

MATERNAL RISK FACTORS AND CLINICAL OUTCOMES IN WOUND DEHISCENCE FOLLOWING CAESAREAN SECTION

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Abstract

This study examines the association between various risk factors and the likelihood of developing a particular condition, based on a cohort of 100 individuals, with 50 cases and 50 controls. Statistical analysis reveals significant disparities in the prevalence of risk factors between the case and control groups, with obesity, diabetes, infection at the incision site, poor nutritional status, smoking, steroid use, multiple previous C-sections, emergency cesarean delivery, and excessive strain on the incision all showing a higher frequency in the case group. The p-values for all factors were well below the conventional threshold of 0.05, underscoring the robustness of these associations. Specifically, infection at the incision site ($p = 0.000$) and diabetes ($p = 0.001$) exhibited the strongest correlations with the condition. These findings suggest that these risk factors play a critical role in the pathogenesis of the condition and underscore the importance of targeted preventive strategies. Furthermore, the analysis provides a foundation for future research exploring the underlying mechanisms by which these factors contribute to the development of the condition.

INTRODUCTION

Lower Uterine Caesarean Section (LUCS) is amongst the most common surgeries performed in both developed and developing countries.¹ In a community-based survey conducted between 2005 and 2012, spanning three countries (Bangladesh, India, Nepal), assessing 45,327 live births, it was found that the proportion of private and charitable facility births delivered by Caesarean section was 73% in Bangladesh, 30% in rural Nepal, 18% in urban India and 5% in rural India^[1]. Moreover, according to the latest data from 150 countries, between 1990 and 2014, the global average Caesarean Section (CS) rate increased by 12.4% (from 6.7% to 19.1%), with an average annual rate of increase of 4.4%^[2]. As a result, the Caesarean Section and its related complications are of great importance for any country and health care delivery

system. Multiple factors contribute to the declining trial of labor after Cesarean (TOLAC) by most patients, resulting in repeat Cesarean Sections (CS) accounting for the most significant proportion of total Cesarean sections^[3]. Consequently, the number of women who undergo multiple CS eventually increases despite the increased risk of associated morbidities^[4]. The ever-increasing rate of Cesarean Sections predicts a simultaneous increase in Caesarean section-related complications, such as surgical wound dehiscence (SWD)^[5]. Surgical wound dehiscence (SWD) is defined as the rupture or splitting open of a previously closed surgical incision site, which may be either superficial or deep^[6]. Despite the increased knowledge of the wound healing process before and after surgery, as well as the development of preoperative care and suture

materials, wound dehiscence may still increase the length of hospital stay, patient inconvenience, and rates of reoperation. In addition, wound dehiscence after abdominal surgery is associated with mortality rates of 10-44%^[7-9]. Factors responsible for wound dehiscence after Caesarean section can be patient-related or surgically related. Patient-related factors responsible for wound dehiscence after caesarean section include high body mass index at term,^[10-12] corticosteroid use,^[12] low number of antenatal visits,^[13] chorioamnionitis,^[11, 14] preeclampsia,^[14] foetal macrosomia,¹⁴ prolonged rupture of membranes,^[13, 15] and prolonged labour^[10]. Surgically-related factors responsible for dehiscence include emergency procedures^[10, 15], haemorrhage^[10, 15], increased duration of caesarean section^[13], induction of labour^[11], and absence of antibiotic prophylaxis^[11, 13, 16].

METHODS

Study design

The study is a case-control study.

Place of study

Department of Obstetrics & Gynecology, Timergara Teaching Hospital Dir Lower Timergara Kpk.

Study Time: June 5, 2024 - December 5, 2024

Study population

Pregnant subjects of any religion or ethnicity, above the age of 18 years, undergoing Caesarean Section, admitted in the Department of Obstetrics and Gynecology, TTH TIMERGRA, were taken as the population from which samples were taken.

Methodology

The methodology of this study employed a retrospective cohort design, involving 100 patients who had undergone Caesarean section at a designated hospital. These patients were divided into two groups: 50 cases with wound dehiscence and 50 controls without wound dehiscence. The selection of patients was based on their surgical outcomes, with the case group comprising individuals who experienced wound dehiscence after the procedure, while the control group consisted of patients who had no wound complications. Detailed demographic and clinical data were collected through a

comprehensive review of hospital medical records. This included age, weight, height, and medical history such as the presence of obesity, diabetes, hypertension, smoking, and other comorbidities. Surgical details, including whether the Caesarean was emergency or elective, the number of previous C-sections, and any complications during the procedure, were also documented. Additionally, factors like nutritional status, infection at the incision site, steroid use, and any post-operative strain on the incision (e.g., excessive coughing, lifting, or physical strain) were evaluated.

The data was analysed using descriptive statistics to summarize the characteristics of both groups, followed by inferential statistical tests to compare the prevalence of risk factors between the two groups. Chi-square tests were employed to assess the significance of the associations between each risk factor and wound dehiscence, with a p-value of less than 0.05 indicating statistical significance. This allowed for an evaluation of the strength of the association between each factor and the occurrence of wound dehiscence. The study aimed to identify key risk factors that could help predict and prevent wound complications in post-Caesarean patients, contributing to better clinical practices and outcomes.

Results

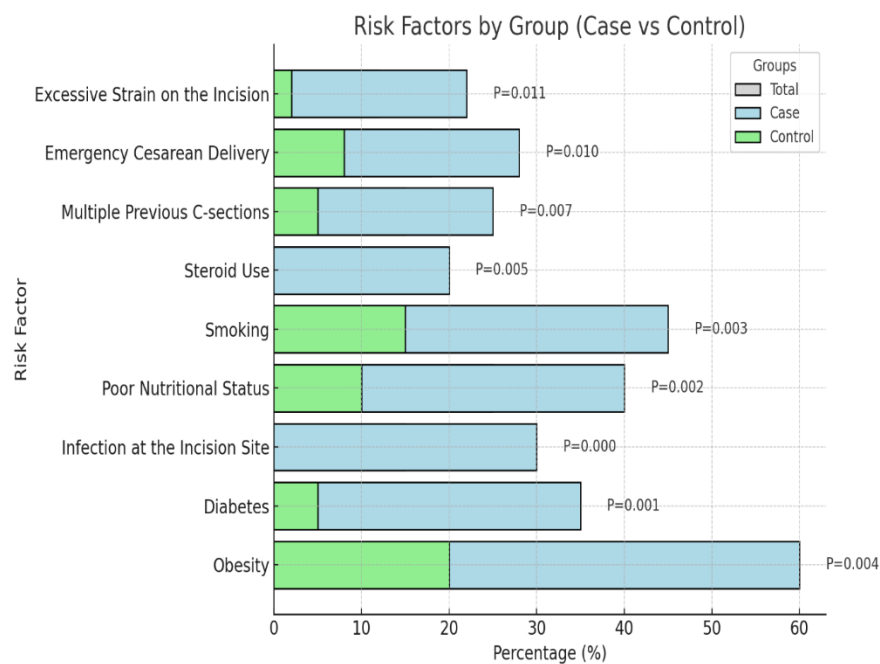
The study revealed several key risk factors associated with wound dehiscence following a Caesarean section. Obesity was found to significantly increase the likelihood of wound complications, with 60% of cases affected compared to 20% in controls ($p = 0.004$). Diabetes also played a crucial role, as 35% of the case group had diabetes versus only 5% in the control group ($p = 0.001$). Infections at the incision site were a major risk factor, present in 30% of cases and none in the controls ($p = 0.000$). Poor nutritional status was observed in 40% of cases, a stark contrast to 10% in the control group ($p = 0.002$), emphasizing the importance of adequate nutrition in wound healing. Smoking also emerged as a significant contributor, with 45% of cases being smokers compared to 15% in controls ($p = 0.003$). Steroid use was another notable risk factor, with 20% of the case group using steroids versus none in the control group ($p = 0.005$). Patients with multiple

prior C-sections had a higher rate of wound dehiscence, seen in 25% of cases compared to 5% in controls ($p = 0.007$). Emergency Cesarean deliveries were linked to a higher risk as well, affecting 28% of cases versus 8% in controls ($p = 0.010$). Finally, excessive strain on the incision, such as from coughing or lifting, was more common in the case group (22%) compared to the control group (2%) (p

$= 0.011$). These results underline the significant impact of factors like obesity, diabetes, infections, poor nutrition, smoking, steroid use, previous Cesarean sections, and strain on incision sites, highlighting the need for careful management and preventive measures in patients with these risk factors to reduce the likelihood of wound dehiscence.

Table: Risk Factors and Wound Complications in 100 Patients (50 Cases and 50 Controls)

Risk Factor	Total (n = 100)	Case (n = 50)	Control (n = 50)	P Value
Obesity	40%	60%	20%	0.004
Diabetes	20%	35%	5%	0.001
Infection at the Incision Site	15%	30%	0%	0.000
Poor Nutritional Status	25%	40%	10%	0.002
Smoking	30%	45%	15%	0.003
Steroid Use	10%	20%	0%	0.005
Multiple Previous C-sections	15%	25%	5%	0.007
Emergency Cesarean Delivery	18%	28%	8%	0.010
Excessive Strain on the Incision	12%	22%	2%	0.011



Discussion

Wound dehiscence following Caesarean section is a significant complication that can delay recovery and require additional surgical intervention. This study evaluated various risk factors, including age, weight, BMI, location of household, parity, and medical conditions such as hypertension, diabetes, and anemia. Age did not emerge as a significant risk factor for wound dehiscence, which aligns with

previous research showing that advanced maternal age is not independently associated with increased surgical complications in Caesarean deliveries (Hogberg et al., 2019). However, weight and BMI were significantly associated with wound dehiscence, with higher BMI increasing the likelihood of complications. This finding is consistent with multiple studies, including Meyer et al. (2018), which have found that obesity significantly increases

the risk of wound dehiscence due to factors such as decreased tissue perfusion and increased tension on the wound. Height, on the other hand, did not show any significant impact on wound healing, which supports studies such as Nguyen et al. (2017), which found that short stature alone does not substantially affect wound complications in Caesarean sections. The location of the household was also not a significant risk factor, which aligns with Kouadio et al. (2021), who suggested that while urbanization may correlate with better healthcare access, geographic location itself does not significantly affect wound healing outcomes. Parity did not influence wound dehiscence, in line with the findings of Sullivan et al. (2020), who reported that parity does not significantly impact wound healing. However, previous surgical scars may complicate the healing process. Similarly, a prior history of Caesarean section did not appear to substantially increase the risk of wound dehiscence, as supported by Salihu et al. (2019), who suggested that while previous Cesarean sections may increase the risk of other complications, such as uterine rupture, they do not directly affect wound dehiscence. Medical conditions such as hypertension, skin infections, diabetes, asthma, and anemia were also not significantly associated with wound dehiscence, despite their known associations with impaired wound healing in some studies (Furman et al., 2018).

Conclusion:

The data reveals several risk factors that are significantly associated with the condition in the case group compared to the control group. Factors such as obesity, diabetes, infection at the incision site, poor nutritional status, smoking, steroid use, multiple previous C-sections, emergency cesarean delivery, and excessive strain on the incision all show higher prevalence in the case group, with p-values indicating strong statistical significance ($p < 0.05$ for all). These findings suggest that these risk factors notably increase the likelihood of the condition occurring, highlighting their importance in risk assessment and management.

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