

EVALUATION OF SCAR INTEGRITY IN PATIENTS WITH PREVIOUS CESAREAN SECTION PRESENTING WITH SCAR TENDERNESS

Dr Fouzia Naudhani^{*1}, Prof Dr Rohana Salaam², Dr Fatima Malgani³, Dr Zamrud⁴^{*1,2,3,4}Department of Obs & Gynae, Bolan Medical College/Hospital, Quetta, Pakistan^{*1}fozia.naudhani51@gmail.comDOI: <https://doi.org/10.5281/zenodo.21304866>**Keywords**

Cesarean Section, Scar Integrity, Scar Tenderness, Scar Dehiscence, Uterine Rupture

Article History

Received: 17 September 2025

Accepted: 06 October 2025

Published: 21 October 2025

Copyright @Author

Corresponding Author: *

Dr Fouzia Naudhani

Abstract

Background: Cesarean section is one of the most commonly performed obstetric procedures worldwide and has contributed substantially to reducing maternal and neonatal morbidity and mortality. However, increasing rates of cesarean delivery have also increased the occurrence of complications associated with previous uterine scars. Uterine scar dehiscence is an important obstetric complication because it may increase the risk of uterine rupture and contribute to adverse maternal and fetal outcomes (Verma et al., 2020; Abdelazim et al., 2020).

Objective: To determine scar integrity in patients with previous cesarean section presenting with scar tenderness.

Methods: A descriptive cross-sectional study was conducted at the Obstetrics and Gynecology Unit, Bolan Medical College Hospital, Quetta. A total of 151 patients with previous cesarean section presenting with scar tenderness were enrolled through non-probability consecutive sampling. Clinical assessment and Ultrasonographic evaluation were performed to assess scar integrity. Data were entered and analyzed using SPSS version 25. Descriptive and inferential statistics were applied.

Results: A total of 151 women with previous cesarean section presenting with scar tenderness were included in the study. The mean age of participants was 31.8 ± 5.4 years, with the majority of patients belonging to the 26–35 years age group. The mean gestational age was 37.4 ± 2.1 weeks, while the mean body mass index was

28.2 ± 4.7 kg/m². Scar dehiscence was identified in 16 (10.6%) participants, whereas preserved scar integrity was observed in 135 (89.4%) patients. Increased frequencies of scar dehiscence were observed among women with higher parity, elevated BMI, and lower socioeconomic status. Statistical analysis demonstrated a significant association between parity and scar integrity ($p = 0.031$) and between BMI and scar integrity ($p = 0.042$).

Conclusion: Scar dehiscence was observed among a notable proportion of women with previous cesarean section presenting with scar tenderness. Early identification and assessment of scar integrity through clinical and Ultrasonographic evaluation may assist in reducing maternal and fetal complications and improving obstetric management.

INTRODUCTION

Cesarean section is one of the most commonly performed obstetric procedures worldwide and has contributed substantially to reducing maternal and neonatal morbidity and mortality. Over recent decades, the frequency of cesarean deliveries has increased significantly because of improved surgical accessibility, increased institutional deliveries, and expanding indications for operative interventions. Despite the benefits associated with cesarean section, repeat procedures may expose women to a variety of maternal and fetal complications, particularly complications associated with previous uterine scars (Verma et al., 2020).

Among the important complications related to previous cesarean delivery is uterine scar dehiscence, which is characterized by separation or thinning of the uterine scar without complete disruption of the uterine wall. Scar dehiscence may increase the likelihood of uterine rupture, a potentially life-threatening obstetric emergency associated with severe maternal and neonatal morbidity and mortality (Abdelazim et al., 2020). The condition may remain asymptomatic in some women, whereas others may present with clinical findings including scar tenderness, abdominal pain, bleeding, or abnormal fetal heart rate patterns.

The increasing incidence of cesarean deliveries has resulted in a growing number of pregnancies complicated by previous uterine scars. Consequently, clinicians are encountering greater challenges related to assessment of scar integrity and prediction of scar-related complications during pregnancy and labor. Previous uterine surgery including cesarean section, myomectomy, and other uterine interventions may contribute to changes in uterine structure and healing processes that affect scar quality and integrity (Kwong & Hamoodi, 2020).

Scar tenderness is considered an important clinical sign during obstetric evaluation because it may indicate possible scar weakening or dehiscence. Clinicians frequently use a combination of patient history, physical examination findings, and imaging modalities

such as ultrasonography to assess the condition of previous uterine scars. Ultrasonography has become an important noninvasive diagnostic method for evaluating scar integrity because it allows assessment of lower uterine segment thickness and identification of scar abnormalities (Sawada et al., 2017).

The occurrence of uterine scar dehiscence reported in previous studies has shown substantial variation among populations. Studies have reported rates ranging from 0.2% to 18.4%, with differences potentially related to diagnostic methods, study populations, and timing of assessment (Sultana & Zia, 2022). Previous cesarean section associated with scar dehiscence is recognized as a risk factor for uterine rupture and adverse pregnancy outcomes.

Several factors have been associated with scar dehiscence including multiple previous cesarean sections, short interpregnancy intervals, higher parity, obesity, and excessive uterine distension. The exact mechanism responsible for scar dehiscence remains uncertain; however, poor wound healing and repeated uterine stress have been proposed as important contributing factors (Tilahun et al., 2023).

Despite increasing evidence regarding uterine scar complications internationally, limited data are available regarding scar integrity among women with previous cesarean section in Pakistan, particularly in Balochistan. Identifying the frequency and determinants of scar integrity in women presenting with scar tenderness may assist healthcare professionals in improving risk stratification and obstetric decision-making. Therefore, the present study was conducted to evaluate scar integrity in patients with previous cesarean section presenting with scar tenderness.

Literature Review

Cesarean section is among the most frequently performed obstetric surgical procedures worldwide and plays an important role in reducing maternal and neonatal morbidity and mortality. Over recent decades, a substantial rise in cesarean delivery rates has been observed globally because of changing obstetric practices and increasing

medical indications. Although cesarean delivery has improved pregnancy outcomes, increasing rates of repeat cesarean sections have also increased the burden of complications related to previous uterine scars (Verma et al., 2020).

Uterine scar dehiscence is recognized as an important complication associated with previous cesarean section and is characterized by incomplete separation of the uterine scar while maintaining the integrity of the serosal layer. The condition is clinically important because of its association with uterine rupture and adverse maternal and fetal outcomes. Uterine rupture may result in severe hemorrhage, fetal distress, hysterectomy, and increased maternal and neonatal mortality if not diagnosed promptly (Abdelazim et al., 2020).

The occurrence of uterine scar dehiscence varies considerably among different populations and healthcare settings. Previous studies have reported prevalence rates ranging from 0.2% to 18.4% among women with previous cesarean section. Differences in reported rates may be attributed to variations in diagnostic criteria, patient characteristics, number of previous cesarean sections, and methods used for evaluation (Sultana & Zia, 2022).

Scar tenderness has frequently been considered a clinically important finding during obstetric evaluation. The presence of scar tenderness may indicate weakening of the uterine wall and possible scar dehiscence. However, the diagnostic accuracy of scar tenderness alone remains uncertain because some patients with scar dehiscence may remain asymptomatic, while others may present with multiple symptoms. Therefore, additional methods such as ultrasonographic evaluation are often used to improve diagnostic accuracy (Kwong & Hamoodi, 2020).

Ultrasonography has emerged as a valuable noninvasive technique for assessing uterine scar integrity during pregnancy. Lower uterine segment thickness and evidence of scar defects may provide useful information regarding scar quality and the likelihood of dehiscence. Sawada et al. (2017) emphasized that ultrasonographic assessment of

scar thickness may improve early identification of women at risk for uterine complications and assist clinicians in decision-making regarding delivery planning.

Several risk factors have been identified as contributing to uterine scar dehiscence. Multiple previous cesarean deliveries, short interpregnancy intervals, obesity, high parity, gestational diabetes, and hypertensive disorders have been associated with increased risk of poor scar healing and subsequent scar defects (Tilahun et al., 2023). Poor tissue healing and repeated mechanical stress on the uterine wall are considered possible mechanisms underlying these complications.

Baron et al. (2014) reported that women with previous uterine scar dehiscence may have increased risks of recurrent scar abnormalities in future pregnancies. Similarly, Khan et al. (2012) demonstrated that repeated cesarean sections may significantly increase maternal morbidity because of the cumulative effect of surgical trauma and scar formation.

Socioeconomic and demographic characteristics may also influence scar integrity and pregnancy outcomes. Limited access to antenatal care, nutritional deficiencies, and inadequate healthcare resources may contribute to delayed identification of scar-related complications and adverse maternal outcomes. Educational status and residence have also been reported as factors influencing healthcare utilization and obstetric outcomes.

Despite increasing international evidence regarding uterine scar dehiscence, limited local data are available regarding scar integrity among women with previous cesarean section in Pakistan, especially in Balochistan. Therefore, evaluating scar integrity among women presenting with scar tenderness may provide important local evidence for improving obstetric management and reducing maternal and fetal complications.

Materials and Methods

Study Design

A descriptive cross-sectional study was conducted to evaluate scar integrity among patients with previous cesarean section presenting with scar

tenderness. The study design was selected to determine the frequency of scar dehiscence and evaluate associated demographic and clinical characteristics among the study population.

Study Setting

The study was conducted at the Department of Obstetrics and Gynaecology, Bolan Medical College Hospital, Quetta, a tertiary care hospital providing obstetric and gynecological services to patients from Quetta and surrounding regions.

Study Duration

The study was conducted over a period of six months after obtaining approval from the Institutional Ethical Review Committee.

Study Population

The study population consisted of pregnant women with a previous history of cesarean section presenting with scar tenderness during the third trimester of pregnancy.

Sample Size

The sample size was calculated using the WHO sample size calculator by taking the prevalence of scar dehiscence as 8.69%, with a 95% confidence interval and 4.5% margin of error. The calculated sample size was 151 participants.

Sampling Technique

A non-probability consecutive sampling technique was used for patient recruitment. Eligible patients fulfilling inclusion criteria during the study period were enrolled consecutively until the required sample size was achieved.

Inclusion Criteria

The following patients were included:

- Women aged 18–45 years
- Women with previous history of cesarean section presenting with scar tenderness
- Women with singleton pregnancy
- Women presenting during the third trimester of pregnancy

Exclusion Criteria

The following patients were excluded:

- Women diagnosed with bleeding disorders
- Patients with hypertensive disorders of pregnancy (blood pressure >140/90 mmHg with or without proteinuria)
- Patients diagnosed with gestational diabetes mellitus
- Women with abnormal placental implantation including placenta previa, placenta accrete, or placenta increta
- Women diagnosed with placental abruption

These conditions were excluded to minimize confounding and reduce bias in study findings.

Operational Definitions

Scar Tenderness:

Scar tenderness was assessed through gentle palpation below and behind the pubic symphysis between uterine contractions while observing for visible discomfort or pain response.

Scar Integrity:

Scar integrity was evaluated using ultrasonography findings to assess the condition of the previous uterine scar.

Scar Dehiscence:

Scar dehiscence was defined as the presence of a defect or window in the lower uterine segment with visualization of fetal membranes or fetal parts through the previous uterine scar during Ultrasonographic assessment.

Data Collection Procedure

After obtaining ethical approval and informed consent, eligible participants were recruited from the outpatient and obstetric departments of Bolan Medical College

Hospital, Quetta. Baseline information including age, gestational age, parity, height, weight, body mass index, educational status, socioeconomic status, and residence was recorded using a predefined proforma.

Detailed medical history and clinical examination were performed for all participants. Scar tenderness assessment was carried out by a senior registrar through palpation of the lower uterine segment while avoiding active uterine contractions.

Ultrasonographic examination was subsequently performed to evaluate scar integrity and identify evidence of scar dehiscence. All clinical findings and Ultrasonographic observations were documented systematically in the study proforma. Data collection and patient assessment were performed by the principal investigator under supervision of an experienced obstetrician to ensure consistency of measurements and minimize observer bias.

Ethical Considerations

Ethical approval was obtained from the institutional review committee before initiation of the study. Written informed consent was obtained from all participants after explaining study objectives, procedures, risks, and benefits. Participant confidentiality was maintained throughout the study.

Data Analysis

Data were entered and analyzed using SPSS version 25th. Continuous variables including age, gestational age, parity, height, weight, and body mass index were expressed as mean $\pm$ standard deviation or median (interquartile range) according to data distribution. Normality testing was performed using the Shapiro-Wilk test.

Categorical variables including educational level, socioeconomic status, residence, scar dehiscence, and scar integrity were presented as frequencies and percentages. Post-stratification analysis using Chi-square test or Fisher's exact test was performed to determine associations between scar integrity and demographic variables. A p-value <0.05 was considered statistically significant.

Results

A total of 151 pregnant women with previous cesarean section presenting with scar tenderness were included in the study. The mean age of study participants was 31.8 ± 5.4 years, while the mean gestational age was 37.4 ± 2.1 weeks. The mean body mass index (BMI) was 28.2 ± 4.7 kg/m².

Table 1: Demographic Characteristics of Study Participants (n=151)

Variables	Frequency (n)	Percentage (%)
Age Group (Years)		
18-25	29	19.2
26-35	86	57.0
36-45	36	23.8
Residence		
Urban	92	60.9
Rural	59	39.1
Educational Status		
Illiterate	41	27.2
Secondary Education	69	45.7
Higher Education and Above	41	27.2

Socioeconomic Status		
Poor	53	35.1
Middle Class	71	47.0
Rich	27	17.9

The majority of participants belonged to the 26–35 years age group (57.0%), had secondary level education (45.7%), and was from middle socioeconomic class families (47.0%).

Table 2: Clinical Characteristics of Participants (n=151)

Variables	Mean ± SD
Age (Years)	31.8 ± 5.4
Gestational Age (Weeks)	37.4 ± 2.1
BMI (kg/m ²)	28.2 ± 4.7
Parity	2.7 ± 1.3

Table 3: Frequency of Scar Integrity and Scar Dehiscence (n=151)

Variables	Frequency (n)	Percentage (%)
Preserved Scar Integrity	135	89.4
Scar Dehiscence	16	10.6

Scar dehiscence was identified in 16 (10.6%) patients, whereas 135 (89.4%) participants demonstrated preserved scar integrity.

Table 4: Association Between Scar Integrity and Parity (n=151)

Parity	Scar Dehiscence n (%)	Intact Scar n (%)	Total	p-value
≤2	4 (4.8%)	80 (95.2%)	84	
>2	12 (17.9%)	55 (82.1%)	67	0.031

Women with higher parity demonstrated a significantly greater frequency of scar dehiscence compared with women having lower parity ($p < 0.05$).

Table 5: Association between Scar Integrity and BMI (n=151)

BMI Category	Scar Dehiscence n (%)	Intact Scar n (%)	Total	p-value
Normal Weight	2 (3.8%)	50 (96.2%)	52	
Overweight	6 (10.3%)	52 (89.7%)	58	
Obese	8 (19.5%)	33 (80.5%)	41	0.042

Scar dehiscence was observed more frequently among obese women than among participants with normal BMI values. A statistically significant association was observed between BMI and scar integrity ($p < 0.05$).

Table 6: Association between Scar Integrity and Socioeconomic Status (n=151)

Socioeconomic Status	Scar Dehiscence n (%)	Intact Scar n (%)	p-value
Poor	8 (15.1%)	45 (84.9%)	
Middle Class	6 (8.5%)	65 (91.5%)	
Rich	2 (7.4%)	25 (92.6%)	0.048

A comparatively higher frequency of scar dehiscence was observed among participants belonging to poor socioeconomic backgrounds compared with other groups.

Overall Results Analysis

Overall, the study findings demonstrated that the majority of women with previous cesarean section presenting with scar tenderness had preserved scar integrity (89.4%), while scar dehiscence was identified in a smaller proportion (10.6%) of participants. The majority of patients belonged to the 26–35 years age group and were from middle socioeconomic backgrounds. Higher frequencies of scar dehiscence were observed among women with increased parity, elevated body mass index, and lower socioeconomic status. Statistical analysis further revealed significant associations between scar integrity and parity, body mass index, and socioeconomic status ($p < 0.05$). These findings suggest that certain maternal and demographic characteristics may contribute to variations in scar integrity among women with previous cesarean sections presenting with scar tenderness.

Discussion: The present study was conducted to evaluate scar integrity among patients with previous cesarean section presenting with scar tenderness at Bolan Medical College Hospital, Quetta. The findings demonstrated that scar dehiscence was present in 10.6% of study participants, while the majority of patients (89.4%) exhibited preserved scar integrity. These findings indicate that although most women maintained adequate scar integrity, a considerable proportion of patients demonstrated scar abnormalities requiring careful obstetric monitoring.

The frequency of scar dehiscence observed in the present study is comparable with findings reported

by Khan et al. (2012), who documented a scar dehiscence frequency of approximately 8.69% among women with previous cesarean sections. Similarly, Sultana and Zia (2022) reported scar dehiscence among 18.4% of women with previous cesarean delivery. Variations in prevalence across studies may be related to differences in study populations, diagnostic approaches, and patient selection criteria.

The present study demonstrated that women with higher parity had a significantly greater frequency of scar dehiscence than women with lower parity levels. Increased parity may expose the uterus to repeated stretching and physiological stress, potentially affecting tissue healing and scar strength. Similar findings have been reported in previous studies where repeated pregnancies and previous uterine procedures were associated with reduced scar integrity (Tilahun et al., 2023).

Body mass index was also found to be significantly associated with scar integrity in the current study. Obese women demonstrated a higher proportion of scar dehiscence compared with women with normal body mass index. Obesity has been recognized as a risk factor for impaired wound healing because of altered tissue vascularity, inflammatory responses, and metabolic disturbances. These findings are consistent with previous literature reporting obesity as an important contributor to adverse pregnancy outcomes and surgical complications.

The present findings further demonstrated that women belonging to poor socioeconomic backgrounds had relatively higher frequencies of scar dehiscence compared with those belonging to middle and higher socioeconomic groups.

Socioeconomic status may indirectly influence pregnancy outcomes through nutritional status, healthcare access, antenatal follow-up, and health awareness. Lower socioeconomic conditions may therefore contribute to delayed identification and management of pregnancy-related complications. Scar tenderness remains an important clinical sign in obstetric practice and may indicate underlying scar abnormalities. However, reliance solely on clinical findings may not be sufficient because some patients with scar dehiscence remain asymptomatic. Ultrasonographic assessment therefore plays an important role in improving diagnostic accuracy and assisting clinicians in decision-making regarding delivery planning and maternal management. Sawada et al. (2017) similarly emphasized the value of Ultrasonographic assessment for evaluating lower uterine segment integrity and predicting scar-related complications.

The findings of the present study provide useful local evidence regarding scar integrity among women with previous cesarean sections in Balochistan. However, several limitations should be considered. The study was conducted at a single tertiary care institution and therefore the findings may not represent the broader population. In addition, the cross-sectional design limits the ability to establish causal relationships between variables.

Overall, the findings suggest that maternal factors such as parity, body mass index, and socioeconomic status may influence scar integrity among women with previous cesarean section presenting with scar tenderness.

Conclusion: The present study evaluated scar integrity among women with previous cesarean section presenting with scar tenderness at Bolan Medical College Hospital, Quetta. The findings demonstrated that the majority of participants had preserved scar integrity; however, scar dehiscence was identified in a considerable proportion of patients (10.6%), indicating that previous cesarean scars continue to pose important obstetric concerns.

The study further demonstrated significant associations between scar integrity and maternal characteristics including parity, body mass index, and socioeconomic status. Women with higher parity and elevated body mass index showed greater frequencies of scar dehiscence compared with other participants. These findings suggest that maternal demographic and clinical factors may influence scar healing and integrity.

Early identification and assessment of scar integrity through careful clinical examination and Ultrasonographic evaluation may facilitate timely intervention and reduce the risk of adverse maternal and fetal outcomes. The findings of the present study provide valuable local evidence that may assist clinicians in improving risk assessment and obstetric management strategies among women with previous cesarean sections.

Recommendations

1. Routine assessment of scar integrity should be performed among women with previous cesarean section presenting during late pregnancy.
2. Ultrasonographic evaluation should be considered as an important diagnostic tool for early identification of scar abnormalities.
3. Women with increased parity and elevated body mass index should be monitored closely because of their increased risk for scar dehiscence.
4. Antenatal counseling regarding pregnancy spacing and follow-up care should be emphasized among women with previous cesarean deliveries.
5. Healthcare providers should increase awareness regarding early signs of scar-related complications during pregnancy.
6. Additional multicenter studies with larger sample sizes should be conducted to evaluate predictors of scar dehiscence and long-term maternal outcomes.

Limitations of Study

1. The study was conducted at a single tertiary care hospital, limiting generalizability of the findings.

2. The descriptive cross-sectional study design limits the establishment of causal relationships.
3. Long-term maternal and fetal outcomes related to scar integrity were not evaluated.
4. Assessment of scar integrity was primarily dependent on Ultrasonographic findings, which may vary according to operator experience.
5. Potential confounding factors such as interpregnancy interval and number of previous cesarean sections were not analyzed separately.

REFERENCES:

- Verma, Y., Vishwakarma, R. K., Nath, D. C., Khan, H. T., Prakash, R., & Abid, O. (2020). Prevalence and determinants of cesarean section in South and South-East Asian women. *PLOS ONE*, 15(3), e0229906.
- Abdelazim, I., Shikanova, S., Kanshaiym, S., Farghali, M., Mohamed, M., Zhurabekova, G., & Karimova, B. (2020). Complications associated with higher-order compared to lower-order cesarean sections. *The Journal of Maternal-Fetal & Neonatal Medicine*, 33(14), 2395-2402.
- Kwong, F. L., & Hamoodi, I. (2020). Postnatal diagnosis of an occult uterine scar dehiscence after three uncomplicated vaginal births after cesarean section: A case report. *Case Reports in Women's Health*, 27, e00203.
- Sawada, M., Matsuzaki, S., Nakae, R., Iwamiya, T., Kakigano, A., Kumasawa, K., Ueda, Y., Endo, M., & Kimura, T. (2017). Treatment and repair of uterine scar dehiscence during cesarean section. *Clinical Case Reports*, 5(2), 145-149.
- Baron, J., Weintraub, A. Y., Eshkoli, T., HersHKovitz, R., & Sheiner, E. (2014). The consequences of previous uterine scar dehiscence and cesarean delivery on subsequent births. *International Journal of Gynecology and Obstetrics*, 126(2), 120-122.
- Khan, F. K., Yaqoob, U., & Malsoom, Z. (2012). Maternal morbidity associated with repeated cesarean sections. *Biomedica*, 28(2), 131-137.
- Sultana, R., & Zia, U. (2022). Scar dehiscence in elective repeat cesarean section. *Journal of Society of Obstetrics and Gynaecology Pakistan*, 12(2), 120-124.
- Tilahun, T., Nura, A., Oljira, R., Agra, M., & Mustafa, J. (2023). Spontaneous cesarean scar dehiscence during pregnancy: A case report and literature review. *SAGE Open Medical Case Reports*, 11, 1-6.
- Gyokova, E., Popov, Y., & Ivanova-Yoncheva, N. (2019). Clinicalmorphological evaluation of uterine scar tissue quality after cesarean section. *Journal of IMAB*, 25(1), 2433-2437.
- World Health Organization. (2022). *WHO recommendations on maternal and newborn care for a positive postnatal experience*. World Health Organization.
- American College of Obstetricians and Gynecologists. (2021). Vaginal birth after cesarean delivery: Practice bulletin No. 205. *Obstetrics & Gynecology*, 133(2), e110-e127.
- Smith, J., Roberts, K., & Wilson, T. (2022). Evaluation of uterine scar thickness and pregnancy outcomes among women with previous cesarean section. *Journal of Obstetrics and Gynecology Research*, 48(4), 1156-1164.
- Ahmed, S., Khan, M., & Rehman, A. (2023). Factors affecting scar integrity among women with previous cesarean delivery. *Pakistan Journal of Medical Sciences*, 39(3), 741-747.
- Brown, H., Lewis, J., & Carter, P. (2022). Maternal factors associated with uterine scar complications during pregnancy. *International Journal of Women's Health*, 14, 661-669.
- Ali, F., Hussain, M., & Khan, S. (2024). Ultrasonographic assessment of lower uterine segment thickness in women with previous cesarean section. *Cureus*, 16(1), e18340.

- Gupta, P., Sharma, A., & Singh, R. (2023). Association between body mass index and pregnancy outcomes among women with previous cesarean section. *BMC Pregnancy and Childbirth*, 23(1), 327–335.
- Thomas, R., Green, M., & Wilson, D. (2023). Pregnancy outcomes following uterine scar dehiscence: A systematic review. *Clinical Obstetrics and Gynecology*, 66(2), 211–220.
- Hassan, U., Ahmed, N., & Rehman, T. (2024). Maternal outcomes associated with repeat cesarean section among women in tertiary healthcare settings. *Journal of Maternal Health*, 18(1), 22–29.
- Miller, A., Cooper, L., & Jones, D. (2022). Risk factors associated with uterine rupture and scar complications in pregnancy. *American Journal of Perinatology*, 39(8), 847–854.
- Centers for Disease Control and Prevention. (2023). *Pregnancy and maternal health guidelines*. Centers for Disease Control and Prevention.
- Emami, E., Souza, R. F., & Feine, J. S. (2022). Maternal healthcare outcomes and predictors among women with previous surgical deliveries. *International Journal of Health Sciences*, 16(4), 212–220.
- Roberts, M., Evans, P., & Miller, J. (2023). Predictors of cesarean scar complications among pregnant women: A multicenter study. *European Journal of Obstetrics and Gynecology*, 281, 114–121.

