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## **Original Research**

# Incidence of peripartum wound dehiscence and associated risk factors: A prospective hospital-based study

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#### ABSTRACT:

Background: Peripartum wound dehiscence is a significant complication in obstetric care, posing risks to maternal health and increasing morbidity. Incidence rates vary across populations and settings. Identifying local incidence and associated risk factors is crucial for improving outcomes. Maternal factors (obesity, diabetes, advanced age, and multiple gestations) and surgical factors (emergency cesarean, vertical uterine incision, prolonged operative time, and tissue trauma) contribute to elevated risk. Consequences include pain, delayed healing, infections, and emotional impact. Addressing this knowledge gap, our study aims to determine incidence and risk factors in our population to optimize preventive strategies. Methods: This prospective study was conducted at a Maheswara Medical College, a suburban tertiary care centre of South India over a 3-year period. The study population consisted of postpartum women who presented in labour ward and underwent both vaginal deliveries with perineal tear and LSCS (elective and emergency), during defined October 2018 to October 2021. Data was collected using a standardized data collection form. The primary outcome was the incidence of peripartum wound dehiscence. A total of 295 women were included in the analysis, and statistical methods, including descriptive analysis and logistic regression, were used to analyze the data. Results: Among 295 postpartum women, the incidence of peripartum wound dehiscence was 4.4%. The study population predominantly comprised women aged 20-35 years, with primary and middle school education, residing in rural areas. Vaginal delivery was the most common mode of delivery. Univariate analysis revealed significant associations between wound dehiscence and the presence of 3rd/4th-degree tear and instrumental delivery. However, no significant associations were found with age groups, education levels, urban residence, or birth weight. Conclusion: By identifying and addressing these modifiable risk factors, healthcare professionals can contribute to reducing the incidence of peripartum wound dehiscence and improving maternal health outcomes. Keywords: Peripartum, Wound dehiscence, Induction of labor, meconium-stained liquor, Vaginal delivery

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#### INTRODUCTION

Peripartum wound dehiscence, characterized by the separation of the layers of a surgical incision during the postpartum period, is a significant complication in obstetric care. It poses considerable risks to maternal health, resulting in increased morbidity, prolonged hospitalization, and potential mortality. Understanding the incidence and associated risk factors of peripartum wound dehiscence is crucial for improving patient outcomes and optimizing obstetric care [1,2].

The incidence of peripartum wound dehiscence varies across different populations and healthcare settings. Reported rates range from 0.2% to 3.8% for cesarean deliveries, while the incidence after vaginal deliveries with episiotomy ranges from 0.2% to 1.5% [3]. These variations could be attributed to several factors including differences in patient demographics, obstetric practices, and surgical techniques. Therefore, studying the local incidence of peripartum wound dehiscence is essential to understanding the scope of the problem and developing appropriate preventive strategies [4].

Several risk factors have been associated with an increased likelihood of peripartum wound dehiscence. Maternal factors such as obesity, diabetes mellitus, advanced maternal age, and multiple gestations have been implicated in higher rates of wound complications. Additionally, factors related to the surgical procedure itself, such as emergency cesarean delivery, vertical uterine incision, prolonged operative time, and excessive tissue trauma, may also contribute to an elevated risk. Identifying these risk factors can aid in risk stratification, allowing healthcare providers to target high-risk individuals and implement preventive measures [5,6].

The consequences of peripartum wound dehiscence extend beyond the physical realm. Maternal wound complications can lead to increased pain, delayed wound healing, infections, and the need for further surgical interventions [7]. Moreover, they can have a profound impact on a woman's emotional well-being, breastfeeding initiation, and bonding with the newborn. The economic burden associated with prolonged hospital stays, additional healthcare resources, and potential litigation adds to the significance of preventing peripartum wound dehiscence [8,9,10,11].

Despite the importance of this obstetric complication, there is a paucity of literature specific to the incidence and risk factors of peripartum wound dehiscence in our target population. Therefore, this study aims to address this gap by conducting a comprehensive analysis at our institution. By investigating a large sample of postpartum women who have undergone surgical procedures, we aimed to determine the incidence of peripartum wound dehiscence and identify the associated risk factors specific to our population.

#### **MATERIALS and METHODS**

#### **Study Design and Setting**

This research study was conducted as aprospective analysis at MaheswaraMedical College, a suburban tertiary care centre ofSouth India. The study period spanned for 3yearsfrom October 2018 to October 2021. Ethical approval for the study was obtained from the Institutional Review Board.

#### **Study Population**

The study population consisted of postpartum women who underwent both vaginal deliveries with perineal tear and LSCS (elective and emergency), during defined study period. Women who were loss to follow up were considered as drop outs and were excluded from the analysis.

#### **Sample Size Calculation**

The sample size was determined based on the expected incidence of peripartum wound dehiscence, assuming a prevalence of 4.61% based on study by Goldaber et al., with a 95% confidence level and a precision of 0.5% [5]. The calculated sample size was determined to be 294, and efforts were made to include all eligible participants within the study period.

#### **Data Collection**

After the patient presenting with the complaints in the labour ward, the treatment was done as per hospital guidelines and protocol. The informed consent was obtained from the patients. Data was collected using a standardized data collection form. The following variables were extracted for each participant: age, education, residence, birth weight, parity, body mass index (BMI), gestational age, mode of delivery, presence of comorbidities (e.g., Diabetes Mellitus, Hypertension, Hypertension, Gestational Preeclampsia. Anaemia), frequency of vaginal examination, induction of labour, duration of 2nd stage of Labour, pre-rupture of membrane, episiotomy occurrence 3rd/4th degree procedure. tear. instrumental deliverv attempted, presence of meconium stained liquor, postpartum haemorrhage, years of experience of delivery conducting health personnel, use of prophylactic antibiotics, and occurrence of peripartum wound dehiscence.

#### **Outcome Measurement**

The primary outcome of this study was the incidence of peripartum wound dehiscence among the study population. Specific definition was used to identify and classify cases of peripartum wound dehiscence in our study population [10,11,12]. By utilizing this standardized definition, we aimed to ensure consistency in the identification and reporting of peripartum wound dehiscencecases across different healthcare settings. The use of a clear and objective criterion for defining peripartum wound dehiscence helps to improve the accuracy and reliability of data collection and analysis in studies investigating this complication.Peripartum wound dehiscencewas confirmed by clinical examination and documented in the medical records.

During the period from October 2018 to October 2021, a tertiary care hospital witnessed a total of 300 pregnant women giving birth. Among them, 174 women (58.0%) underwent cesarean delivery (elective and emergency), while 126 women (42.0%) had vaginal delivery. To ensure data accuracy, 5 women (1.7%) were excluded due to loss to follow up. From the remaining women who had undergone vaginal delivery and LSCS with perineal wound repair, consecutive data was collected. Ultimately, 295 women were included in the analysis, around the calculated sample size of 294. Among this group, 13 women (4.4%) were identified to have experienced peripartum wound dehiscence.

#### **Statistical Analysis**

Data were analyzed using appropriate statistical methods. Descriptive statistics were used to summarize demographic and clinical characteristics of the study population. The incidence of peripartum wound dehiscence was calculated as the number of cases divided by the total number of eligible participants, reported as a percentage.Univariate analysis was performed to identify potential risk factors associated with peripartum wound dehiscence. Variables with a p-value < 0.05 in the univariate analysis or considered clinically relevant were included in the multivariable model. Adjusted odds ratios (OR) with corresponding 95% confidence intervals (CI) were calculated to assess the strength of association.All statistical analyses were performed using SPSS 20.0. A p-value < 0.05 was considered statistically significant.

#### **Ethical Considerations**

Patient confidentiality and privacy were strictly maintained throughout the study. Data were anonymized and securely stored according to institutional guidelines.

The study included a total of 295 postpartum women. Among them, 13 women experienced peripartum wound dehiscence, resulting in an overall incidence of 4.4%. The mean age of the participants was 23.85 years, with the majority falling within the age group of 20-35 years (72.0%). The educational levels varied, with primary and middle school education being the most common (37.6%). Regarding residence, 72.0% of participants resided in rural areas. The mean BMI was 21.83 kg/m2, and the most prevalent BMI category was 18.5-24.9 (72.0%). Primiparas accounted for 19.4% of the population. The mean birthweight was 2,752.12 grams, and the most common birthweight category was 2500-2999 grams (53.8%). Vaginal delivery was the most frequent type of delivery (61.5%), followed by emergency lower segment cesarean section (LSCS) (30.8%) and elective LSCS (7.7%)(Table 1) (Figure 1 and 2).

RESULTS

ladie 1. Baseline characteristics of the patient with wound denise
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Baseline Variables	Wound Dehiscence		Total	Incidence			
	Frequency	%					
Mean age (in years) 23.85±7.26							
Age group							
<20 years	2	15.1	44	4.5%			
20-35 years	9	72.0	204	4.4%			
>35 years	2	12.9	47	4.3%			
Education							
Illiterate	5	16.1	47	10.6%			
Primary and middle school	5	37.6	62	8.1%			
Higher and secondary school	4	32.3	118	3.4%			
Graduate and above	2	14.0	68	2.9%			
	Residence						
Rural	9	72.0	56	16.1%			
Urban	4	28.0	239	1.7%			
]	BMI (in Kg/m2)						
<18.5	2	18.3	56	3.6%			
18.5-24.9	9	72.0	212	4.2%			
25.0-29.9	1	6.5	17	5.9%			
>30	0	3.2	10	0.0%			
Modifie	ed Kuppuswamy	's SES					
Upper/Upper Middle	1	7.7	33	3.0%			
Lower middle	4	30.8	122	3.3%			
Upper lower/Lower	8	61.5	140	5.7%			
Mean BMI (in Kg/m2)		21.83±	3.14				
Parity							
Primipara	2	19.4	62	3.2%			
Multipara	11	80.6	233	4.7%			
Mean Birthweight (in grams) 2752.12±913.23							
Birthweight (in grams)							
<2500	1	10.8	32	3.1%			
2500-2999	7	53.8	162	4.3%			
3000-3499	3	23.7	62	4.8%			
3500-3999	1	7.5	20	5.0%			
>4000	1	4.3	19	5.3%			
Type of delivery							
Vaginal	8	61.5	126	6.3%			
Elective	1	7.7	94	1.1%			





Figure 2. Mode of delivery among enrolled patients (N=295).

Univariate analysis was done to find the significant associations. No significant association was found between age groups (<35 years vs. >35 years) and wound dehiscence (OR 1.04, 95% CI 0.22-4.87, p = 0.956). Similarly, education level (below higher school vs. higher school and above) was not significantly associated with wound dehiscence (OR

2.19, 95% CI 0.71-6.69, p = 0.169). Urban residence showed a non-significant association with wound dehiscence (OR 1.96, 95% CI 1.04-2.61, p = 0.275). No significant association was observed between birth weight (<3000 grams vs.  $\geq$ 3000 grams) and wound dehiscence (OR 1.23, 95% CI 0.39-3.86, p = 0.722). However, the presence of 3rd/4th-degree tear was significantly associated with an increased risk of wound dehiscence (OR 21.48, 95% CI 2.53-182.01, p = 0.005). Instrumental delivery also showed a significant association with wound dehiscence (OR 7.41, 95% CI 1.42-38.56, p = 0.017). Other variables

such as birthweight, associated diseases, duration of the 2nd stage of labor, mode of delivery, and experience of delivery conducting health personnel were not having any significant associations with peripartum wound dehiscence(Table 2).

Baseline	No wound dehiscence	dehiscence		Wound Dehiscence		p value
	Frequency	%	Frequency	%	(95% CI)	
	A	ge grou	р		·	
≤35 years	237	84.0	11	84.6	1.04	0.956
>35 years	45	16.0	2	15.4	(0.22 - 4.87)	
	E	ducatio	n			
Below Higher school	98	34.8	7	53.8	2.19	0.169
Higher school and above	184	65.2	6	46.2	(0.71 - 6.69)	
Residence						
Urban	230	81.6	9	69.2	1.96	0.275
Rural	52	18.4	4	30.8	(1.04 - 2.61)	
	Birthwe	eight (in	grams)		·	
<3000	187	66.3	8	61.5	1.23	0.722
≥3000	95	33.7	5	38.5	(0.39 - 3.86)	
	Assoc	iated dis	seases	•	·	•
Diabetes Mellitus	26	9.2	1	7.7	1.21	0.186
					(0.15 - 9.75)	
Hypertension	42	14.9	2	15.4	1.03	0.961
					(0.22 - 4.85)	
Gestational Hypertension	20	7.1	1	7.7	1.09	0.934
					(0.13 - 8.82)	
Pre-eclampsia	26	9.2	2	15.4	1.21	0.186
_					(0.15 - 9.75)	
Anaemia	67	23.8	1	7.7	3.73	0.209
					(0.47 - 29.29)	
	Vaginal ex	aminati	on (n=126)			
≥4 times	24	20.3	2	25.0	1.30	0.753
<4 times	94	79.7	6	75.0	(0.24–6.87)	
	Induction	of labou	ır (n=126)		·	
Yes	46	38.9	4	50.0	1.56	0.540
No	72	61.1	4	50.0	(0.37–6.56)	
	Duration of 2nd	stage of	Labour (n=126		·	
≥30 minutes	10	8.5	2	25.0	3.60	0.145
<30 minutes	108	91.5	6	75.0	(0.64 - 20.23)	
	Pre-rupt	ure of m	embrane	•	·	
Yes	15	17.0	2	55.9	1.71	0.341
No	103	89.0	6	44.1	(0.56–5.24)	
	Episio	otomy (n	=126)			
Yes	104	88.2	7	87.5	1.06	0.957
No	14	11.8	1	12.5	(0.12–9.27)	
	3rd/4th degree	tear (n=	=126)			
No	89	75.4	7	87.5	21.48	0.005
Yes	29	24.6	1	12.5	(2.53-182.01)	
	Instrument	al delive	erv (n=126)		, , ,	
Yes	34	28.8	6	75.0	7.41	0.017
No	84	71.2	2	25.0	(1.42-38.56)	
	Meconiu	m-stain	ed liquor		· · /	1
Yes	35	12.4	3	23.1	2.11	0.271
No	247	87.6	10	76.9	(0.55 - 8.06)	
	Postnarti	um haer	norrhage		· · · · · /	1
Yes	21	7.3	0	0.0	2.21	0.584
	-		~			

No	251	92.6	13	100.0	(0.12 - 38.63)			
Prophylactic antibiotic								
Yes	31	11.0	1	7.7	1.48	0.710		
No	251	89.0	12	92.3	(0.18 to 11.79)			
Experience of delivery conducting health personnel								
< 5years	152	53.9	10	76.9	2.85	0.117		
≥5 years	130	46.1	3	23.1	(0.76 -10.57)			
Mode of delivery								
Vaginal delivery	122	26.9	4	30.7	1.20	0.762		
Caserian section	160	73.1	9	69.3	(0.36 - 4.02)			

The results of the logistic regression analysis showed that instrumental delivery was significantly associated with peripartum wound dehiscence, with a crude odds ratio (OR) of 7.41 (95% CI 1.42 - 38.56) and an adjusted OR of 3.66 (95% CI 1.02 - 9.21), indicating that women who underwent instrumental delivery had a higher risk of experiencing wound dehiscence compared to those who did not. Similarly, the absence of a 3rd/4th degree tear was also significantly

associated with wound dehiscence, with a crude OR of 21.48 (95% CI 2.53 - 182.01) and an adjusted OR of 12.39 (95% CI 7.29 - 34.62), suggesting that participants without a 3rd/4th degree tear had a substantially higher risk of wound dehiscence. The p-values for both associations were statistically significant, indicating strong evidence for these associations(Table 3).

Variables	Crude OR Adjusted OR		p value
	Wound De		
Instrumental delivery	7.41(1.42 - 38.56)	3.66 (1.02 to 9.21)	< 0.0001
Absence of 3rd/4th degree tear	21.48(2.53-182.01)	12.39 (7.29-34.62)	0.010

#### DISCUSSION

Peripartum wound dehiscence typically occurs within a specific timeframe after vaginal or cesarean delivery, usually between 4 to 7 days. The common causative organisms for surgical site infections leading to wound dehiscence are often A or B betahemolytic streptococcus or genital mycoplasma. It is important to note that not all cases of wound dehiscence require antibiotic treatment, as not all wounds are infected. Antibiotics are typically indicated only in cases where cellulitis is present [13,14,15,16]. In our study, the postnatal hospital stays and antibiotic therapy aligned with expectations for both modes of delivery in cases of wound dehiscence, compared to the control group. This suggests that the management of wound dehiscence, including hospital stay and antibiotic usage, was consistent with standard protocols.Usually wound dehiscence require regular dressing with antibiotics and followup .In our study only one case required secondary suturing others healed in a week's time

The incidence of peripartum wound dehiscence worldwide has been reported to range from 0.21% to 24.6% [17]. The study included a total of 295 postpartum women. Among them, 13 women experienced peripartum wound dehiscence, resulting in an overall incidence of 4.4%. A similar incidence of wound dehiscence was observed following vaginal delivery in the study by Berkowitz et al., [18].

In our study, there was no significant association between prophylactic antibiotic use and the occurrence of peripartum wound dehiscence (OR: 1.48, 95% CI: 0.18-11.79, p = 0.710). These results suggest that in our study population, prophylactic antibiotics did not have a significant impact on the incidence of peripartum wound dehiscence. However, it is worth noting that Bonet et al., Van Schalkwyk et al.,and Knight et al., found that prophylactic antibiotics reduced the incidence of peripartum wound dehiscence[19,20,21].

In our study, we did not find a significant association between the experience of delivery conducting health personnel with less than 5 years of experience and the occurrence of peripartum wound dehiscence (OR: 2.85, 95% CI: 0.76-10.57, p =0.117) and it was incoherence to the study conducted by Jallad et al., [11]. This finding suggests that less experienced healthcare providers may be associated with a higher risk of peripartum wound dehiscence compared to more experienced providers. It highlights the importance of proper training, supervision, and ongoing professional development for healthcare professionals involved in obstetric care. Ensuring that healthcare providers have sufficient experience and expertise can contribute to reducing the incidence of peripartum wound dehiscence and improving patient outcomes.

In our study, we observed that there was no significant association between the frequency of vaginal examinations ( $\geq$ 4 times) and the occurrence of peripartum wound dehiscence (OR: 1.30, 95% CI: 0.24-6.87, p = 0.753). A similar finding was observed in the study by Nell et al., [22].In light of the potential risk of introducing infection during frequent vaginal

examinations, we recognize the importance of investigating the aseptic technique and indications for performing vaginal examinations during delivery [23]. In our study, we found that the occurrence of 3rd/4th degree tear was higher among pregnant women without wound dehiscence (aOR: 12.39, 95% CI: 7.29-34.62, p = 0.010). This finding contrasts with the results of a previous study conducted by Bowler et al., [15]. Wound dehiscence was significantly more common with instrumental delivery (aOR3.66, 95% CI 1.02-9.21, p < 0.0001), as seen in the study by Macleod et al., [24].

In our study, there was no significant association between birth weight and the occurrence of peripartum wound dehiscence (OR: 1.23, 95% CI: 0.39-3.86, p = 0.722), which was in contrast to the studies conducted by Klankhajhon et al., Buphasiri et al., and Gommesen et al., [25,26,27].

In our study, a higher incidence of wound dehiscence (OR: 1.56, 95% CI: 0.37-6.56, p = 0.540) was observed in women with induction of laborcompared to in whom no induction of lobor was done attempted. This finding suggests that the process of inducing labor may contribute to an increased risk of peripartum wound dehiscence. Additionally, we found that meconium-stained amniotic fluid was more prevalent among patients with wound dehiscence (OR: 2.11, 95% CI: 0.55-8.06, p = 0.271). This observation could be attributed to the longer duration of labor and the use of misoprostol for labor induction, which may influence the integrity of the surgical incision. These findings highlight the need for careful consideration and management of induction of labor and the potential impact on wound healing[28].

In our study, there was no significant association between postpartum hemorrhage and the occurrence of peripartum wound dehiscence (OR: 2.21, 95% CI: 0.12-38.63, p = 0.584), and it was contrasting with the studies by Kindberg et al., Klankhajhon et al., and Gommesen et al., [12,25,27].

#### LIMITATIONS

As a prospective study, it still has some limitations. The single-center design may limit its generalizability to other healthcare settings. The small sample size might affect the study's statistical power and ability to detect certain associations.

#### CONCLUSION

In our study, the women who underwent instrumental delivery had a higher risk of wound dehiscence, while those without a 3rd/4th-degree tear had a substantially increased risk. These findings underscore the importance of identifying risk factors to improve peripartum wound healing and patient outcomes. These findings emphasize the importance of careful consideration and attention to detail during surgical procedures and wound closure. Efforts should be made to provide adequate training, supervision, and ongoing professional development to healthcare

providers involved in obstetric care. By identifying and addressing these modifiable risk factors, healthcare professionals can contribute to reducing the incidence of peripartum wound dehiscence and improving maternal health outcomes.

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