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ORIGINAL ARTICLE

Peritoneal Closure at Caesarean Section; A Comparative Cross-Sectional Study

Saira Bibi[1], Shahnaz Sultan[2], Muhammad Usman[3], Heema[4], Kousar Robeen[5], Saima Khattak[6]

[1]. Woman Medical Officer, Health Department, Khyber Pakhtunkhwa, Pakistan.
[2]. Woman Medical Officer, Health Department, Khyber Pakhtunkhwa, Pakistan.
[3]. Associate Professor of Surgery, Swat Medical College, Swat, Pakistan.
[4]. Associate Professor, KMU-IMS, Women and Children Hospital, Kohat, Pakistan.
[5]. Assistant Professor, Department of Obstetrics and Gynecology, Abbottabad International Medical College, Pakistan.
[6]. Assistant Professor, Department of Obstetrics and Gynecology, Medical Teaching Institution, Lady Reading Hospital Peshawar, Pakistan.

Correspondence:
Dr. Saima Khattak
Email: dr_saima_79@yahoo.com

Abstract

Background: Cesarean section rates have been growing consistently on a worldwide scale. Peritoneal closure is important because it can help provide the best possible surgical results and recuperation after surgery. The surgical incision site could not receive enough support and protection if the peritoneal layer is not closed.
Objective: To compare the mean pain score following peritoneal closure with non-closure during Caesarean procedure.
Materials and Methods: Comparative cross-sectional study, conducted at the Department of Obstetrics and Gynecology of Hayatabad Medical Complex Peshawar. The research comprised 276 pregnant women with primigravida, who were having an elective caesarian section, categorized into two groups (Closure & Non-closure) of 138 participants in each. To prevent surgical skill bias, senior obstetricians with over three years of experience conducted Caesarean sections on both groups. SPSS (version 22) was used to enter and analyze all the data.
Results: A total of 138 closure patients were observed 38(60%), 48(35%), and 7(5%) patients had mild, moderate, and severe pain respectively. While in the closure group, a total of 138 patients were observed of which 64(46%) had mild, 62(45%) moderate, and 12(9%) patients had severe pain. The p-values for mild, moderate, and severe pain across age groups were 0.571 and 0.681 for the non-closure and closure groups, respectively.
Conclusion: Our study highlights that peritoneum non-closure discomfort is less severe than peritoneum closure during a cesarean section. It is advised that during an emergency cesarean section, both visceral and parietal peritoneal closure can be safely skipped because the surgical result is better.

Keywords: Peritoneum closure, Caesarean Section, Gynecology, Primigravida, Pain_

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Introduction

Cesarean section (CS), commonly known as C-section, is a surgical procedure performed to deliver a baby through incisions in the mother's abdomen and uterus. The global rate of cesarean sections has been steadily rising.[1]It is one of the most frequently performed surgical interventions globally, with rates.

Varying between countries and healthcare settings. Researchers are focused on developing a safe and efficient technique that ensures positive post-operative results, minimal hospitalization, and cost--effectiveness.[2]Despite its prevalence, various aspects of the cesarean section procedure continue to be subjects of debate and ongoing research. One such area of contention revolves around the closure or non-closure of the peritoneum, a thin membrane that lines the abdominal cavity and covers the organs within it. A study reported comparable rates of wound complications and adhesion formation in women undergoing CS with or without peritoneal closure.[3]

The peritoneum plays a crucial role in the body's physiological functions, including protecting internal organs, facilitating movement, and aiding in the healing process following surgical interventions.[4]For quite some time, the closure of the peritoneum during lower segment cesarean section (LSCS) has been widely regarded as a routine practice.[5]This closure is typically achieved by suturing or stapling the peritoneal edges together following the delivery of the baby during a cesarean section procedure.[6]The significance of peritoneal closure lies in its potential to contribute to optimal surgical outcomes and postoperative recovery.[7]It aims to restore the natural anatomy, facilitate tissue approximation for proper healing, re-establish the peritoneal barrier to lower infection risks, minimize the chances of wound herniation or irregularities, and reduce adhesion formation.[8]However, in recent years, the necessity of peritoneal closure has been questioned, leading to a growing body of research comparing the effectiveness of closure versus non-closure of the peritoneum in cesarean section procedures.[9] Various studies involving both humans and animals have demonstrated that opting not to close the peritoneum entails no drawbacks.[10]According to researchers peritoneum can be kept non-closed because the peritoneum possesses inherent self-healing capabilities [11]As a mesothelial organ capable of initiating multiple repair sites, it can effectively heal across the wound simultaneously.[12]

This comparative analysis seeks to explore and evaluate the effectiveness of peritoneal closure versus non-closure in cesarean section, considering various factors such as surgical outcomes, postoperative complications, recovery times, and healthcare costs. By critically examining existing literature, clinical studies, and outcomes data, this study aims to provide insights into the potential benefits and drawbacks of both approaches, thereby aiding healthcare practitioners in making informed decisions regarding peritoneal closure during cesarean section procedures. This study aimed to compare the mean pain score after the closure of the peritoneum with the non-closure of the peritoneum during Caesarean section.

Material and Methods:

Study Design & Setting: This comparative cross-sectional study was conducted in the Department of Obstetrics and Gynecology, Hayatabad Medical Complex, Peshawar, Pakistan.

Study Duration & Sample Size: This study was conducted for a duration of six months from 30th March to September 2022. A total of 276 pregnant females were recruited using an average pain of 2.28±1.4SD, in a non-closure group and, average pain of 2.79±1.54SD in the closure group. All patients who underwent a cesarean section and provided informed consent during the study period were included in the study.

Sampling Technique: A non-probability convenient sampling technique was used for patient recruitment.

Inclusion & Exclusion Criteria: All primigravida women undergoing elective caesarian section were included in the study. All Multigravidas women, on steroids or other immunosuppressant drugs: altered pain sensation, diabetes mellitus; detected when fasting blood sugar >126mg/dl. All these conditions act as confounders and introduce bias in the study results.

Data Collection Procedure: Before starting the study, permission was taken from Hayatabad Medical Complex ethical committee Ref. 852/HEC/B&PSC/2022. Informed

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written consent should be taken from patients, explaining the purpose of study benefits and risks involved patients explaining the purpose of study benefits and risks involved. Patients were ensured that the information provided was used for research purposes only and confidential. Patients had the ultimate right to refuse to participate in the study. After that data about name, age, gestation, gravidity, and parity were collected. Patients were non-randomly categorized into two groups with 138 participants in each group. Group A: Nonclosure of peritoneum at cesarean section and Group B: Closure of peritoneum at cesarean section. Cesarean section in both groups was performed by a senior obstetrician with more than three years of experience to avoid bias in the skill of surgery. Post-cesarean pain on day 2 was recorded on a visual analog scale. All information was recorded on Proforma attached herewith. Exclusion criteria were strictly followed to control the confounding and bias in study results.

Data Analysis: All the data was entered and analyzed in SPSS (version 22). Mean±SD was calculated for numerical variables like age and pain scores. An Independent sample t-test was applied to compare the mean scores in both groups. The mean pain score was stratified among the age of the patients to see the effect modification. A P-value less than 0.05 was deemed statistically significant. All the results were presented as tables and charts.

Results:

The total sample size was 138 in each group to compare mean pain score after closure of the peritoneum with non-closure of peritoneum during Caesarean section and the results were analyzed as; Age distribution among 276 patients was analyzed. The mean age was 35 years with SD±1.26 (Table 1).

Table 1: Age Distribution (n=276)

Age	Frequency	Percentage
20-30 year	133	48%
31-40 years	99	36%
41-50 years	44	16%
Total	276	100%

The analysis of postoperative pain among patients with closure and non-closure of the peritoneum during cesarean sections is presented in Table 2. In the non-closure group (n=138), the majority of patients (60%) experienced mild pain, 35% reported moderate pain, and only 5% reported severe pain. However, among the closure group (n=138), 46% of patients experienced mild pain, 45% reported moderate pain, and 9% reported severe pain. The mean pain score was significantly lower in the non-closure group (3.11 ± 1.52) compared to the closure group (4.00 ± 1.97), indicating that non-closure of the peritoneum was associated with reduced postoperative pain.

Table 2: Post Operative Pain Among Closure and Non-Closure Peritoneum (n=276)

Pain	Non-closure (n=138)	Closure (n=138)
Mild	83(60%)	64(46%)
Moderate	48(35%)	62(45%)
Severe	7(5%)	12(9%)
Total	138	138
Mean and SD	3.11±1.52	4±1.97

Postoperative pain stratified by age among patients with closure and non-closure of the peritoneum during cesarean sections is presented in Table 3. In the non-closure group, mild pain was most commonly reported across all age groups, with 40 cases in the 20–30 years group, 28 cases in the 31–40 years group, and 15 cases in the 41–50 years group. Moderate pain was experienced by 23, 18, and 7 patients in the same respective age groups, while severe pain was reported only in the younger age groups, with 4 cases in the 20–30 years group and 3 cases in the 31–40 years group. In the closure group, mild pain was also the most prevalent, observed in 33, 22, and 09 cases in the 20–30 years, 31–40 years, and 41–50 years age groups, respectively. Moderate pain was experienced by 20, 29, and 06 patients, while severe pain was reported in 09, 13, and 02 cases, respectively. The p-values for mild, moderate, and severe pain across age groups were 0.571 and 0.681 for the non-closure and closure groups, respectively, indicating no statistically significant difference in postoperative pain distribution by age.

Table 3: Stratification of Post-Operative Pain with Age Distribution (n=276)

Group	Age	Pain				
		Mild	Moderate	Severe	Total	p-value
Non-Closure	20—30 Years	59.7 (40)	34.3 (23)	5.9 (4)	67	0.571
	31—40 Years	57.1 (28)	36.7 (18)	6.1 (3)	49	

	41—50 Years	68.2 (15)	31.8 (7)	0 (0)	22	
	Total	60.1 (83)	34.7 (48)	5.1 (7)	138	
Closure	20—30 Years	57.9 (33)	35.1 (20)	7.0 (4)	57	0.681
	31—40 Years	32.8 (22)	43.3 (29)	8.9 (6)	67	
	41—50 Years	37.5 (09)	54.2 (13)	8.3 (2)	24	
	Total	46.4 (64)	44.9 (62)	8.7 (12)	138	

Discussion:

This comparative cross-sectional study was conducted to evaluate postoperative outcomes in peritoneal closure versus non-closure during cesarean sections. Our findings align with existing literature while also highlighting notable trends specific to our study population. The peritoneum, a mesothelial organ, exhibits rapid self-repair, with re-periodization initiating within 24–48 hours after injury and complete healing occurring within 5–6 days.13Despite recommendations from professional bodies like the Royal College of Obstetricians and Gynecologists (RCOG) stating that peritoneal closure offers no additional benefit, the practice remains prevalent among many gynecologists.[14]

Our study's primary focus was to compare postoperative pain between closure and non-closure groups. The mean pain score in the non-closure group (3.11 ± 1.52) was significantly lower than in the closure group (4.00 ± 1.97). Our results revealed that the mean pain score was significantly lower in the non-closure group (3.11 ± 1.52) compared to the closure group (4.00 ± 1.97), with a $p<0.05$, indicating a statistically significant difference. These findings are consistent with Ali et al., and Amer reporting lower pain scores in the non-closure group.[15, 16]

In our study, mild pain was the most commonly reported category across all age groups in both cohorts. In the non-closure group, mild pain was experienced by 59.7% of patients aged 20–30 years, 57.1% of those aged 31–40 years, and 68.2% of those aged 41–50 years. Moderate pain followed similar patterns, while severe pain was reported by only 5.9% of patients aged 20–30 years and none in the oldest age group. In the closure group, mild pain was reported in 57.9%, 32.8%, and 37.5% of patients aged 20–30, 31–40, and 41–50 years, respectively. The distribution of moderate and severe pain was higher compared to the non-closure group, particularly in older age groups, where 54.2% of patients aged 41–50 years reported moderate pain. A study by Kiran et al reported mild pain in 12% of the closure group and 48% of the non-closure group which is in line with our finding of higher mild pain in the closure group about 60% while 46% in the non-closure group.[17]

The mean age of the study participants was 35 years (SD±1.26). Stratifying pain outcomes by age demonstrated no statistically significant differences in pain distribution across age groups in either the closure ($p = 0.681$) or non-closure groups ($p = 0.571$). This is in alignment with the report by Javi S et al., and Prabhu et al., who found no significant difference in mean pain score among different age groups of closure and non-closure groups.[18,19]

Our findings corroborate prior research suggesting that non-closure of the peritoneum during cesarean sections leads to reduced postoperative pain and quicker recovery.[20] For instance, studies have demonstrated that the non-closure technique results in shorter operative times, reduced postoperative adhesions, and fewer complications related to pain and wound healing.[19]Conversely, some studies argue in favor of peritoneal closure, citing a potential reduction in long-term adhesion-related complications.[21]However, these claims remain less substantiated compared to the immediate postoperative advantages observed with non-closure.

Despite the strong evidence favoring non-closure, our study highlights the significant difference in the mean pain score between the closure and non-closure groups, but the persistence of peritoneal closure as a routine practice may stem from traditional surgical training, perceived concerns over adhesion formation, or limited awareness of updated guidelines. Promoting adherence to evidence-based practices, including the non-closure technique, could enhance patient comfort and recovery while optimizing surgical efficiency.

While our study provides valuable insights, certain limitations must be acknowledged. The sample size, though sufficient for analyzing pain outcomes, may not capture rare complications associated with non-closure or closure techniques. Additionally, long-term follow-up data were not included, which could provide further insights into adhesion formation and other postoperative complications. Future research should focus on

longitudinal studies comparing closure and non-closure techniques, with an emphasis on long-term outcomes like adhesion-related infertility, chronic pelvic pain, and repeat cesarean complications. Efforts to update surgical training programs and guidelines could further bridge the gap between evidence and practice, ensuring optimal patient care.

Conclusion:

This comparative cross-sectional study shows that the pain score of peritoneal non-closure is less than in the peritoneum closure technique at cesarean section. Therefore, it is recommended that the peritoneal non-closure technique to all obstetricians, because it is not only associated with less post-operative pain but is also cost-effective, less time spent on suturing, and causes less adhesion.

References:

1. Ali AE, Ibrahim AE, Abdel-Aziz AM, Abdel-fottoh MT. Short-Term Outcome of Closure or Non-Closure of Peritoneum in Caesarian Section. The Egyptian Journal of Hospital Medicine. 2021 Jul 1;84(1):2576-80.
2. Della Corte L, Guarino MC, Vitale SG, Angioni S, Mercurio A, Bifulco G, Giampaolino P. C-section technique vs mini-laparotomy after minimally invasive uterine surgery: a retrospective cohort study. Archives of Gynecology and Obstetrics. 2024 Jan;309(1):219-26.
3. Phythian CJ, Angell JW, Crilly JP, Martin AD. Ewe Caesarean section: reviewing the evidence base and sharing cross-country experiences part two. Livestock. 2019 May 2;24(3):149-54.
4. Landon MB. Vaginal birth after cesarean delivery. Queenan's Management of High-Risk Pregnancy: An Evidence-Based Approach. 2024 Jan 2:415-24.
5. Radwan ME-H. Different uterine suturing techniques during LSCS at Zagazig Maternity Hospital (short Term Comparative Study). Life Science Journal. 2019;16(3).
6. Nunes I, Nicholson W, Theron G, FIGO Childbirth and Postpartum Hemorrhage Committee, Beyeza J, Nassar A, Chandran R, Riethmuller D, Begum F, Zafar SM, Ramašauskaitė D. FIGO good practice recommendations on surgical techniques to improve safety and reduce complications during cesarean delivery. International Journal of Gynecology & Obstetrics. 2023 Oct;163:21-33.
7. Cunningham FG, Leveno KJ, Bloom SL, Spong SY, Dashe JS. Williams Obstetrics.-McGraw-Hill Education. Medical; 24 edition (April 28. 2014;2994:2994.
8. Ovington LG. Surgical Wound Closure and Healing. IntechOpen; 2022 Sep 29.
9. Lanowski JS, von Kaisenberg CS. The surgical technique of cesarean section: what is evidence-based. Cesarean Section. 2018 Nov 5;4:63-77.
10. Simões J, Stilwell G, Simões J, Stilwell G. Assisted Vaginal Delivery and Newborn Calf Care. Calving Management and Newborn Calf Care: An interactive Textbook for Cattle Medicine and Obstetrics. 2021:113-44.
11. Nezhat C, Zaghi B, Baek K, Nezhat A, Nezhat F, Lindheim S, Nezhat C. Outcomes of laparoscopic cesarean scar defect repair: retrospective and observational study. Journal of Clinical Medicine. 2023 May 28;12(11):3720.
12. Arslan OE. Peritoneal Organ-Anatomical and Physiological Considerations. InExploring Drug Delivery to the Peritoneum 2023 Dec 1 (pp. 1-36). Cham: Springer International Publishing.
13. Persichetti P, Ciarrocchi S, Brunetti B. Abdominal Wall Surgery. Textbook of Plastic and Reconstructive Surgery: Basic Principles and New Perspectives. 2022:401-18.
14. Leung SO, Chapel D, King M, Elias KM. Update on Management of Cervical Cancer.
15. Ali AE, Ibrahim AE, Abdel-Aziz AM, Abdel-fottoh MT. Short-Term Outcome of Closure or Non-Closure of Peritoneum in Caesarian Section. The Egyptian Journal of Hospital Medicine. 2021 Jul 1;84(1):2576-80.
16. Amer WM, El-Mashad AI, Soliman EM, Edris Y. Effects of Closure versus Non-Closure of The Visceral and Parietal Peritoneum at Cesarean Section. Benha Medical Journal. 2023 May 1;40(1):206-16.
17. KIRAN S, JAVED H, BASHIR M, NAWAZ F, HASSAN S, ILYAS A. Comparing Outcome of Peritoneal Closure with Nonclosure during Patients' Caesarean Section. Age (years).;31(7.57):31-78
18. Ghongdemath JS, Banale SB. A randomized study comparing non-closure and closure of visceral and parietal peritoneum during cesarean section. The Journal of Obstetrics and Gynecology of India. 2011 Feb;61:48-52.
19. Prabhu S, Prasad DN, Mishra N, Jadhav V, Savani G. A prospective randomized controlled study comparing short-term outcomes of closure and non-closure of the peritoneum during elective cesarean section. International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2021 Jul 1;10(7):2656-62.
20. Çintesun E, Kebapçılar AG, Uçar MG, Yılmaz SA, Bertizlioğlu M, Çelik Ç, Kerimoğlu ÖS. Effect of Closure of Anterior Abdominal Wall Layers on Early Postoperative Findings at Cesarean Section: A Prospective Cross-sectional Study. Revista Brasileira de Ginecologia e Obstetrícia. 2021 Jun 18;43:250-5.
21. Ali AE, Ibrahim AE, Abdel-Aziz AM, Abdel-fottoh MT. Short-Term Outcome of Closure or Non-Closure of Peritoneum in Caesarian Section. The Egyptian Journal of Hospital Medicine. 2021 Jul 1;84(1):2576-80.