravida. Since the computed t value for BMI is 2.24 at p = 0.043, null hypothesis is rejected at p<0.05 and the analysis concluded that there is statistically significant association of duration of second stage of labor with BMI in the control group of primigravida. There is no statistically significant association of duration of second stage of labor with intrapartum variables in control group of primigravida.

Block B: Multigravida

There is no statistically significant association of duration of second stage of labor with demographic variables and intrapartum variables in experiment group in Multigravida. The r=0.08 with value = 0.018 suggestive of some positive correlation between duration of first stage and second stage of labor in multigravida. The correlation coefficient r=0.08 at p = 0.77 suggestive of a weak positive correlation between duration of first stage and second stage of labor in multigravida experiment group. Hence null hypothesis is not rejected

There is no statistically significant association of duration of second stage of labor with demographic and baseline variables in the control group in multigravida. Hence null hypothesis is not rejected. The r=0.35 is suggestive of strong positive correlation between duration of first stage and second stage of labor in multigravida control group.

Discussion

In an Observational study conducted by Oglak C and Obut M, in turkey to assess the effectiveness of perineal massage

revealed that the length of second stage of labour in experiment group was 36 ± 19 and control group was 46 ± 25 with a statistically significant finding $p = 0.024$.²⁸ The findings were similar to present study which revealed the duration of second stage of labor in primigravida experiment group is 37.73 ± 13.21 and control group is 54.67 ± 16.27 . Mean duration is lesser in experimental group in comparison with control group among primigravida.

Similar findings were present in another study conducted by Abinaya Raja, Pallavee P, Rupal Samal to investigate the effect of perineal massage in the second stage of labour on duration of second stage of labour and the incidence of episiotomy among 150 term mothers in labour in Puducherry. The study concluded that mean duration of second stage of labour in the massage group (42.13 ± 14.19 mins) was significantly shorter than in the control group (51.45 ± 14.45 mins), which concluded that perineal massage significantly reduces the duration of second stage of labour⁴, which is comparable to the present study.

The finding of the present study is in concurrence with the study conducted by Salunkhe H A *et al* to assess the effect of perineal massage on duration of first and second stage of labor with 30 experimental and 30 control (randomly assigned by lottery method) prenatal mothers. There was a significant association found between mean duration of second stage of labour ($p < 0.05$). The finding supported the effectiveness of perineal massage on duration of second stage of labour.

Implications of the study

Perineal massage is a simple and practical technique which can be used effectively and independently by the nurses to improve the standards of integrated management of pregnancy and child health care. The outcomes of the study will help the nurse educators in the preparation of students to deliver respectful maternity care with comfort to the parturient in labor. Based on the study findings administrators can encourage the practice of perineal massage to improve the maternal outcome in terms of reduction in the duration of second stage, less incidence of episiotomy and perineal tear thereby improving the outcome of quality assured maternity care.

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

Midwives play a crucial role in childbirth, requiring qualities like patience, consideration, and sound judgment to ensure safe practice and teamwork. Techniques such as upright positions and ambulation help reduce labor duration,

as endorsed by LAQSHYA guidelines. During the second stage, effective maternal bearing down efforts aid fetal descent and delivery. Research suggests that perineal massage enhances Ferguson nerve plexus stimulation, promoting expulsive contractions and reducing labor duration. Additionally, it improves blood flow, reduces perineal rigidity, and lowers the need for episiotomy and perineal tears. Given its potential benefits, incorporating perineal massage into routine practice warrants further study to support evidence-based clinical care.

Conflict of Interest: Not available.

Financial Support: Not available.

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