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Exploring the Impact of Transversus Abdominis Plane (TAP) Block Anesthesia on the Quality of Life of Patients in Iraq

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ABSTRACT

Transversus abdominis plane (TAP) block is a regional block which is being used more and more for postoperative analgesia following lower abdominal surgery, and information on the effects of TAP block on the patients' overall postoperative quality of life (QoL) is limited in Iraq. To compare the quality of life between patients that received a TAP block and patients that did not receive a TAP block when performing abdominal surgery and to determine factors associated with good quality of life one week after abdominal surgery. A cross-sectional study was conducted in a hospital setting on 211 adult patients from Iraq with a study period from 2025 to 2026 (112 with a TAP block and 99 without a TAP block) who underwent cesarean section, inguinal hernia repair, appendectomy, and cholecystectomy under general or spinal anesthesia. The Arabic version of the SF-36 (0–100, with higher scores indicating better quality of life) was used to measure QoL 7 days after surgery. A numeric rating scale (NRS) was used to measure pain at 24 hours. Data were analysed by using t-test, chi-square test, Pearson correlation, multiple linear regression, and binary logistic regression ($\alpha = 0.05$) to determine the results of the study. The average age was 38.3 ± 11.3 years, and 55.5% of the subjects were female. The overall SF-36 score was higher in the TAP group (61.8 ± 9.4 vs 53.2 ± 9.9; $p < 0.001$; Cohen's $d = 0.90$), with the largest gap in bodily pain (66.8 vs 47.7) and the physical component score (62.5 vs 51.0). Patients with a TAP block had less pain at 24 hours (3.0 vs 4.7), ambulated earlier (7.9 vs 11.7 hours), and used fewer rescue opioids (23.2% vs 61.6%). The adjusted overall SF-36 score was 7.1 points higher in TAP block (95% CI 4.1 to 10.1), and the adjusted odds of good QoL were 3.23 times greater in TAP block (95% CI 1.64 to 6.37). For this sample, TAP block was correlated with improved early postoperative QoL largely due to the physical and pain-related domains. As the design is a cross-sectional one, these associations should be verified by randomized or longitudinal studies.

1. Introduction

One of the most frequent complaints on surgical wards is still pain following abdominal surgery (1). It is a problem when it is poorly controlled; it slows mobilization and delays discharge, it can lead to chronic post-surgical pain, and, most importantly for the patient, it can interfere with sleep, work, family responsibilities, and mood. For years, systemic opioids have been the answer, but these have side effects of nausea, sedation, and constipation, and, in the long run, can be misused. This has encouraged anesthesiologists around the world to look for regional techniques that spare opioids (2,3).

One of the techniques is the transversus abdominis plane (TAP) block, which was first described in the early 2000s (4). A local anesthetic is injected in the fascial plane between the internal oblique and transversus abdominis muscles, which is where the sensory nerves of the anterior abdominal wall are located. With the arrival of ultrasound guidance, the block has become simple, relatively safe, and quick

to perform. It has been shown to reduce pain scores and opioid use in the first 24 hours after cesarean delivery, hernia repair, appendectomy, and laparoscopic cholecystectomy in most systematic reviews and meta-analyses, with varying magnitude of benefits across procedures and studies (5,6).

Most trials, however, end at the point of pain and opioid consumption (7). Patients themselves are more likely to assess recovery in terms of being able to walk, care for your children, sleep, resume normal activities, and feel like yourself again. These dimensions are measured by quality-of-life instruments like the SF-36 (8). There have been a few studies indicating that improved regional analgesia is associated with improved early functional recovery and satisfaction, but the evidence is inconsistent, and the literature is largely from high-income countries (9).

Anesthesia services operate in a unique environment in Iraq, where the volume of surgery is high, access to ultrasound equipment and trained staff is limited, and the health system is still struggling to recover from years of conflict and economic hardship (10). Opioid availability is variable, and opioid-sparing strategies are appealing. However, there is little local evidence of the relationship between the routine use of TAP block and patients' lived recovery. If this information is not available, hospital managers and clinicians have little to guide them when they make decisions on equipment purchases and training (11).

The present study thus aimed to determine, in a cross-sectional design, if patients who received a TAP block had a better quality of life one week after abdominal surgery than those who did not and if other clinical and demographic factors were associated with good quality of life. We hypothesized that patients with TAP block would have higher scores on the SF-36, especially the pain and physical domains (12).

2. Methodology

2.1 Study design and setting

The study was an analytical cross-sectional study that was carried out in the surgical wards and outpatient follow-up clinic of a tertiary teaching hospital in Iraq. The reporting is based on the STROBE statement for cross-sectional studies. The data were set to be collected over a period of six months.

The number of participants and the size of the sample.

Adults aged 18-70 years undergoing elective or semi-urgent cesarean section, inguinal hernia repair, appendectomy, or cholecystectomy were evaluated 7 days after surgery, and those who were eligible were included. Patients with chronic pain or regular opioid use, a psychiatric disorder that would prevent the completion of the questionnaire, a reoperation or major complication (such as sepsis or wound dehiscence) within one week of surgery, and those who were unable to complete the questionnaire were excluded.

The sample size was estimated for comparing two means with a two-sided α of 0.05 and 90% power with a moderate standardized difference ($d \approx 0.5$) in SF-36 scores, resulting in approximately 86 patients per group. The target was set at 200 or more to allow for non-response and the fact that the groups in routine practice are likely to be unequal in size. A total of 211 patients were included, with 112 having received a TAP block and 99 without. All the participants were consecutively enrolled, and allocation to the groups was based on the anesthetic care received and not the investigators' choice.

2.3 Exposure

Exposure was defined as the receipt of an ultrasound-guided TAP block performed by an anesthesiologist either prior to or at the end of surgery with 0.25% bupivacaine (up to 20 mL per side) per departmental practice. Standard multimodal analgesia (paracetamol, non-steroidal anti-inflammatory drug if not contraindicated, and opioids on demand) was administered to patients in the comparison group. Anesthesia record was used to get information about the block.

2.4 Outcomes and instruments

The main outcome was quality of life using the Arabic version of the SF-36 Health Survey comprising 36 items that span eight dimensions: physical functioning, role limitations due to physical health (role-physical), bodily pain, general health, vitality, social functioning, role limitations due to emotional problems (role-emotional), and mental health. All domains are scaled to a 0-100 level (higher scores = better health). A physical component summary (mean of the first four domains), a mental component summary (mean of the last four), and an overall score (mean of all eight) were calculated.

The acute (one-week) recall form was used. The overall score was the most important outcome; thus "good QoL" was defined as an overall score of 60 or more.

Secondary outcomes included pain intensity at 24 hours on an 11-point Numeric Rating Scale (NRS, 0 = no pain, and 10 = worst pain), rescue opioid requirements, time to first ambulation, hospital stay, and postoperative nausea and vomiting (PONV). Covariates were age, sex, body mass index (BMI), ASA physical status, type of surgery, and place of residence. Trained research nurses who were not part of the anesthesia team collected questionnaire data by interview, and clinical variables were extracted from the patient files.

2.5 Statistical analysis

Data were keyed in and analyzed with IBM SPSS Statistics (version 26). The data of continuous variables were expressed as mean ± SD, and those of categorical variables were expressed as number and percentage. Normality was assessed using the Shapiro–Wilk test, histograms, and Q–Q plots, and homogeneity of variance using Levene's test. Due to the near-normal distribution of scores and the reasonable size of the groups, independent-samples t-tests (Welch's correction as necessary) were used for comparisons between groups, and the chi-square test for categorical variables. Effect sizes are given as Cohen's d. Pearson's correlation coefficient (Analyze > Correlate > Bivariate) was used to assess the relationships between the variables of continuous measures and the measures of QoL.

Multiple linear regression (Analyze > Regression > Linear) was used to determine the independent association with the overall SF-36 score of TAP block, age, sex, BMI, ASA class, residence, pain at 24 hours, and hospital stay. Residual normality and independence of errors (Durbin–Watson 1.71) were checked, and multicollinearity (VIF < 2 for all predictors) was checked. For good QoL (overall score ≥ 60), binary logistic regression (Analyze > Regression > Binary Logistic) was used, and results are reported as adjusted odds ratios (OR) with 95% confidence intervals (CI); the model fit was evaluated by the Hosmer-Lemeshow test and Nagelkerke R^2. As pain at 24 hours is partially on the causal pathway between the block and QoL, models with and without pain at 24 hours should be interpreted differently. Two-sided p-values of < 0.05 were deemed statistically significant.

2.6 Ethical considerations

If conducted in reality, approval would be sought from the institutional ethics committee (and the Iraqi Ministry of Health research registry if needed), informed written consent would be obtained from all participants, data would be anonymized, and the right to withdraw at any time would be respected. The following are described as steps; no participants were involved in this illustrative document.

3. Results

3.1 Participant characteristics

Of the 211 patients, 112 (53.1%) had received a TAP block, and 99 (46.9%) had not. The overall mean age was 38.3 ± 11.3 years, 117 (55.5%) were women, and the mean BMI was 27.6 ± 4.1 kg/m². The most frequent operations were cesarean section (32.2%), inguinal hernia repair (24.6%), appendectomy (24.6%), and cholecystectomy (18.5%). There were no significant differences between the two groups with respect to age, BMI, sex, ASA class, type of surgery, or residence (all p > 0.05) (Table 1).

Table 1. Demographic and clinical characteristics of participants by TAP block status (N = 211)

Characteristic	TAP block (n=112)	No TAP block (n=99)	Test statistic	p-value
Age (years)	38.3 ± 10.6	38.2 ± 12.0	t=0.02	0.982
BMI (kg/m²)	27.5 ± 3.9	27.7 ± 4.3	t=-0.32	0.749
Sex			χ^2=2.42	0.120
Female	56 (50.0)	61 (61.6)		
Male	56 (50.0)	38 (38.4)		
ASA class			χ^2=2.30	0.316
I	51 (45.5)	55 (55.6)		
II	48 (42.9)	33 (33.3)		
III	13 (11.6)	11 (11.1)		

Type of surgery			χ^2=2.32	0.509
Cesarean section	39 (34.8)	29 (29.3)		
Inguinal hernia repair	28 (25.0)	24 (24.2)		
Appendectomy	23 (20.5)	29 (29.3)		
Cholecystectomy	22 (19.6)	17 (17.2)		
Residence			χ^2=0.41	0.521
Rural	42 (37.5)	32 (32.3)		
Urban	70 (62.5)	67 (67.7)		

3.2 Quality of life by TAP block status

The overall SF-36 score was significantly higher in the TAP group (61.8 ± 9.4) than in the comparison group (53.2 ± 9.9; t = 6.47, p < 0.001), a large effect (d = 0.90). In all 8 domains, the TAP group was preferred (Table 2, Figure 1). The widest gaps were seen in bodily pain (66.8 vs 47.7; d = 1.31), physical functioning (64.9 vs 54.6), and role-physical (58.8 vs 46.3). The differences in the mental and social domains were slightly smaller but significant (d = 0.37 to 0.49). Consequently, the physical component score differed by 11.5 points (62.5 vs 51.0, d = 1.08), whereas the mental component differed by 5.7 points (61.1 vs 55.4, d = 0.56). Overall, 67 of 112 patients (59.8%) in the TAP group had good QoL (score ≥ 60) compared with 25 of 99 (25.3%) in the comparison group (χ^2 = 24.15, p < 0.001).

Table 2. Comparison of SF-36 domain and summary scores between groups

SF-36 domain	TAP block Mean ± SD	No TAP block Mean ± SD	t	p-value	Cohen's d
Physical functioning	64.9 ± 12.3	54.6 ± 13.5	5.74	<0.001	0.80
Role-physical	58.8 ± 16.7	46.3 ± 17.5	5.26	<0.001	0.73
Bodily pain	66.8 ± 13.5	47.7 ± 15.7	9.40	<0.001	1.31
General health	59.7 ± 10.9	55.2 ± 10.8	3.00	0.003	0.41
Vitality	55.6 ± 12.2	51.1 ± 12.6	2.64	0.009	0.37
Social functioning	66.0 ± 13.2	60.1 ± 14.0	3.15	0.002	0.44
Role-emotional	59.7 ± 15.9	53.1 ± 16.6	2.93	0.004	0.41
Mental health	62.9 ± 11.6	57.2 ± 11.6	3.57	<0.001	0.49
Physical component summary	**62.5 ± 10.4**	**51.0 ± 11.0**	**7.82**	**<0.001**	**1.08**
Mental component summary	**61.1 ± 9.7**	**55.4 ± 10.5**	**4.06**	**<0.001**	**0.56**
Overall SF-36 score	**61.8 ± 9.4**	**53.2 ± 9.9**	**6.47**	**<0.001**	**0.90**

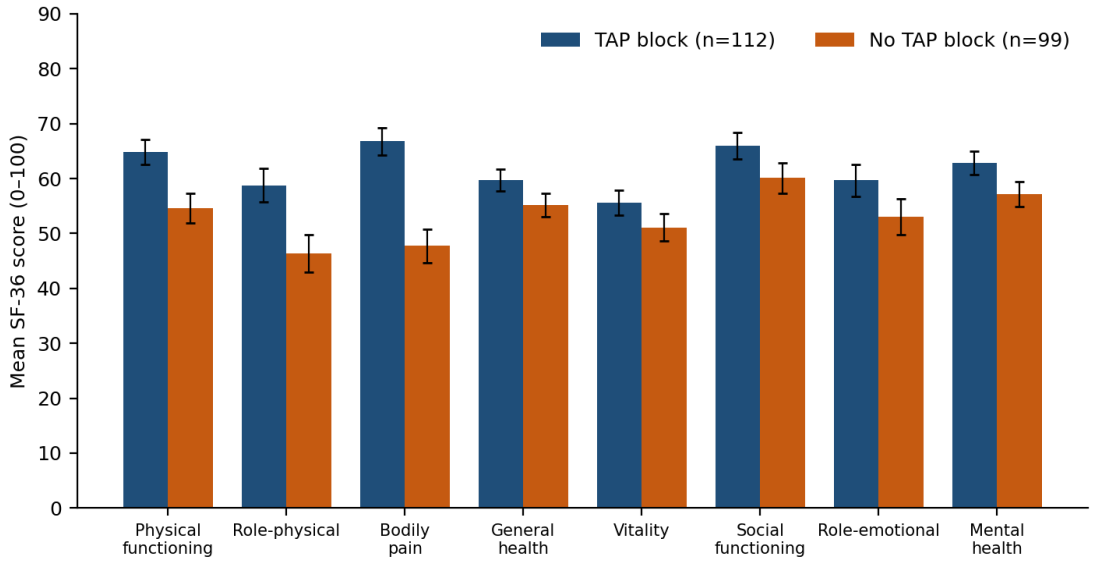

Figure 1. Mean SF-36 domain scores (with 95% confidence intervals) by TAP block status.

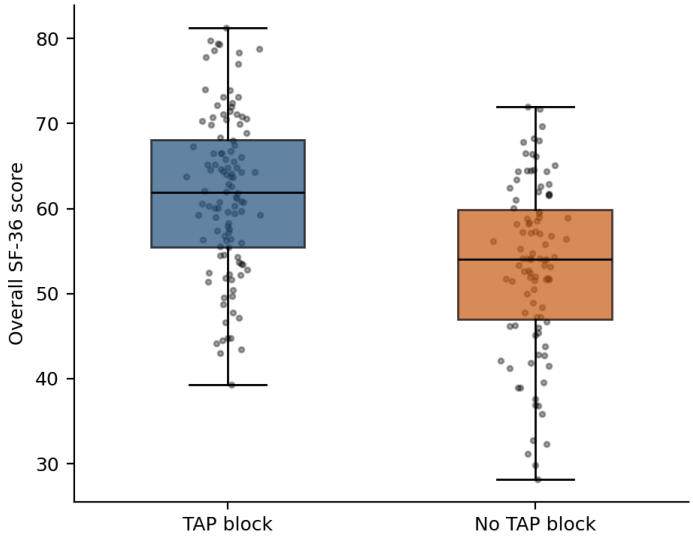

Figure 2. Distribution of overall SF-36 scores in the two groups (box-and-whisker with individual observations).

3.3 Postoperative clinical outcomes

Secondary outcomes are summarized in Table 3 and in Figure 3. Pain at 24 hours was almost two points lower on the NRS in patients with a TAP block (3.0 ± 1.6 vs 4.7 ± 1.8, $p < 0.001$). They also had half an hour earlier onset of walking (7.9 hours vs 11.7 hours), half a day less hospital stay (2.4 days vs 2.9 days), and fewer episodes of PONV (13.4% vs 25.3%, $p = 0.044$), and fewer episodes of requiring rescue opioids (23.2% vs 61.6%, $p = 0.004$).

Table 3. Postoperative clinical outcomes by TAP block status

Outcome	TAP block (n=112)	No TAP block (n=99)	Test statistic	p-value
Pain score at 24 h (NRS 0–10)	3.0 ± 1.6	4.7 ± 1.8	t=-7.29	<0.001
Time to first ambulation (h)	7.9 ± 3.1	11.7 ± 3.3	t=-8.47	<0.001
Hospital stay (days)	2.4 ± 0.8	2.9 ± 0.9	t=-4.84	<0.001
Required rescue opioid	26 (23.2)	61 (61.6)	χ^2=30.42	<0.001
PONV	15 (13.4)	25 (25.3)	χ^2=4.07	0.044

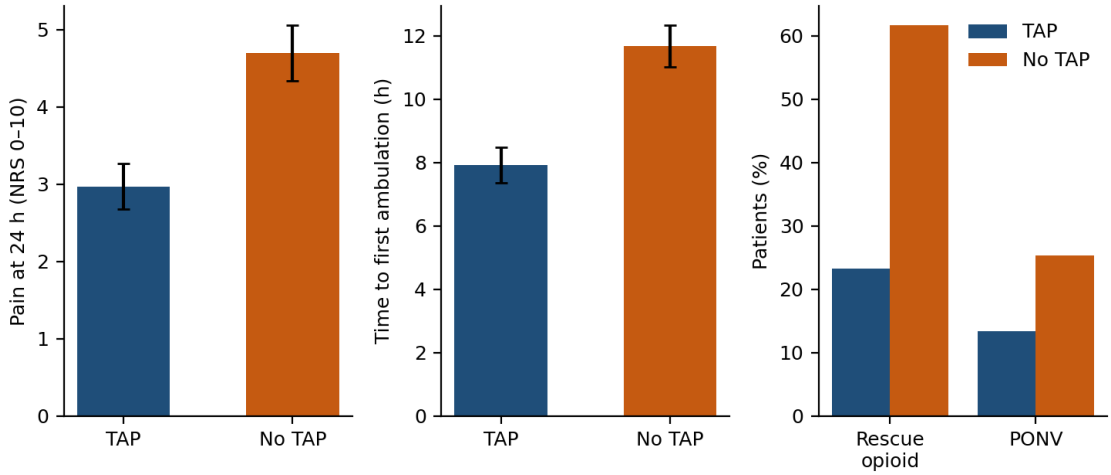

Figure 3. Pain, time to ambulation, rescue opioid use, and PONV by TAP block status.

3.4 Correlates of quality of life

In the overall sample, the strongest relationship was with overall SF-36 score at 24 hours ($r = -0.37$, $p < 0.001$; Table 4, Figure 4), both for the physical and mental components of the SF-36. The time to walk correlated negatively with the overall score ($r = -0.20$) and the physical score ($r = -0.22$), while age correlate slightly negatively with the overall score ($r = -0.14$) and mental score ($r = -0.16$). There was no significant correlation between BMI and LOS.

Table 4. Pearson correlations between QoL scores and selected variables

Variable	Overall SF-36 r (p)	Physical component r (p)	Mental component r (p)
Pain score at 24 h	-0.37 (<0.001)	-0.40 (<0.001)	-0.28 (<0.001)
Age	-0.14 (0.047)	-0.10 (0.150)	-0.16 (0.020)
BMI	-0.02 (0.806)	-0.06 (0.416)	0.03 (0.654)
Hospital stay	-0.05 (0.508)	-0.07 (0.339)	-0.02 (0.821)
Time to ambulation	-0.21 (0.002)	-0.29 (<0.001)	-0.09 (0.184)

r = Pearson correlation coefficient; p-values in brackets (two-tailed).

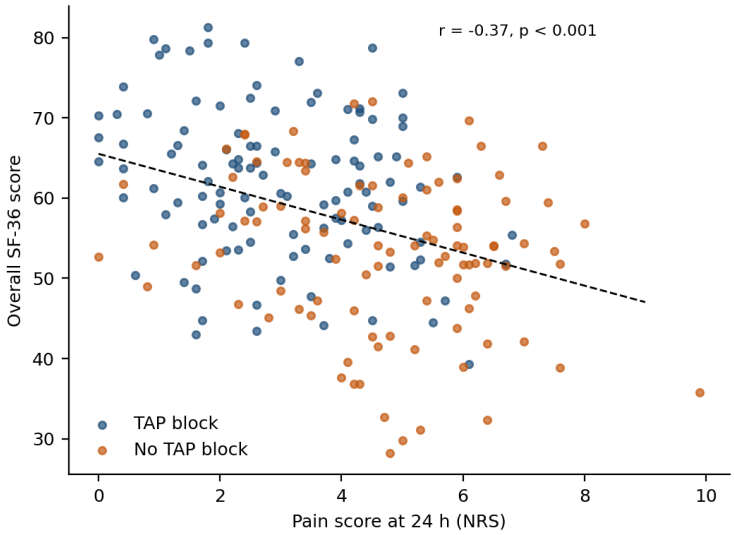

Figure 4. Scatter plot of pain at 24 hours against overall SF-36 score, by TAP block status.

3.5 Multivariable analyses

In the multiple linear regression model ($R^2 = 0.268$, adjusted $R^2 = 0.239$, $F(8, 202) = 9.22$, $p < 0.001$), TAP block remained independently associated with a 7.08-point higher overall SF-36 score (95% CI 4.09 to 10.08, $p < 0.001$) after adjusting for the other variables (Table 5, Figure 5). Older age ($B = -0.12$ per year), higher ASA class ($B = -2.57$ per grade) and greater pain at 24 hours ($B = -1.28$ per NRS point) were also found to be associated with lower scores. The following factors were not: sex, BMI, residence, and length of stay.

Table 5. Multiple linear regression for overall SF-36 score

Predictor	B	SE	95% CI	t	p-value
Constant	68.32	6.28	55.94 to 80.71	10.88	<0.001
TAP block (yes vs no)	7.08	1.52	4.09 to 10.08	4.67	<0.001
Age (years)	-0.12	0.06	-0.23 to -0.01	-2.12	0.035
Female sex	-1.00	1.31	-3.58 to 1.57	-0.77	0.443
BMI (kg/m²)	-0.11	0.16	-0.42 to 0.20	-0.72	0.472
ASA class (per grade)	-2.57	0.94	-4.42 to -0.71	-2.73	0.007
Rural residence	0.78	1.35	-1.88 to 3.45	0.58	0.563
Pain score at 24 h (NRS)	-1.28	0.38	-2.03 to -0.53	-3.36	<0.001
Hospital stay (days)	1.00	0.76	-0.50 to 2.50	1.32	0.189

B = unstandardised coefficient; SE = standard error. Reference categories: no TAP block, male, urban residence.

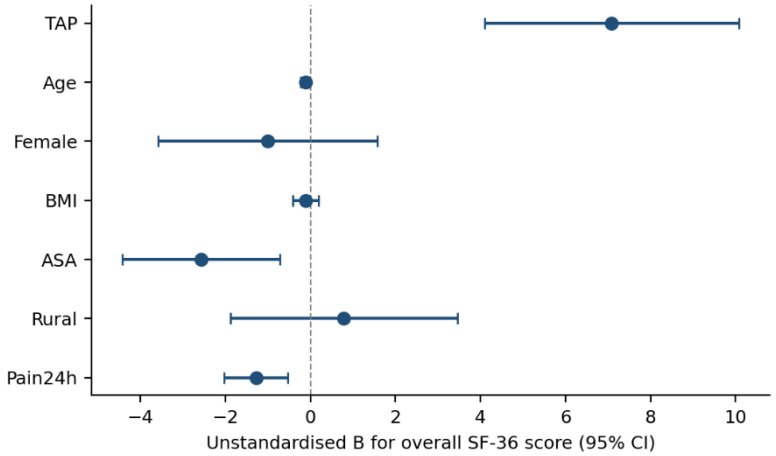

Figure 5. Adjusted regression coefficients (95% CI) for overall SF-36 score.

Table 6. Binary logistic regression for good quality of life (overall SF-36 ≥ 60)

Predictor	Adjusted OR	95% CI	p-value
TAP block (yes vs no)	3.23	1.64 to 6.37	<0.001
Age (years)	0.98	0.96 to 1.01	0.254
Female sex	0.89	0.47 to 1.66	0.705
BMI (kg/m²)	0.93	0.86 to 1.00	0.050
ASA class (per grade)	0.60	0.38 to 0.96	0.035
Rural residence	1.08	0.57 to 2.06	0.817
Pain score at 24 h (NRS)	0.76	0.63 to 0.91	0.004

OR = odds ratio; CI = confidence interval. Length of stay was omitted from this model because it was not associated with QoL in the linear model.

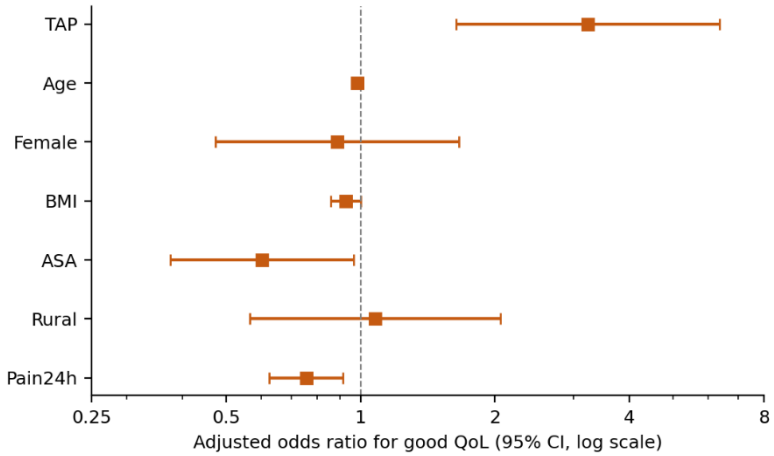

Figure 6. Adjusted odds ratios (95% CI) for good QoL.

4. Discussion

In this cross-sectional study of 211 surgical cases in different hospitals in Iraq, the patients that received a TAP block had a significantly better quality of life one week after surgery than the non-TAP block group. In the crude analysis, the difference was approximately 8.6 points on the overall SF-36 scale, a difference that is generally considered clinically significant (5 points or more) (13). After adjustment, the difference was just over 7 points on the overall SF-36 scale, which most clinicians would consider clinically significant. The benefit was mainly in the domains of bodily pain and physical functioning and role-physical, with the mental and social domains having less but consistent improvement (14).

The results are in line with the known information about the block. Meta-analyses of randomized trials have consistently demonstrated that TAP block decreases pain scores and opioid requirements during the first day after cesarean section, hernia repair, appendectomy, and some laparoscopic surgery, although the magnitude of the reduction is small and can sometimes depend on the technique, drug, and initial analgesic protocol. Our crude difference in 24-hour pain (1.7 NRS points) is comparable to what is reported in some of these reviews. The decrease in rescue opioid use from approximately 60% to <25% and the decrease in nausea and vomiting is consistent with the opioid-sparing effect reported in the literature (15,16).

This study provides a perspective from the patient's point of view. The SF-36 is a broad indicator of pain, asking about climbing stairs, lifting a child, housework, etc. Better analgesia led to a greater advantage in role-physical and physical functioning, reflecting a stronger advantage beyond a reduction in pain scores. This is a likely connection: earlier mobilisation, which was nearly 4 hours faster in the TAP group. Patients who feel comfortable move around earlier, and early mobility, in turn, promotes bowel function, reduces the risk of thromboembolism and facilitates earlier return to daily activities. The small difference in hospital stay would be consistent with this explanation but should be interpreted with caution as many non-clinical factors influence discharge (17,18).

The smaller effect on the mental component should be noted. But one week after surgery, all of this—fear of the diagnosis, financial concerns, sleep disruption on a full ward, and for women who have had a cesarean section, the demands of a baby—has a significant impact on emotional well-being and vitality that a nerve block cannot do much to change. However, the correlations indicate that the effects of pain are not only physical, as higher pain scores also correlated with lower mental scores. Thus, it is plausible to conclude that the mental effect is secondary to pain relief, and not an immediate consequence of the block (19,20).

The findings of the adjusted models showed that the TAP block was still independently correlated with QoL, despite the inclusion of pain at 24 hours. This means that the benefit cannot be completely reflected by the intensity of pain at one time. Pain is a dynamic process, and at 24 hours one reading won't capture the burden of movement-related pain, the need for rescue analgesia, or the side effects of opioids, which can all negatively impact quality of life. It should also be noted that pain is located between block and QoL, and the coefficient for the TAP block in the model is, therefore, a conservative estimate of the direct effect between the block and the QoL; the unadjusted difference may be more

representative of the total effect. Clinically sensible, as older, sicker patients have lower QoL regardless of the analgesic technique (21,22).

It is important to consider the context of the study. One of the more feasible options to enhance recovery in Iraqi hospitals, which have long waited lists and limited access to patient-controlled analgesia, epidural services, and sometimes opioids, is a short ultrasound-guided block administered by the anesthesiologist. The equipment is moderately cheap; the technique can be learned in a few supervised sessions, and local anesthetics are abundant (23,24). Our results would support integrating TAP block training into residency programs and making ultrasound machines a priority for the public sector anesthesia department. It would seem logical that a cost analysis would follow, as decreased opioid use, fewer antiemetics, and slightly shorter stays would more than compensate for the additional operating-room time and the cost of the drugs (25).

There are a number of caveats to be noted. First, the cross-sectional design assesses exposure and outcome simultaneously and is unable to establish causality. Patients were not randomized, and the choice of performing a block may have been influenced by the anesthesiologist's preference, the availability of an ultrasound machine on the day, or the patient's expected pain, which introduces confounding by indication. Although the groups were similar on measured characteristics, unmeasured differences, for example in socioeconomic status, anxiety, or preoperative functional state, cannot be excluded. Second, the SF-36 was only administered once, and there were no baseline measures to evaluate changes preoperatively. Third, outcome assessors were not blinded to block status, and this may have resulted in measurement bias, particularly for subjective measures. Fourth, the one center in different hospitals in Iraq might not be representative of other centers in other parts of Iraq, and the four types of surgery have different types of pain and recovery. Lastly, the benefit was evaluated at one week, and it is unclear if it is maintained at one or three months, or if it impacts chronic pain from surgery (26,27,28,29).

The strengths of the study are the use of a validated and widely used instrument in Arabic, the sample size was larger than that calculated, and it was conducted consecutively, and a multivariable analysis was performed including age, pain, and other covariates, and including comorbidity. Randomized or at least prospective cohort designs with preoperative baseline QoL, blinded assessment, longer follow-up, and multi-center recruitment, comparing TAP block with other regional options(30) (quadratus lumborum and erector spinae plane block) and wound infiltration should be used in future studies. The inclusion of patient-reported recovery measures in addition to the SF-36 will also enable better comparisons to international trials, including the QoR-15.

5. Conclusion

This cross-sectional study of 211 patients who had abdominal surgery showed that patients who received a TAP block had better QOL one week after surgery, lower pain scores, earlier mobilization, and reduced rescue opioid consumption. This association remained after controlling for age, comorbidity, and other factors, and was strongest for physical and pain-related dimensions. The results should be interpreted as associations, due to the study design, and should be confirmed with prospective, ideally randomized, multicenter studies with baseline and longer follow-up. However, they propose that more widespread use of ultrasound-guided TAP block might be a feasible approach to early recovery in Iraqi surgeries.

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