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Postoperative Pain and Treatment Satisfaction among Women Receiving Transversus Abdominis Plane Block after Cesarean Delivery: A Cross-Sectional Study

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ABSTRACT

Objective: This study examined postoperative pain, treatment satisfaction-related scores, and their association among women receiving transversus abdominis plane (TAP) block after cesarean delivery.

Methods and Materials: A descriptive cross-sectional study recruited 278 women through purposive sampling at two public hospitals in Al-Muthanna Governorate, Iraq, between December 2025 and January 2026. Assessments were conducted 12–24 hours postoperatively using a modified 14-item Pain Treatment Satisfaction Scale and a numerical pain measure. Data were analyzed using descriptive statistics and Spearman's rank correlation in SPSS 27.

Findings: Mild postoperative pain was reported by 242 women (87.1%), while 16 (5.8%) reported no pain, 18 (6.5%) moderate pain, and two (0.7%) severe pain. The mean satisfaction-related score was 59.05 ± 5.70, with 259 participants (93.2%) classified as high and 19 (6.8%) as moderate according to study-defined thresholds. Pain and satisfaction-related scores demonstrated a significant inverse correlation ($r_s = -.505$, $p < .001$). However, inconsistent satisfaction scoring anchors and an incompatible pain-score summary restricted clinical interpretation.

Conclusion: Most participants reported mild postoperative pain, and an inverse association was observed between recorded pain and satisfaction-related scores. Nevertheless, unresolved scoring inconsistencies and the absence of a comparison group prevent conclusions regarding TAP block effectiveness or definitive satisfaction levels.

Keywords: Cesarean Delivery, Transversus Abdominis Plane Block, Postoperative Pain, Patient Satisfaction, Cross-Sectional Study.

Introduction

Postoperative pain after cesarean delivery can interfere with mobility, sleep, infant care, and early recovery. Assessment should therefore consider the woman's experience alongside the physical consequences of surgery. Contemporary definitions recognize pain as a sensory and emotional experience influenced by biological, psychological, and social factors (Raja et al., 2020). The severity of acute pain also varies substantially between women, making a single analgesic approach or a single satisfaction rating an incomplete measure of recovery (Sangkum et al., 2024).

The transversus abdominis plane (TAP) block is a regional analgesic technique in which local anesthetic is deposited in the fascial plane between the internal oblique and transversus abdominis muscles to target nerves supplying the abdominal wall. Randomized studies have evaluated its postoperative effects after cesarean delivery under general anesthesia and under spinal anesthesia without intrathecal opioid (Buluc et al., 2019; Innamorato et al., 2023). Different block approaches and background analgesic regimens can produce different outcomes, so evidence from one protocol should not automatically be generalized to another (El-Amrawy & El-Attar, 2024).

Comparative evidence supports evaluating TAP block within the complete perioperative analgesic regimen. A cesarean-specific meta-analysis compared TAP block with intrathecal morphine across pain, opioid consumption, and adverse-effect outcomes (White et al., 2025). A broader meta-analysis across surgical procedures also examined postoperative analgesia and opioid sparing (Zako et al., 2026). Current procedure-specific guidance recommends multimodal analgesia after elective cesarean delivery under neuraxial anesthesia, with fascial plane blocks among the options when a neuraxial opioid is not administered (Crowe et al., 2026). These comparative findings cannot be reproduced by an uncontrolled cross-sectional assessment alone.

Satisfaction with pain treatment reflects more than pain intensity. Communication, expectations, perceived relief, and the care process may all contribute to how patients evaluate treatment (Buli et al., 2022; Evans et al., 2004). After cesarean delivery, high satisfaction can coexist with substantial pain, underscoring the need to assess both outcomes separately (Hesse et al., 2018). A biopsychosocial perspective also supports attention to the woman's concerns and social context when interpreting patient-reported outcomes (Seyed Alitabar, 2025).

Local descriptions of postoperative experiences can inform nursing assessment and identify questions for controlled research. The present study examined pain intensity, satisfaction-related scores, and their association among women who received TAP block after cesarean delivery at two public hospitals in Al-Muthanna Governorate, Iraq. The observational design was intended to describe experiences and associations rather than estimate the causal analgesic effect of TAP block.

Methods and Materials

Design and Setting

A descriptive cross-sectional study was conducted in the obstetric and postnatal units of Women and Children Teaching Hospital in Al-Samawah and Al-Rumaitha General Hospital, Al-Muthanna Governorate, Iraq. Both are public hospitals affiliated with the Iraqi Ministry of Health and provide elective and emergency cesarean care. Data were collected from December 21, 2025, to January 30, 2026.

Participants and Sampling

Purposive sampling was used to recruit 278 women who had undergone cesarean delivery and received a TAP block for postoperative pain management. Assessments were described as occurring during the 12–24-hour postoperative interval. The exact interval from block administration to assessment, and detailed eligibility and exclusion criteria, were not specified. The study did not include women managed without TAP block as a comparison group.

The sample-size calculation used an estimated finite population of 998 cesarean cases across the two hospitals: 673 at Women and Children Teaching Hospital and 325 at Al-Rumaitha General Hospital. With a 95% confidence level, a 5% margin of error, and an assumed response distribution of 50%, the planned sample was 278. Proportional allocation yielded 188 women from the first hospital and 90 from the second. This calculation informed the recruitment target; purposive recruitment does not confer the representativeness of a probability sample.

Measures

The questionnaire included age, educational attainment, occupation, residence, monthly income in Iraqi dinars (IQD), anthropometric information, previous cesarean deliveries, previous TAP block exposure, current cesarean type, and a categorical rating of block effectiveness. The timing and reference period of the effectiveness rating were not defined sufficiently to identify whether it concerned the current or a previous experience. The anesthetic technique, local anesthetic drug and dose, block approach, and concurrent analgesic regimen were not detailed.

Satisfaction was assessed with a modified 14-item questionnaire derived from the Pain Treatment Satisfaction Scale (PTSS), originally developed for patients with acute or chronic pain (Evans et al., 2004). Items were adapted to the post-cesarean context, and permission to use and modify selected items was reported. The items addressed perceived physical recovery, mood, communication with staff, daily activities, care, relief expectations, and willingness to receive TAP block again.

The stated response coding was 1 = strongly agree to 5 = strongly disagree. Nevertheless, higher scores were classified as higher satisfaction. The scoring key and any item-specific reversals were not provided, leaving this directional inconsistency unresolved. This is particularly relevant because the item "Believe TAP block could be more effective" differs in meaning from positively worded benefit statements. Total scores and the original category labels are therefore presented descriptively without assuming that a higher score demonstrates greater satisfaction. The total-score intervals were 14–32.66, 32.67–51.33, and 51.34–70.00; the stated item-mean intervals were 1–2.33, 2.34–3.66, and 3.67–5.00. These thresholds were not established as validated clinical cutoffs.

Ten experts reviewed questionnaire content: eight from the College of Nursing, University of Baghdad, and two from Sawa University, each with more than five years of experience. A pilot study involving 30 women was conducted from December 18 to 20, 2025. Cronbach's α was reported as .843, although it was not clear whether this estimate came from the pilot or main sample. Expert review and internal consistency do not by themselves establish structural validity, correct score direction, or equivalence to the original PTSS. Inclusion of pilot participants in the final sample was not specified.

Pain was assessed using a numerical scale labeled the Numerical Analog Scale (NAS), with a stated range of

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0–10. The supplied categories were no pain (0), mild pain (0.1–3.4), moderate pain (3.5–7.4), and severe pain (7.5–10). The reported M ± SD of 1.02 ± 0.39 is incompatible with these raw-score categories and frequencies. Coding the four categories as 0, 1, 2, and 3 reproduces approximately 1.02 ± 0.39, but this does not verify the coding of the underlying records. The summary is consequently not interpreted as a confirmed mean on the raw 0–10 pain scale.

Data Collection and Analysis

Data were obtained through structured interviews and self-report questionnaires. Responses were checked for omissions during collection. A participant screening flow and the number of women approached or declining participation were not available, so a response rate could not be determined.

SPSS version 27 was used for analysis. Frequencies, percentages, means, and standard deviations summarized the data. Spearman's rank correlation assessed the association between pain and satisfaction scores, with $p < .05$ as the stated significance threshold. Mann–Whitney U and Kruskal–Wallis H tests were mentioned for demographic and clinical comparisons, but no corresponding test results were supplied and no subgroup inference is drawn from them. No adjusted association model or confidence interval for the correlation was reported. The variables' coding must be established before assigning a clinical direction to the correlation.

Ethical Considerations

The College of Nursing Ethics Review Committee, University of Baghdad, approved the study on December 7, 2025 (approval no. 62). Informed consent was obtained before participation.

Findings and Results

Participant Characteristics

The study included 278 women, with a reported mean age of 29.02 years (SD = 5.779; range = 18–41). The largest age group was 26–33 years (45.0%). Primary education was the most common educational category (32.0%); 87.4% were housewives, 60.4% lived in rural areas, and 59.0% reported monthly income below 300,000 IQD. Normal weight was the most frequent BMI category (66.2%), followed by overweight (20.5%), underweight (11.5%), and obesity (1.8%). Table 1 presents the supplied demographic categories and frequencies. The separate body-weight summary contains an impossible mean relative to its stated range and cannot be interpreted reliably.

Table 1

Demographic and anthropometric characteristics of participants

Characteristic	Category	n	%
Age Groups	18 – 25 years	83	29.9
	26 – 33 years	125	45.0
	34 – 41 years	70	25.2
Level of Education	Illiterate (Does not read/write)	54	19.4
	Primary school	89	32.0
	Intermediate school	48	17.3
	Preparatory school	16	5.8
	Diploma	31	11.2
	Bachelor's degree	40	14.4
Occupation	Housewife	243	87.4
	Student	4	1.4

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	Government Employee	30	10.8
	Non-Government Employee	1	0.4
Residence	Rural	168	60.4
	Urban	91	32.7
	Suburban	19	6.8
Monthly Income (IQD)	Less than 300,000	164	59.0
	301,000 - 600,000	19	6.8
	601,000 - 900,000	40	14.4
	901,000 - 1,200,000	44	15.8
	1,201,000 - 1,500,000	11	4.0
BMI Categories	Underweight (< 18.5)	32	11.5
	Normal Weight (18.5 – 24.9)	184	66.2
	Overweight (25.0 – 29.9)	57	20.5
	Obese (≥ 30.0)	5	1.8

Note. N = 278. IQD = Iraqi dinar; BMI = body mass index. Age: M = 29.02, SD = 5.779, range = 18–41 years. Height: M = 158.73, SD = 4.573, range = 148–173 cm. The supplied body-weight summary is M = 29.02, SD = 5.779 kg, range = 40–110 kg; the mean is below the minimum and is not interpretable. Income categories are retained as supplied. Percentages may not sum to 100 because of rounding.

Elective cesarean delivery accounted for 219 cases (78.8%) and emergency delivery for 59 (21.2%). Eighty-seven women (31.3%) had no previous cesarean delivery. Previous TAP block during a cesarean was reported by 66 women (23.7%), whereas none reported receiving it during another operation. The general effectiveness item was classified as low by 215 women (77.3%), moderate by 55 (19.8%), and high by eight (2.9%). Its unclear reference period prevents direct reconciliation with the satisfaction-related classifications (Table 2).

Table 2

Clinical and obstetric history and reported effectiveness rating

Characteristic	Category	n	%
Received TAP block in previous C-Section	No	212	76.3
	Yes	66	23.7
Received TAP block in other surgeries	No	278	100.0
Rating effectiveness of TAP block	Low	215	77.3
	Moderate	55	19.8
	High	8	2.9
Number of previous C-Sections	0	87	31.3
	1	63	22.7
	2	74	26.6
	3	42	15.1
	4	10	3.6
	5	2	0.7
Type of current C-Section	Emergency	59	21.2
	Elective	219	78.8

Note. N = 278. TAP = transversus abdominis plane. The effectiveness item's reference period and scoring anchors were not sufficiently defined to reconcile it with the satisfaction classifications. Prior cesarean TAP exposure was tabulated for the entire sample, including women with no previous cesarean delivery.

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Satisfaction Scores

The total satisfaction-related score was 59.05 (SD = 5.70), with a reported range of 34–70. Under the supplied scoring categories, 259 women (93.2%) were labeled high, 19 (6.8%) moderate, and none low (Table 3). These are score classifications rather than verified estimates of satisfaction prevalence because the response anchors and score interpretation conflict.

Table 3

Distribution of satisfaction-related total-score classifications

Reported category	Score interval	n	%
Low	14–32.66	0	0.0
Moderate	32.67–51.33	19	6.8
High	51.34–70.00	259	93.2

Note. N = 278. Reported total-score M = 59.05, SD = 5.70, range = 34–70. Category labels and thresholds are retained descriptively. The stated anchors (1 = strongly agree; 5 = strongly disagree) conflict with the interpretation of higher scores as greater satisfaction. A complete item-level scoring key is required.

All item means exceeded 3.67 under the supplied classification system. The highest means concerned willingness to receive TAP block in the future (M = 4.77, SD = 0.58) and the belief that the block could be more effective (M = 4.74, SD = 0.64). The lowest concerned participation in leisure activities (M = 3.79, SD = 0.57) and ease of asking staff questions (M = 3.81, SD = 0.59). The overall mean item score was 4.22 (SD = 0.41; Table 4). These item rankings do not resolve whether the responses indicate agreement or disagreement.

Table 4

Descriptive statistics for the adapted satisfaction items

Item	Content	M	SD
Q1	TAP block positive effect on physical health	4.13	0.72
Q2	TAP block better outlook on recovery	4.30	0.68
Q3	TAP block easier daily activities	4.31	0.66
Q4	TAP block improves mood	4.14	0.65
Q5	Ease of asking medical staff questions	3.81	0.59
Q6	Medical staff reassurance and care	4.09	0.46
Q7	Participation in leisure activities	3.79	0.57
Q8	Maintaining better relationships with others	4.01	0.43
Q9	Concentration during daily tasks	3.98	0.42
Q10	Adequate follow-up care by medical staff	4.07	0.44
Q11	Overall satisfaction with pain management	4.58	0.77
Q12	How level of pain relief meets expectations	4.31	1.04
Q13	Believe TAP block could be more effective	4.74	0.64
Q14	Desire to continue TAP block in the future	4.77	0.58
Total	Mean item score	4.22	0.41

Note. N = 278. M = mean; SD = standard deviation. Item content is presented in abbreviated form. All item means were labeled high under the supplied 3.67–5.00 interval. Item wording, response anchors, and any reverse coding must be reconciled before interpreting these values as satisfaction levels.

Pain Categories and Score Association

Most women were classified as having mild pain (242, 87.1%); 16 (5.8%) had no pain, 18 (6.5%) had moderate pain, and two (0.7%) had severe pain (Table 5). The reported pain summary of 1.02 ± 0.39 should not be read as a verified mean and standard deviation on the raw 0–10 scale. The category distribution is retained separately from that inconsistent summary.

Table 5

Distribution of reported postoperative pain categories

Pain category	Reported interval	n	%
No pain	0	16	5.8
Mild	0.1–3.4	242	87.1
Moderate	3.5–7.4	18	6.5
Severe	7.5–10	2	0.7

Note. N = 278. Reported M ± SD = 1.02 ± 0.39 is inconsistent with the raw 0–10 categories; score coding requires verification.

A moderate inverse rank correlation was reported between the satisfaction-related score and the pain score ($r_s = -.505$, $p < .001$; $N = 278$; Table 6). Thus, participants with higher values of one recorded score tended to have lower values of the other. Whether this represents greater satisfaction with less pain depends on the satisfaction scoring key and the pain variable used in the correlation. The analysis does not demonstrate within-person improvement or an effect caused by TAP block.

Table 6

Association between satisfaction-related and pain scores

Variables	r_s	p
Satisfaction and pain scores	−.505	< .001

Note. N = 278 as reported. r_s = Spearman's rank correlation coefficient. The pain variable used and the satisfaction scoring direction require confirmation. The correlation is an unadjusted association and does not estimate a treatment effect.

Discussion and Conclusion

Pain and Satisfaction as Separate Outcomes

This study describes postoperative experiences among women who received TAP block at two Iraqi public hospitals. The main statistical finding was an inverse association between two recorded scores. Most pain classifications were mild, and most satisfaction-related totals fell in the category labeled high. However, the unresolved scoring direction and the inconsistent pain summary prevent a firm interpretation that lower raw pain intensity was associated with greater satisfaction. The available data do not establish that TAP block reduced pain or improved satisfaction compared with another analgesic strategy.

The distinction between pain and satisfaction remains clinically important. In a prospective cesarean investigation, women reported substantial pain during movement despite high treatment satisfaction (Hesse et al., 2018). Research in a mixed surgical population has likewise examined satisfaction in relation to care processes and pain management experiences (Buli et al., 2022). These findings support measuring perceived relief, communication, function, and pain intensity separately instead of treating a favorable satisfaction category as proof of adequate analgesia.

The present questionnaire combined perceived recovery and daily functioning with staff communication, reassurance, and expectations. Such breadth may help characterize experience, but it complicates interpretation of a single total. The original PTSS development does not automatically validate a shortened, reworded 14-item version in postpartum women (Evans et al., 2004). A clear item-level scoring key, examination of dimensionality, and assessment of whether the thresholds reflect meaningful differences are needed before using these classifications for service comparisons or clinical decisions.

Comparison with Analgesic Evidence

The numerical pain summary deserves particular caution. Its agreement with a possible 0–3 category index suggests that an ordinal variable may have been summarized while the table retained a 0–10 range. Only the original coding and statistical output can establish that explanation. Even if the category frequencies are accurate, a one-time postoperative measurement cannot quantify the amount of pain relief attributable to TAP block. There was no pre-block

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assessment or comparison group, and concurrent medication exposure was not sufficiently described.

Controlled research provides a different level of evidence. Trials have evaluated TAP block after cesarean delivery under general anesthesia and under opioid-free spinal anesthesia (Buluc et al., 2019; Innamorato et al., 2023). Other trials compared different block approaches rather than treating all TAP techniques as interchangeable (El-Amrawy & El-Attar, 2024). These differences in technique and anesthetic context limit direct numerical comparisons with the present sample.

Evidence synthesis also indicates that outcome selection matters. A cesarean-specific review compared TAP block with intrathecal morphine and considered pain scores, opioid requirements, and postoperative nausea and vomiting (White et al., 2025). A broader review synthesized randomized evidence on pain management and opioid sparing across surgical populations (Zako et al., 2026). Neither review makes a high satisfaction percentage in an uncontrolled sample sufficient evidence of comparative efficacy. Local studies should report pain at rest and during movement, rescue analgesia, adverse effects, and recovery alongside satisfaction.

Psychosocial and Nursing Implications

A patient-centered assessment should allow women to describe whether relief meets their needs and whether pain interferes with infant care, movement, or sleep. Information should be understandable across educational and socioeconomic groups. Earlier work in Al-Samawa examined women's knowledge about health promotion after cesarean delivery, providing local context for attention to postoperative education (Hameed et al., 2021). The current demographic profile can guide accessible communication, but the absence of subgroup results prevents identifying particular demographic groups as more dissatisfied or in greater pain.

Psychological factors are relevant to the interpretation of pain without replacing assessment of the physical effects of surgery. Research on pain catastrophizing has examined its associations with neuroticism and self-efficacy, suggesting variables that may be considered in future explanatory models (Sayed Alitabar & Goli, 2023). Those variables were not measured here, so no psychological mechanism can be inferred in this postpartum sample. More broadly, integrating biological, psychological, and social assessment is consistent with individualized care and attention to the patient's experience (Seyed Alitabar, 2025).

Reviews of postoperative pain predictors support considering preoperative characteristics when studying variability in recovery (Sangkum et al., 2024; Yang et al., 2019). Future studies could measure relevant predictors prospectively and examine whether they alter the relationship between pain and satisfaction. Clinical analgesic decisions should continue to follow procedure-specific evidence and individual assessment rather than the present unadjusted correlation. Current guidance for elective cesarean delivery under neuraxial anesthesia emphasizes multimodal treatment and defines a role for fascial plane blocks when neuraxial opioid is not used; that scope should not be generalized automatically to emergency delivery or general anesthesia (Crowe et al., 2026).

Limitations and Future Research

Purposive sampling from two hospitals limits generalizability, and the single postoperative assessment cannot establish temporal or causal relationships. Detailed eligibility criteria, recruitment flow, and nonparticipation were not available. Timing from block to assessment, block technique, anesthetic dose, background anesthesia, concurrent analgesia, and adverse events were insufficiently characterized. Hospital-level differences and potential confounding were not examined in an adjusted model.

Measurement and reporting problems further limit inference. Satisfaction anchors conflict with the assigned score direction, item reversal is undocumented, and the reported pain mean and standard deviation are incompatible with the raw-scale categories. The reference period of the effectiveness item is unclear, while the body-weight mean is inconsistent with its stated range. Correcting these issues requires the questionnaire codebook and participant-level

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data or verified statistical output. Internal consistency alone cannot resolve them.

Future prospective work should use clearly defined and appropriately validated measures, document all score transformations, and assess pain at rest and on movement at prespecified times. Controlled designs are needed to estimate the additional effect of TAP block within a specified multimodal regimen. Functional recovery, breastfeeding-related function, rescue analgesia, adverse events, and longer-term pain should be assessed alongside satisfaction. Effect estimates with confidence intervals and transparent reporting of missing data would improve interpretation.

Conclusion

Among 278 women assessed after cesarean delivery with TAP block, mild pain was the most frequent reported category and the recorded pain and satisfaction-related scores were inversely correlated. Unresolved scoring and summary-statistic inconsistencies limit the clinical meaning of that association and the interpretation of satisfaction categories. This cross-sectional study does not establish comparative analgesic efficacy or improvement caused by TAP block. Verification of the measurement coding and statistical output is necessary before definitive clinical conclusions can be drawn.

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Declaration of Interest

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