https://doi.org/10.29309/TPMJ/2026.33.05.10056 www.theprofesional.com

ORIGINAL ARTICLE

Comparison of absorbable and non-absorbable sutures used for skin closure in lower segment cesarean section.

Farwa Sikandar[1], Muniba Tahir[2], Fatima Javed[3], Sidra Javaid[4], Asfa Fatima[5], Fariha Farooq[6]

ABSTRACT… Objective: To compare postoperative wound infection, operative time, and blood loss in women undergoing cesarean section using absorbable (Monocryl) versus non-absorbable (Prolene) sutures for skin closure. **Study Design:** Non-Randomized Controlled Trail. **Setting:** Department of Obstetrics and Gynecology, Akhtar Saeed Trust Hospital, Lahore. **Period:** April 2025 to August 2025. **Methods:** This study was conducted on 280 women aged 18–40 years, selected via non-probability purposive sampling. Participants undergoing elective or emergency cesarean section were divided into two groups: Group A received absorbable Monocryl sutures; Group B received non-absorbable Prolene sutures. Standardized protocols were followed for preoperative preparation, wound closure, and postoperative care. Outcomes were assessed on postoperative days 2 and 7–10. **Results:** The mean operative time was 59.78 ± 16.63 minutes in Group A vs. 60.79 ± 17.99 minutes in Group B (p = 0.625). Mean blood loss was 505.37 ± 178.56 ml vs. 492.79 ± 172.53 ml, respectively (p = 0.549). Wound infection occurred in 18.6% of participants. Operative time was significantly longer in the non-absorbable group among patients with wound infection (p = 0.046) and pus discharge (p = 0.040). Blood loss was significantly higher in unbooked patients of Group A (p = 0.025). **Conclusion:** Both absorbable and non-absorbable sutures were comparable in terms of operative time and intraoperative blood loss. However, the presence of wound infection and pus discharge contributed to longer operative time in the non-absorbable group. Clinical context and surgeon judgment should guide suture selection.

Key words: Blood Loss, Cesarean Section, Monocryl, Operative Time, Suture Material, Prolene, Wound Infection.

Article Citation: Sikandar F, Tahir M, Javed F, Javaid S, Fatima A, Farooq F. Comparison of absorbable and non-absorbable sutures used for skin closure in lower segment cesarean section. Professional Med J 2026; 33(05):815-821. https://doi.org/10.29309/TPMJ/2026.33.05.10056

INTRODUCTION

Cesarean delivery is the most common major surgical procedure performed in the United States and elsewhere. Currently, approximately a third of pregnant women in the US and 15% worldwide deliver by cesarean, and this prevalence is on the rise.[1,2] Given these trends, cesarean wound complications, such as disruption or infection, remain an important cause of post-cesarean morbidity at considerable costs to the patient and health system.[3,4]

Cesarean section rates have been increasing dramatically during the past three decades and surgical site infections are becoming a leading cause of morbidity and mortality among women undergoing cesarean deliveries. However there is lack of sound evidence on both the magnitude of the problem and the associated factors in developing countries.[5] Wound infection is a common complication following caesarean section. Factors influencing the risk of infection may include the suture material for skin closure, and closure technique.[6]

Wound complication rates were similar in primary and repeat cesarean groups based on the type of suture material. Skin closure time is usually longer with non-absorbable suture material. However, other outcomes including postoperative pain, need for additional analgesic use, late phase pain, and itching at the scar may be similar with absorbable and non-absorbable suture material. Although the cosmetic results tended to be better with non-absorbable suture.[7] Siddiqui et al., conducted a trial and found that percentage of wound infection was 23.2% with absorbable suture and 11.9% with non-absorbable suture ($p<0.05$).[8] Hasdemir et al., also conducted a study and observed that percentage of wound infection was 22.5% with absorbable suture and 14.9% with non-absorbable suture ($p>0.05$).[7]

1. MBBS, PG Resident Gynae & Obs, Akhtar Saeed Trust and Teaching Hospital, Lahore.
2. MBBS, FCPS, Senior Registrar Diploma in Gynaecological Laparoscopic Surgery, Akhtar Saeed Medical and Dental College, Farooq Hospital Westwood, Lahore.
3. MBBS, PG Resident Gynae & Obs, Akhtar Saeed Medical and Dental College, Lahore.
4. MBBS, FCPS, Senior Registrar, PNS Hafeez, Islamabad.
5. MBBS, PG Resident Gynae & Obs, Akhtar Saeed Trust and Teaching Hospital, Lahore.
6. MBBS, FCPS, Professor, Akhtar Saeed Medical and Dental College, Lahore.
Correspondence Address:
Dr. Farwa Sikandar
Gynae & Obs, Akhtar Saeed Trust and Teaching Hospital, Lahore.
sikandarfarwa13@yahoo.com

Article received on:
29/09/2025
Accepted for publication:
22/01/2026

Rationale of this study is to compare the postoperative wound infection with absorbable (Monocryl) versus non-absorbable (Prolene) sutures in females undergoing lower segment cesarean section via subcuticular and interrupted sutures respectively. Literature showed that the non-absorbable sutures are more beneficial than absorbable sutures as they causes less wound infection. Still absorbable sutures are used in routine. However, local evidence also exist in literature supporting non-absorbable sutures. Therefore, we want to conduct this study to get local evidence and we will be able to implement the results of this study in local setting to improve the protocol to use non-absorbable (Prolene) sutures and absorbable (Monocryl) for closure of wound after cesarean section to reduce risk of wound infection, early healing and also better cosmetic results. This will also help to improve our practice and knowledge.

METHODS

The research was designed as a non-randomized controlled trial in the Department of Obstetrics and Gynecology, Akhtar Saeed Trust Hospital, Lahore. The study was conducted over a period of five months (April'25 to August'25) following ethical approval (IRB Approval No: M-25/ 225/ -Obstetrics % Gynecology, Dated: 27-03-25).

A total of 280 patients were selected using a non-probability purposive sampling technique. The sample size was estimated using the WHO calculator, assuming a 5% significance level and 80% study power, with an infection rate of 23.2% for absorbable sutures and 11.9% for non-absorbable sutures, requiring 140 patients per group.

Participants were females aged 18 to 40 years with parity less than five and gestational age more than 36 weeks, undergoing either elective or emergency lower segment cesarean section under standardized antibiotic coverage. Women were excluded if they had prior cesarean sections, placenta previa on ultrasound, hysterectomy, chorioamnionitis, PROM, diabetes (OGTT >186 mg/dl), wound site infection or allergy, anemia (Hb <11 g/dl), or smoking history above 5 pack-years.

After obtaining consent, demographic data including name, age, gestational age, BMI, parity, type of anesthesia, booking status, lifestyle, residence, hypertension (≥140/90 mmHg), and suture technique (continuous or interrupted) were documented. Patients were assigned to Group A (absorbable Monocryl, subcuticular) or Group B (non-absorbable Prolene, subcuticular/interrupted). All operations were performed by the principal researcher under consultant supervision.

Standard surgical site preparation was carried out with Povidone-Iodine or Chlorhexidine, and antibiotics were administered prophylactically. Postoperatively, wounds were covered with sterile dressings and evaluated on the second day. Operative time was noted. Participants were monitored in wards and discharged with standard antibiotics. Follow-up examination was done on postoperative days 7–10 for assessment of wound infection parameters, including pus, induration, swelling, and approximation. All findings were recorded in a structured proforma.

Analysis was done using SPSS version 25. Continuous variables like age, BMI, gestational age, and operative time were analyzed using mean ± SD, while categorical variables such as anesthesia type, hypertension, suture type, and wound infection were presented as frequencies and percentages. The chi-square test was used to compare infection rates across the groups, with $p \leq 0.05$ considered significant. Data were stratified by potential confounders (age, BMI, parity, etc.), followed by post-stratification chi-square analysis using the same significance threshold.

RESULTS

Demographic and Clinical Profile

The study included 280 women who underwent lower segment cesarean section, with the majority (60.0%) aged between 18 and 30 years, and 40.0% aged 31–40 years. Most participants (56.8%) had a gestational age between 37 and 39 weeks, while 43.2% were beyond 39 weeks. Regarding body mass index (BMI), 55.7% of the women were overweight or obese (BMI >25), and 44.3% had a BMI between 18 and 25. A high proportion (79.3%) had parity between 0 and 3, with only 20.7% having more than three previous deliveries. Urban dwellers

comprised 53.9% of the sample, while 46.1% resided in rural areas. The majority of the participants (82.5%) were booked cases, and 17.5% were unbooked.

Hypertension was reported in 19.3% of the women, while 10.7% were smokers. Anemia was identified in 33.9% of participants, and 11.4% had diabetes. In terms of lifestyle, 50.4% of the women were physically active, while 49.6% led sedentary lifestyles. Regarding surgical wound closure techniques, 51.1% underwent subcuticular closure and 48.9% had interrupted closure. Postoperative wound infection occurred in 18.6% of cases, and pus discharge was observed in 14.3%. Induration and swelling at the incision site were noted in 10.7% and 9.3% of patients, respectively. Wound approximation was reported as good in 88.9% and poor in 11.1% of the cases. Antibiotic compliance was generally high, with 91.4% adhering well to their prescribed regimen. Lastly, 24.6% of participants reported experiencing itching at the surgical site. (Table-I)

Continuous Variable Summary

The mean age of the study participants was 28.40 years (±6.84), while the mean gestational age was 39.05 weeks (±1.46). The average BMI was 26.23 kg/m^2 (±5.06), indicating a tendency toward overweight in the study population. The mean parity was 1.97 (±1.44), suggesting that most women were either primiparous or had few previous births. (Table-II)

Comparison between Absorbable and Non-Absorbable Sutures

Comparison of operative variables between the two groups showed no statistically significant differences. In Group A (absorbable sutures), the mean operative time was 59.78 ± 16.63 minutes, while in Group B (non-absorbable sutures), it was slightly longer at 60.79 ± 17.99 minutes (p = 0.625). Similarly, the mean blood loss in Group A was 505.37 ± 178.56 ml compared to 492.79 ± 172.53 ml in Group B (p = 0.549). These results indicate that both types of sutures had comparable outcomes in terms of operative time and intraoperative blood loss. (Table-III)

Across most subgroups, there were no significant differences in operative time or blood loss between absorbable (Group A) and non-absorbable (Group B) sutures. Operative time remained comparable across age, BMI, gestational age, parity, residence, booking status, comorbidities, lifestyle, and closure method (p>0.05). However, it was significantly longer in Group B among patients with wound infection (p=0.046) and pus discharge (p=0.040). (Table-IV)

Similarly, blood loss showed no significant variation across most stratification variables. An exception was seen in unbooked cases, where Group A had significantly higher blood loss than Group B (524.74 ± 164.72 ml vs. 422.14 ± 139.06 ml, p=0.025). Other differences were statistically non-significant. (Table-V)

DISCUSSION

This non-randomized controlled trial assessed the postoperative outcomes of using absorbable (Monocryl) versus non-absorbable (Prolene) sutures for skin closure in lower segment cesarean sections. The primary outcomes measured were wound infection, operative time, and intraoperative blood loss. Our results showed no statistically significant difference in mean operative time (59.78 ± 16.63 min in Group A vs. 60.79 ± 17.99 min in Group B; p = 0.625) or blood loss (505.37 ± 178.56 ml vs. 492.79 ± 172.53 ml; p = 0.549). However, wound infection was observed in 18.6% of the overall sample, with certain clinical conditions, such as pus discharge, significantly influencing operative duration in the non-absorbable group.

These findings align with previous studies, particularly Hasdemir et al., who compared polyglactin (absorbable) and polypropylene (non-absorbable) in 250 cesarean deliveries. They reported similar wound complication rates but noted longer closure time with non-absorbable sutures, consistent with our findings regarding operative time trends without statistical significance.[9] Cosmetic outcomes in that study favored non-absorbable sutures, which may support their selective use in primary cesareans where aesthetics are prioritized.

TABLE-I

Demographic and clinical profile

Variable	Category	Count	Percent
Age	18–30	168	60.0%
	31–40	112	40.0%
Gestational Age	37–39	159	56.8%
	>39	121	43.2%
BMI	18–25	124	44.3%
	>25	156	55.7%
Parity	0–3	222	79.3%
	>3	58	20.7%
Residence	Urban	151	53.9%
	Rural	129	46.1%
Booked	Yes	231	82.5%
	No	49	17.5%
Hypertension	Yes	54	19.3%
	No	226	80.7%
Smoking	Yes	30	10.7%
	No	250	89.3%
Anemia	Yes	95	33.9%
	No	185	66.1%
Diabetes	Yes	32	11.4%
	No	248	88.6%
Lifestyle	Active	141	50.4%
	Sedentary	139	49.6%
Closure Method	Subcuticular	143	51.1%
	Interrupted	137	48.9%
Wound Infection	Yes	52	18.6%
	No	228	81.4%
Pus Discharge	Yes	40	14.3%
	No	240	85.7%
Induration	Yes	30	10.7%
	No	250	89.3%
Swelling	Yes	26	9.3%
	No	254	90.7%
Approximation	Well	249	88.9%
	Poor	31	11.1%
Antibiotic Compliance	Good	256	91.4%
	Poor	24	8.6%
Itching	Yes	69	24.6%
	No	211	75.4%

TABLE-II

Continuous variables summary

Variable	Mean ± SD	N
Age	28.40 ± 6.84	280
Gestational Age	39.05 ± 1.46	280
BMI	26.23 ± 5.06	280
Parity	1.97 ± 1.44	280

TABLE-III

Comparison of absorbable and non-absorbable sutures used for skin closure in lower segment cesarean section

Variable	Group A Mean ± SD (n=140)	Group B Mean ± SD (n=140)	P-Value
Operative Time (min)	59.78 ± 16.63	60.79 ± 17.99	0.625
Blood Loss (ml)	505.37 ± 178.56	492.79 ± 172.53	0.549

Siddiqui et al., in a Pakistani population, found wound infection rates of 23.2% in the absorbable group versus 11.9% in the non-absorbable group ($p < 0.05$), suggesting a clear advantage of non-absorbable sutures in infection prevention.[10] While our overall infection rate was 18.6%, we did not observe a statistically significant difference in infection frequency between the two groups; however, infection and pus discharge were associated with longer operative times in the non-absorbable group ($p = 0.046$ and 0.040, respectively), indicating a potential link between suture type, tissue response, and handling difficulty in compromised conditions.

Our study further demonstrated that among unbooked cases, blood loss was significantly higher in the absorbable group ($p = 0.025$). This may reflect either delayed surgical access or more complicated cases among unbooked patients, suggesting a possible interaction between booking status and suture performance. However, this variable was not adjusted in multivariate models and should be interpreted cautiously.

While our focus was on physical outcomes, recent studies have emphasized the importance of maternal psychological well-being during delivery.

TABLE-IV

Comparison of operative time (min) of absorbable and non-absorbable sutures used for skin closure in lower segment cesarean section for various effect modifiers

Stratification Variable	Subgroup	Group-A Mean±SD	Group-B Mean±SD	P-Value
Age	18–30	61.714±16.66	62.024±17.61	.907
	31–40	56.875±16.29	58.946±18.56	.531
Gestational Age	37–39	60.159±18.19	59.753±18.16	.888
	>39	59.241±14.26	62.063±17.85	.341
BMI	18–25	61.765±16.02	62.795±17.81	.742
	>25	58.640±16.95	58.612±18.07	.992
Parity	0–3	60.398±16.11	60.061±17.94	.883
	>3	57.688±18.37	64.000±18.23	.197
Residence	Urban	60.079±16.22	60.613±17.27	.845
	Rural	59.422±17.23	61.000±18.93	.621
Booking Status	Yes	59.531±16.90	61.136±18.50	.493
	No	60.815±15.71	58.955±15.20	.678
Hypertension	Yes	58.333±20.02	61.222±19.62	.595
	No	60.124±15.79	60.690±17.68	.800
Smoking	Yes	60.643±16.92	62.375±18.97	.795
	No	59.683±16.66	60.589±17.93	.679
Anemia	Yes	58.920±16.04	60.511±17.33	.643
	No	60.256±17.01	60.926±18.39	.797
Diabetes	Yes	56.778±17.67	64.000±16.46	.243
	No	60.221±16.50	60.437±18.18	.922
Lifestyle	Active	60.110±16.27	59.750±17.98	.901
	Sedentary	59.418±17.12	61.778±18.08	.432
Closure Method	Subcuticular	60.411±15.76	59.471±18.11	.741
	Interrupted	59.090±17.62	62.114±17.91	.321
Wound Infection	Yes	58.722±16.86	68.375±14.85	.046
	No	60.144±16.61	59.815±18.18	.887
Pus Discharge	Yes	60.704±17.30	71.846±14.26	.040
	No	59.558±16.53	59.661±18.00	.963

Mirkovic et al. and Tufail et al. demonstrated that psychological support, whether via internet platforms or continuous in-person reassurance, significantly reduces labor anxiety and improves cooperation.[8,11] While not directly assessed in our study, reduced stress may indirectly influence wound healing and postoperative recovery.

Similarly, the International Childbirth Initiative (ICI) framework and Siddiqui et al.'s trial advocate for evidence-based, respectful maternity care that integrates physical, psychological, and procedural best practices.[12-13] Suture choice, as a part of surgical technique, may impact maternal satisfaction and overall recovery, highlighting the value of individualized care.

Our study contributes local evidence to a field where data from developing countries remain limited. It underscores that both suture types are comparable in terms of operative metrics, though infection-related prolongation of surgery was noted in the non-absorbable group. Surgeon skill, patient comorbidities, and wound care practices likely play modifying roles in these outcomes.[14]

TABLE-V

Comparison of blood loss (ml) of absorbable and non-absorbable sutures used for skin closure in lower segment cesarean section for various effect modifiers

Stratification Variable	Subgroup	Group-A Mean±SD	Group-B Mean±SD	P-Value
Age	18–30	519.857±177.50	473.155±169.90	.083
	31–40	483.643±179.52	522.250±173.77	.250
Gestational Age(weeks)	37–39	512.768±167.70	477.974±167.18	.192
	>39	494.914±193.89	510.905±178.52	.638
BMI	18–25	509.196±181.03	474.685±160.62	.266
	>25	503.180±178.12	512.522±183.82	.750
Parity	0–3	502.593±182.03	499.009±171.29	.880
	>3	514.750±168.74	465.538±178.70	.290
Residence	Urban	508.224±175.34	503.867±169.77	.877
	Rural	501.984±183.63	480.015±176.11	.489
Booking Status	Yes	500.743±182.09	505.966±175.44	.824
	No	524.741±164.72	422.136±139.06	.025
Hypertension	Yes	470.037±163.84	475.556±175.01	.905
	No	513.814±181.56	496.912±172.46	.474
Smoking	Yes	494.071±174.94	466.563±176.70	.672
	No	506.627±179.60	496.177±172.42	.639
Anemia	Yes	486.840±169.44	479.289±156.54	.823
	No	515.667±183.54	499.189±180.05	.538
Diabetes	Yes	502.556±201.29	447.000±196.94	.440
	No	505.787±175.87	497.881±169.72	.719
Lifestyle	Active	501.548±171.50	492.309±166.27	.746
	Sedentary	509.537±187.16	493.250±179.41	.601
Closure Method	Subcuticular	494.027±187.50	490.143±173.58	.898
	Interrupted	517.731±168.81	495.443±172.68	.446
Wound Infection	Yes	505.611±191.70	550.563±186.35	.435
	No	505.288±174.75	485.339±170.04	.385
Pus Discharge	Yes	499.889±190.49	532.923±186.63	.608
	No	506.681±176.45	488.685±171.28	.424

Strengths of this study include its adequate sample size, detailed stratification by clinical variables, and focus on practical surgical metrics. The use of real-world data from a tertiary hospital adds to its applicability. Limitations include its non-randomized design, lack of long-term cosmetic or pain assessment, and absence of microbiological confirmation of wound infections. Moreover, confounding variables such as surgeon expertise and intraoperative factors could not be fully controlled. Recommendations include larger multicenter randomized trials with longer follow-up periods to assess scar quality, maternal satisfaction, and cost-effectiveness. Psychological support interventions, though not the focus here, should also be explored in future studies assessing cesarean outcomes.

CONCLUSION

Both absorbable (Monocryl) and non-absorbable (Prolene) sutures offer comparable outcomes in cesarean wound closure with regard to operative time and blood loss. However, wound infection and pus discharge are associated with prolonged surgery in the non-absorbable group. Clinical judgment, patient factors, and surgical expertise should guide suture selection for optimal postoperative recovery.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

SOURCE OF FUNDING

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

REFERENCES

1. Guambo MPR, Spencer L, Vispo NS, Vizuete K, Debut A, Whitehead DC, et al. **Natural cellulose fibers for surgical suture applications.** Polymers. 2020; 12(12):3042.
2. Briscoe KE, Haas DM. **Developing a core outcome set for cesarean delivery maternal infectious morbidity outcomes.** American Journal of Perinatology. 2020; 37(04):436-52.
3. Cochetti G, Abraha I, Randolph J, Montedori A, Boni A, Arezzo A, et al. **Surgical wound closure by staples or sutures?: Systematic review.** Medicine. 2020; 99(25):e20573.
4. Dahlke JD, Mendez-Figueroa H, Maggio L, Sperling JD, Chauhan SP, Rouse DJ. **The case for standardizing cesarean delivery technique: Seeing the forest for the trees.** Obstetrics and Gynecology. 2020; 136(5):972.
5. Molla M, Temesgen K, Seyoum T, Melkamu M. **Surgical site infection and associated factors among women underwent cesarean delivery in Debretabor General Hospital, Northwest Ethiopia: hospital based cross sectional study.** BMC Pregnancy and Childbirth. 2019; 19(1):317.
6. Poprzeczny AJ, Grivell RM, Louise J, Deussen AR, Dodd JM. **Skin and subcutaneous fascia closure at caesarean section to reduce wound complications: The closure randomised trial.** BMC Pregnancy and Childbirth. 2020; 20(1):606.
7. Hasdemir PS, Guvenal T, Ozcakir HT, Koyuncu FM, Dinc Horasan G, Erkan M, et al. **Comparison of Subcuticular Suture Materials in Cesarean Skin Closure.** Surgery Research and Practice. 2015; 2015:141203.
8. Siddiqui M, Zahra SS, Ejaz ST, Sahar B, Eajaz N, Ahmad SR. **Comparison of wound infection with absorbable suture versus non-absorbable suture after cesarean section.** Pakistan Journal of Medical & Health Sciences. 2022; 16(11):264-.
9. Hasdemir PS, Guvenal T, Ozcakir HT, Koyuncu FM, Dinc Horasan G, Erkan M, et al. **Comparison of subcuticular suture materials in cesarean skin closure.** Surgery Research and Practice. 2015; 2015(1):141203.
10. Gabbai D, Jacoby C, Gilboa I, Maslovitz S, Yogev Y, Attali E. **Comparison of complications and surgery outcomes in skin closure methods following cesarean sections.** Archives of Gynecology and Obstetrics. 2025 Jul; 312(1):125-9.
11. Mirkovic T, Vejnovic T, Mirkovic D. **Psychological support during childbirth via the Internet: A randomized controlled trial.** PLoS ONE. 2022; 17(7):e0270337.
12. Tufail S, Khalid A, Ghani S. **Impact of psychological support on maternal anxiety during labor.** Pak J Med Health Sci. 2022; 16(11):594-7.
13. International Federation of Gynecology and Obstetrics (FIGO), et al. **Protocol for the International Childbirth Initiative (ICI).** 2023.
14. Siddiqui K, Saeed T, Rizwan F. **Effects of psychological support on labor outcomes in pregnant women.** Pak Armed Forces Med J. 2018; 68(3):545-9.

AUTHORSHIP AND CONTRIBUTION DECLARATION	
1	**Farwa Sikandar:** Data collection.
2	**Muniba Tahir:** Discussion writing.
3	**Fatima Javed:** Manuscript writing.
4	**Sidra Javaid:** Data entry.
5	**Asfa Fatima:** Literature review.
6	**Fariha Farooq:** Data analysis.