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Original Research Article

Study of Role of Perineal Body Length and Its Effect on Time and Type of Delivery - A Prospective Observational Study

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Abstract:

Background: The perineal body (PB) is a key anatomical structure of the pelvic floor that plays a vital role during vaginal childbirth. Perineal body length (PBL), measured from the posterior vaginal fourchette to the center of the anal orifice, varies among women and may influence the duration of labor, mode of delivery, risk of perineal trauma, and neonatal outcomes. Identifying women at risk of adverse obstetric outcomes using a simple, non-invasive parameter such as PBL may help optimize intrapartum management and improve maternal and neonatal outcomes.

Aim: To evaluate the relationship between perineal body length and the duration of the second stage of labor and mode of delivery in low-risk primigravida women.

Methodology: This prospective observational study was conducted at the Department of Obstetrics and Gynaecology, GMC & Government General Hospital, Guntur, from July 2023 to December 2024. A total of 100 low-risk primigravida women with term singleton pregnancies (37–40 weeks) planned for vaginal delivery were included. Perineal body length was measured antenatally and categorized as <3 cm or ≥3 cm. Maternal outcomes assessed included duration of the second stage of labor, mode of delivery, episiotomy, and degree of perineal tears. Neonatal outcomes included birth weight, head circumference, APGAR scores, birth asphyxia, and NICU admission. Statistical analysis was performed using EPI INFO version 7.2.5.0, with $p<0.05$ considered significant.

Results: Women with PBL <3 cm had a significantly higher incidence of severe perineal tears (third- and fourth-degree), instrumental vaginal deliveries, and neonatal birth asphyxia compared to those with PBL ≥3 cm ($p<0.05$). Shorter PBL was also associated with lower APGAR scores. The duration of the second stage of labor was shorter in women with PBL <3 cm, while those with PBL ≥3 cm had longer second-stage duration. Higher birth weight was significantly associated with increased perineal trauma.

Conclusion: Perineal body length is a significant predictor of maternal and neonatal outcomes during vaginal delivery. A PBL <3 cm is associated with higher rates of operative delivery, severe perineal trauma, and adverse neonatal outcomes. Routine antenatal assessment of PBL may aid in individualized labor management and prevention of perineal morbidity.

Keywords: Perineal Body Length, Second Stage of Labor, Perineal Tears, Mode of Delivery, Neonatal Outcome.

Introduction

The perineal body (PB) is a central structure of the pelvic floor that plays a crucial role in maintaining pelvic organ integrity and facilitating the childbirth process. Perineal body length is defined as the distance between posterior vaginal fourchette to the centre of anal orifice. PBL has been observed to vary among individuals, and these variations may have significant implications for labor and delivery outcomes.

Understanding the importance of studying PBL lies in its potential to predict labor dynamics, influence obstetric management strategies, and ultimately improve maternal and neonatal outcomes. [1] During childbirth, the perineal body undergoes substantial stress as it accommodates the passage of the fetal head through the birth canal. A longer PBL is thought to provide better support to the pelvic floor muscles, potentially reducing the risk of perineal trauma and providing better control over the descent of the fetal head.

Conversely, a shorter PBL may predispose women to perineal lacerations, episiotomy, or instrumental delivery due to reduced structural integrity and resilience. Moreover, PBL has been linked to the likelihood of successful spontaneous vaginal delivery (SVD) versus the need for assisted vaginal

or cesarean delivery, making it a critical factor in assessing labor progress and the risk of complications. From a clinical perspective, measuring PBL offers a non-invasive, simple method to identify women at higher risk of adverse outcomes during delivery. For instance, obstetricians can use PBL assessments to anticipate challenges in labor, such as prolonged second-stage labor or the need for episiotomy, and tailor interventions to minimize maternal and fetal morbidity. Additionally, studying PBL contributes to understanding its relationship with other factors, such as maternal age, parity, and pelvic dimensions, which collectively influence delivery outcomes. [2]

The increasing emphasis on personalized obstetric care further underscores the importance of PBL research. By incorporating PBL as part of routine antenatal assessments, healthcare providers can develop individualized birth plans that prioritize both safety and comfort. In this context, studying PBL not only has immediate implications for managing labor and delivery but also contributes to broader efforts to reduce perinatal morbidity and improve quality of care in obstetrics.

The current study was conducted at Govt General Hospital, Guntur, which is a tertiary care hospital. All facilities are available in this hospital to conduct the study.

Aim: To establish the correlation between perineal body length and duration of second stage of labour and mode of delivery.

Objectives: To study the incidence of operative vaginal deliveries in relation with perineal length. To assess the occurrence of perineal lacerations during delivery in low risk primigravida. To analyse foetal injury due to rigid perineum e.g: birth asphyxia, low APGAR score

Materials and Methods

This was Prospective Observational study done in 100 antenatal mothers, primigravida, who delivered between 37 weeks to 40 weeks in Department of Obstetrics and Gynaecology, GMC & GGH, Guntur, Andhra Pradesh, India over a period of 18 months – July 2023 to December 2024.

Inclusion Criteria: All low risk primigravida admitted for delivery between 37weeks to 40 weeks period of gestation confirmed by LMP or USG and Antenatal women who were willing for vaginal delivery.

Exclusion Criteria: Preterm labour <37 weeks of gestational age, who had surgeries on perineum, Women with scars on perineum, Congenital anomalies related to perineum like vestibular anus, thin perineum, septate vagina, Anogenital tract abnormalities like cloacal anomalies, Infections on perineum like HSV, venereal warts , Molluscum contagiosum, Maternal medical conditions like Diabetes, Hypertension, cardiac, liver and renal disorders, Malposition and malpresentation. Women who were not willing for vaginal birth.

Exclusion criteria was assessed mainly through oral history, medical records, physical, obstetric examination to rule out above mentioned conditions. The data of all 100 women was compete. All patients provided consent for the study.

Parameters Assessed: Demographic data, Maternal age, Gestational age, Perineal body length, Duration of second stage of labour, Mode of delivery, Degree of perineal tear, Foetal birth weight, Foetal head circumference, Need for episiotomy, Maternal outcomes, Foetal outcomes, Signs of birth asphyxia, APGAR score at 1min and 5 min, NICU/SNCU admission- yes or no.

Statistical Analysis: Data were processed in MS Excel 2023 and analysis was done using EPI INFO free version. 7.2.5.0. P value <0.05, was considered as statistically significant. Frequencies, percentages were also used. Chi square was done to know if association is present or not between categorical variables. Quantitative measures were compared using T test.

Results

Table 1: Perineal Body Length and Age Distribution

PBL	</=20 years	21-30 years	>30 years	Grand Total
<3cms	10	17	9	36
>3.0 cm	9	45	10	64
Grand Total	19	62	19	100

Table 2: PBL Vs Various Parameters

Parameters	Perineal Body Length		
	<3cms	>3.0 cm	
Mean time of 2nd stage of labour	50.6min	65.5min	
Episiotomy given	20	40	chi-square 0.463
Episiotomy not given	16	24	p-value0.496242 **NS**
1st degree perineal tear	25	60	chi-square 9.4654
2nd degree perineal tear	7	3	
3rd degree perineal tear	3	1	p-value0.023702 **S**
4th degree perineal tear	1	0	

Table 3: Mean Birth Weight & Head Circumference and Degree of Perineal Tears

Mean birth weight	1st degree perineal tear	2nd degree perineal tear	3rd degree perineal tear	4th degree perineal tears	Total	
<3.5kgs	67	2	1	0	80	chi-square 19.4005
>3.5kgs	18	8	3	1	20	P-value 0.000226. **S**
Mean Head circumference						
<33cms	65	7	3	0	75	chi-square 0.9007
>33cm	20	3	1	1	25	p-value .825256 **NS**

Table 4: Mean Birth Weight & Head Circumference and Duration of 2nd Stage, Episiotomy

Mean birth weight	Duration of 2nd stage of labour	Episiotomy given	Episiotomy not given
<3.5kgs	55.5 mins	42	38
>3.5kgs	60.4 mins	18	2
		chi-square 9.375	P-value 0. 0022 **S**
Mean Head circumference			
<33cms	45.5mins	40	35
>33cm	65.5 mins	20	5
p=0.01 S		chi-square 5.5556	p-value0.01842 **S**

Table 5: Perineal Tears, Perineal Body Length & Mode of Delivery, Length of Hospital Stay

Mode of delivery	1st degree perineal tears	2nd degree perineal tears	3rd degree perineal tear	4th degree perineal tears	PBL <3cm	PBL >3cm
Outlet forceps	0	5	3	1	7	2
Vacuum	7	3	1	0	8	3
NVD	78	2	0	0	21	59
Total	85	10	4	1	36	64
chi-square 16.5587	p-value 0. 000254 **S**					
< 7 days Hospital Stay	67	6	1	0	chi-square 7.6832	
>7 Days	18	4	3	1	p-value 0.053034 **NS**	

Table 6: Perineal Body Length and Birth Asphyxia

Perineal body length	With birth asphyxia	Without birth asphyxia	Total
<3cms	14	22	36
>3cms	12	52	64
Total	26	74	100
chi-square 4.8568	p-value 0.027538 **S**		

Table 7: Perineal Body Length and Apgar Score

Perineal body length	Apgar 4	Apgar 5	Apgar 6	Apgar 7	Apgar≥8	Total
<3cms	3	4	3	6	20	36
>3cms	1	2	3	4	54	64
Total	4	6	6	10	74	100
chi-square 10.6861	p-value 0.030328 **S**					

Table 8: Mode of Delivery and Birth Asphyxia, Episiotomy

Mode of delivery	With birth (APGAR<8) asphyxia	Without birth asphyxia (APGAR>/=8)	Episiotomy given	Episiotomy not given
Instrumental vaginal delivery	8	12	15	5
Normal Vaginal delivery	18	62	45	35
Total	26	74	60	40
chi-square 2.5468, p-value0.110519 **NS**		chi-square 2.3964, p-value0.301743 **NS**		

Discussion

The length of the perineal body plays a crucial role in determining the risk of perineal trauma during vaginal delivery. Studies have shown that a shorter perineal body, typically defined as less than 2.5 cm, is associated with an increased likelihood of obstetric anal sphincter injuries (OASIS), including third- and fourth-degree perineal tears. This increased susceptibility is due to the reduced amount of soft tissue available to stretch and accommodate the fetal head during delivery, making the perineum more prone to spontaneous lacerations or episiotomy extension. In contrast, a longer perineal body may offer greater tissue distensibility and structural support, reducing the risk of severe perineal injury. [3] Women with a shorter perineal body are also more likely to require an episiotomy, particularly in primiparous births, as clinicians may attempt to control perineal tearing and facilitate delivery. However, routine episiotomy has been associated with higher rates of perineal trauma, raising concerns about whether it is beneficial in all cases. The mode of delivery further influences perineal outcomes, with instrumental vaginal deliveries—especially forceps-assisted births—significantly increasing the risk of severe perineal lacerations in women with a short perineal body. Given these risks, perineal length assessment may serve as a useful predictor of perineal trauma, guiding the implementation of preventive strategies such as antenatal perineal massage, perineal warm compresses during the second stage of labor, and controlled delivery techniques to minimize perineal injury. [4,5] Perineal body length has been suggested to influence the mode of delivery, particularly in relation to the progress of labor and the need for obstetric interventions. A shorter perineal body (<2.5 cm) has been associated with an increased likelihood of instrumental vaginal deliveries, especially forceps-assisted births. This may be due to reduced perineal elasticity and support, which can contribute to fetal malposition, prolonged second-stage labor, or difficulty in controlled delivery of the fetal head. In such cases, obstetricians may resort to assisted vaginal delivery or cesarean section to prevent severe perineal trauma. However, the direct relationship between perineal body length and cesarean delivery rates remains unclear, with some studies suggesting that PB length does not significantly influence overall cesarean rates, while others indicate that women with a short PB may be at higher risk of labor dystocia. [6,7] Additionally, in multiparous women, a longer PB may act as a natural protective factor, facilitating spontaneous vaginal delivery with reduced perineal injury. Given these potential associations, assessing perineal body length during pregnancy may help guide clinical decision-making, allowing for individualized labor management strategies aimed at minimizing both perineal trauma and unnecessary operative interventions. [8,9]

Pelvic floor dysfunction, including urinary incontinence, anal incontinence, and pelvic organ prolapse, is a major concern following vaginal delivery. While direct evidence linking perineal body length to long-term pelvic floor outcomes is limited, it is postulated that a shorter PB may contribute to postpartum anal sphincter dysfunction due to its proximity to the anorectal complex. Additionally, severe perineal trauma associated with a short PB may lead to persistent pelvic floor weakness, further predisposing individuals to prolapse and incontinence. [10]

The recognition of perineal body length as a predictor of obstetric outcomes has significant clinical implications for prenatal counselling and intrapartum management. Measuring perineal body length during pregnancy could serve as a valuable screening tool to identify women at higher risk of perineal trauma, allowing for targeted preventive strategies. For instance, antenatal perineal massage, warm compress application during labor, and controlled delivery techniques such as perineal support or modified episiotomy approaches may help mitigate the risk of obstetric anal sphincter injuries in women with a shorter perineal body. [11] Furthermore, understanding the relationship between perineal body length and mode of delivery may contribute to individualized decision- making regarding operative vaginal delivery. In cases where a short perineal body is identified, obstetricians may opt for vacuum-assisted rather than forceps delivery to reduce the risk of severe perineal trauma. Additionally, postpartum pelvic floor rehabilitation programs can be prioritized for women with a short perineal body who have sustained significant perineal injury, potentially improving long-term pelvic floor function and

reducing the incidence of urinary or anal incontinence. [9] Future research should focus on establishing standardized cutoff values for perineal body length that can reliably predict adverse pregnancy outcomes. Large-scale prospective studies are needed to validate its role in labor management and postpartum recovery, particularly in diverse obstetric populations. Investigating the genetic and biomechanical factors influencing perineal elasticity and trauma susceptibility may also provide new insights into personalized perineal care. Integrating perineal body length assessment into routine obstetric practice could ultimately enhance maternal health outcomes by promoting evidence-based perineal protection strategies.

Table 9: A brief comparison of our study with other studies in the literature:

Studies	Mean age	Mean PBL	Mean time of 2nd stage of labour	Mean birth weight in Kgs	% of Episi-otomy	% of 3rd & 4th degree tears
Lane et al [12]	23.7	3.7	58min	3.3	2	3
Deering et al [13]	24.3	3.9	56.6min	3.2	37.7	40
Ganiga et al [14]	26.8	3.1	43.6min	2.9	28.6	12.5
Djusad et al [15]	24.6	3.3	48.6min	3.4	67.5	16.7
Our study	26	3.2	50.9min	2.9	75	5

Conclusion

This study demonstrates a clear and significant correlation between perineal body length (PBL) and various maternal and neonatal outcomes during vaginal delivery. Women with a PBL of less than 3 cm experienced higher rates of episiotomy, severe perineal tears (third- and fourth- degree), instrumental vaginal deliveries, and neonatal complications such as birth asphyxia and lower APGAR scores.

Conversely, a PBL greater than 3 cm was associated with more favourable outcomes, including lower rates of perineal trauma and better neonatal well-being. Duration of second stage labour is less in women with PBL less than 3 cms as compared to women with PBL more than 3 cms who have more duration of second stage of labour. These findings highlight the value of assessing PBL as a predictive, non-invasive tool in obstetric practice. Incorporating PBL measurement into routine antenatal care could aid in identifying at- risk pregnancies, guiding individualized labor management strategies, and ultimately improving maternal and neonatal outcomes.

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