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Evaluating Post Cesarean Delivery Analgesia in Kirkuk Teaching Hospital

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Abstract

Background: Postoperative pain after caesarean section is a common problem that may impact maternal recovery, breastfeeding, and patient satisfaction. Many analgesic techniques are used to alleviate pain and minimizes postoperative complications.

Objectives: This study aimed to evaluate the effectiveness of postoperative analgesic methods after caesarean section through assessing pain intensity, analgesic effectiveness, side effects, and patient satisfaction.

Methods: A prospective observational study was conducted on 207 women who underwent caesarean section in Kirkuk General Hospital, Azadi Teaching Hospital and Al-Nasr Hospital from October 2025 to March 2026. Data were collected using questionnaires and patient interviews. Pain intensity, analgesic methods, duration of pain, side effects, and satisfaction levels were documented then they were analyzed using SPSS 2026 software.

Results: Most patients were young aged 20–29 years (50.7%). Pain scores up to 7/10 and 8/10 were the most commonly reported symptoms (24.2% each). Intravenous opioid analgesia was the most frequently used method (90.3%). More than half of the patients (57%) considered the analgesia as effective method. Drowsiness (39%) and constipation (19.7%) were the most common side effects reported from these analgesia's. Most patients experienced pain for one day duration after surgery (53.1%). A significant negative correlation was found between pain intensity and patient satisfaction.

Conclusion: Postoperative pain after caesarean section remains a significant clinical issue. Intravenous opioid analgesia provided acceptable pain relief but was associated with common

side effects. Improving pain management strategies and using multimodal analgesia may enhance maternal recovery and patient satisfaction.

Keywords: Caesarean Section, Postoperative Pain, Analgesia, Opioids, Pain Management, Patient Satisfaction.

1.1 Introduction

Pain is known as the most significant negative clinical outcome related to caesarean section (CS). [1] Effective post-operative pain management is essential for obstetric patients, as their recovery needs varies, particularly in relation to breastfeeding and caring for their newborns. Inadequate analgesia can hinder these activities. The optimal analgesic regimen after CS should be effective while allowing the mother to care for her infant and ensuring minimal medication bypass through breast milk to the newborn. Nonetheless, both observational studies in developed and developing countries indicate that we have yet to meet these objectives. In developing nations, the primary challenges in delivering sufficient post-CS analgesia include limited access to medications, equipment, and expertise. [2]

Over the last five years, there has been an increase in research focusing on innovative post-operative analgesic techniques. Many of these approaches require less specialized knowledge and aim to decrease opioid use during the recovery phase. A significant factor contributing to inadequate management of postpartum pain is the concern regarding the potential adverse effects of analgesic medications on the health of the newborn. [3]

This apprehension often results in mothers not disclosing their severe pain. While it is true that certain systemic analgesics can transfer into breast milk and potentially harm the newborn [4], there is insufficient evidence based knowledge to suggest that similar complications occur with other alternatives. This misunderstanding or uncertainty may cause the unwarranted withholding of necessary pain relief. Inadequately managed postoperative pain can result in various negative outcomes, including late recovery for women, opioid over usage, compromising mother-child bonding due to breastfeeding limitations [5], and adverse effects on both physiological and psychological maternal health. Moreover, significant postoperative pain is a recognized risk factor for developing chronic postsurgical pain [6].

Effective pain management for women undergoing CS is vital to reduce the risk of chronic pain, which is linked to postpartum depression, and to improve mother-infant bonding including successful breastfeeding. Studies show a wide range (1% to 18%) of persistent incision pain or extended pain relief needs that are beyond six months post-CS. Research from

a regional hospital in Cape Town indicated that patients experienced the highest levels of moderate to severe pain (84%) within the first 24 hours following a CS under spinal anaesthesia. [5]

1.2 Acute and Chronic Pain Post Caesarean Section

In 2020, the International Association for the Study of Pain (IASP) revised its definition of pain to describe it as "an unpleasant sensory and emotional experience related to, or resembling that associated with, actual or potential tissue damage." According to the IASP, chronic pain is characterized as pain that continues beyond the typical healing period for tissues, which is usually around three months in healthy person.[6]

The severity and duration of pain can lead to increased opioid consumption, delayed recovery, and negatively impact maternal to foetal bonding. Furthermore, severe acute pain is a significant risk factor for postpartum depression and chronic pain, resulting in long-term psychological, social, and economic challenges.[7]

Recent studies have enhanced our ability to identify mothers who are at risk for postoperative pain and their subsequent analgesic requirements. Important predictors of acute postoperative pain include anxiety, maternal expectations, and the duration of surgery.[7] Chronic pain, such as incisional and pelvic pain, can develop after a caesarean delivery. In a study involving 220 patients, 12.3% reported experiencing severe pain six months after delivery, which affected their ability to care for their infants, while 6% indicated they experienced persistent daily pain one year later. Other research shows varying rates of analgesic use at six months, ranging from 1% to 18%. Chronic pain can also increase the risk of postpartum depression. The likelihood of experiencing chronic pain and functional impairment is greater after a caesarean delivery compared to a vaginal delivery, although it is lower than in non-obstetric surgeries.[8]

Attempts to alleviate chronic postoperative pain have produced mixed outcomes due to its complex nature and various contributing factors. Risk factors include psychosocial elements such as anxiety, pain perception, catastrophizing, and depression.[8]

2. Patients & methods

2.1 Study Design

This study was designed as a prospective observational cross-sectional study. It aimed to evaluate the propose a hypothesis about the effectiveness of different analgesic methods used after caesarean delivery by following patients after surgery and assessing their pain levels and analgesic requirements.

2.2 Study Duration

The study was conducted over a period of five months, from October 1, 2025, to March 1, 2026.

2.3 Study Setting

The study was carried out in three teaching hospitals located in Kirkuk city, Iraq: Kirkuk General Hospital, Azadi Teaching Hospital, and Al-Nasr Hospital

These hospitals were selected because they receive a large number of caesarean section cases.

2.4 Target Population

The target population included women who underwent caesarean section (CS) during the study period in the selected hospitals.

2.5 Sample Size

The total number of patients included in this study was (n=207) patients.

2.6 Inclusion Criteria

Participants were included in the study based on the following criteria:

- Women aged between 18 and 45 years
- Patients undergoing elective or emergency caesarean section
- Patients who agreed to participate in the study

2.7 Exclusion Criteria

The following patients were excluded from the study:

- Patients with known allergy to analgesic drugs
- Patients with severe systemic diseases such as renal or hepatic failure
- Patients who refused to participate

2.8 Study Variables

Independent Variables:

- Type of analgesia used
- Type of anesthesia
- Type of caesarean section (elective or emergency)

Dependent Variables:

- Pain score measured using the Visual Analog Scale (VAS). [32]
- Time to first request for analgesia
- Total analgesic consumption
- Presence of side effects such as nausea and vomiting…etc

2.9 Data Collection Method

Data were collected using a structured questionnaire and patient data sheet. The information was obtained through:

- Direct interviews with patients during the postoperative period.

2.10 Questionnaire Characteristics

The questionnaire was designed in a simple and clear format and included the following sections:

- Demographic data (age, weight, parity)
- Clinical data (type of caesarean section and anesthesia)
- Analgesic methods used
- Pain assessment using the Visual Analog Scale (VAS)
- Side effects such as nausea, vomiting, and sedation

2.11 Ethical Considerations

- Approval was obtained from hospital authorities through the ethical committee of Al-Qalam University.
- Verbal consent was obtained from all participants
- Patient confidentiality was kept anonymous.
- Participation was voluntary and patients had the right to withdraw at any time

2.12 Data Analysis Method

Data were analyzed using Statistical Package for Social Sciences (SPSS 2026):

- Quantitative data were expressed as mean ± standard deviation
- Qualitative data were presented as frequency and percentage
- Statistical tests such as one way ANOVA and Chi-square test were used
- A p-value less than 0.05 was considered statistically significant

3. Results

3.1. Demographic characteristic of the studied sample:

The study involved 207 patients with caesarian section delivery attending the teaching hospital in Kirkuk governorate (Kirkuk & Azadi) hospital.

The age of the studied sample divided into five age group from less than 20 years to more than 50 years. (Table 1) Among the studied sample, the majority (50.7%) of them were at the second decade of their life. While (31.9%) of them were at the third decade of their life. The third (11.1%) of them were at the fourth decade of their life. (fig2)

Table 1. The age distribution of the studied group.

Age distribution					
Age		Frequency	Percent	Valid Percent	Cumulative Percent
	Less than 20 years old	9	4.3	4.3	4.3
	20-29 years old	105	50.7	50.7	55.1
	30-39 years old	66	31.9	31.9	87.0
	40-49 years old	23	11.1	11.1	98.1
	50-59 years old	4	1.9	1.9	100.0
	Total	207	100.0	100.0	

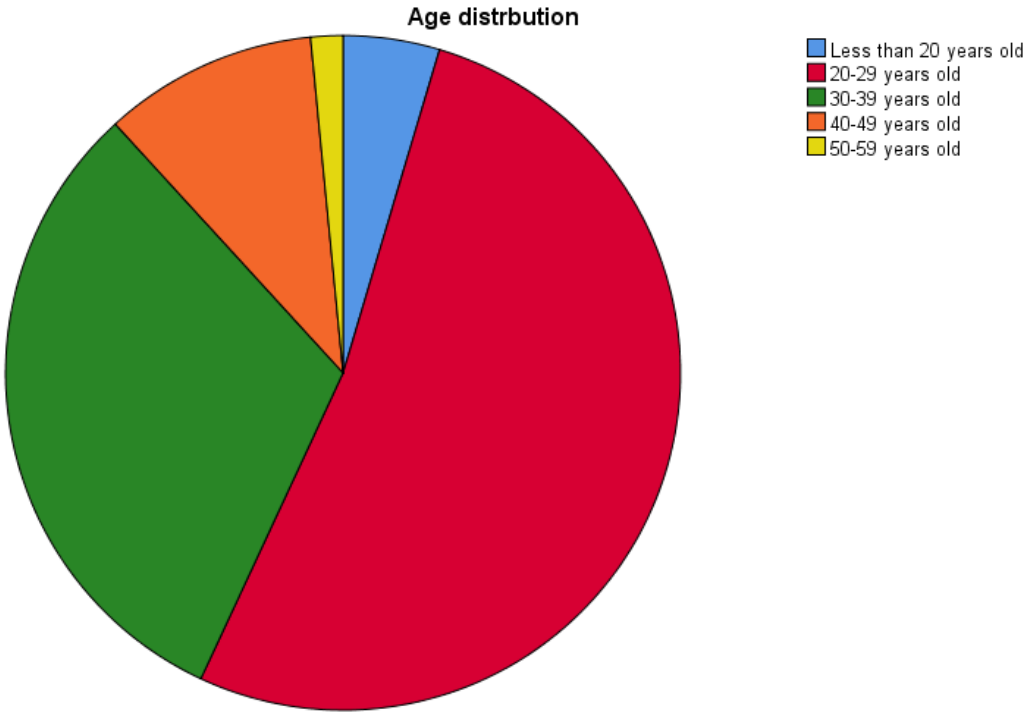

Fig 2. Age distribution of the studied sample

The residency for the studied sample was living in rural area of Kirkuk governorate (39.5%) while (60.5%) of them lived at the urban locality of Kirkuk governorate. (Fig 3)

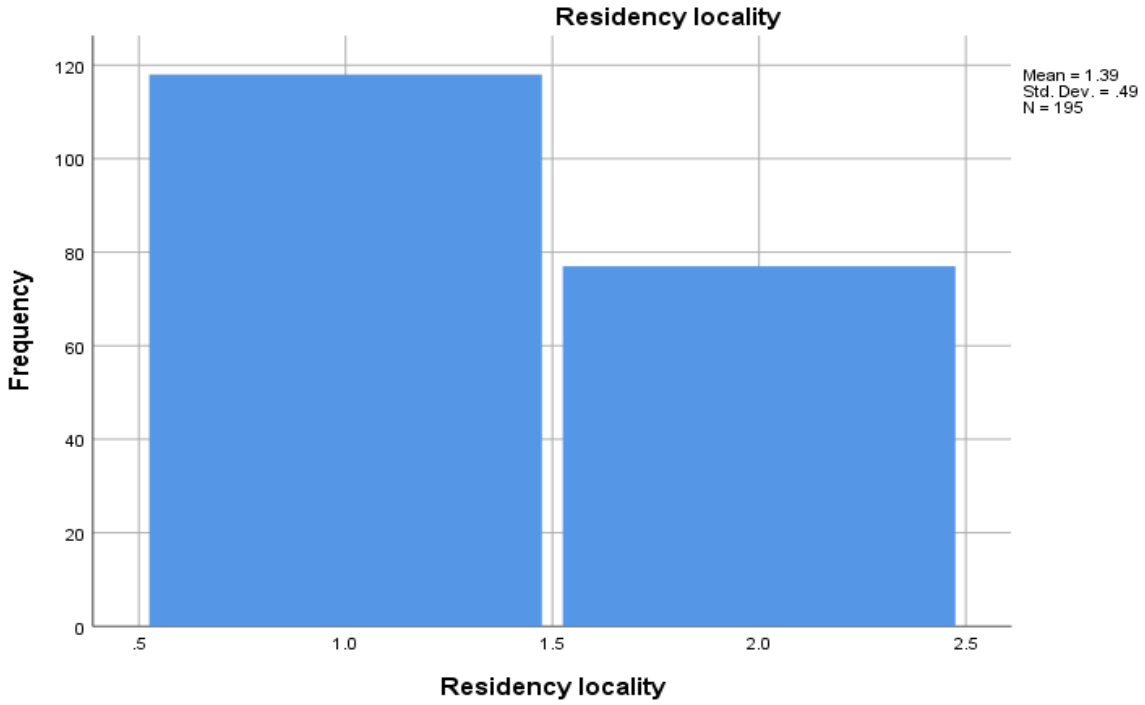

Fig 3. The distribution of the residency types among the studied sample.

The ethnicity of the studied sample was summarized in table 2. There were (58.5%) Arabic ethnicity while (24.6%), (16.9%) were Turkmen & Kurdish consequently. (fig 4)

Table 2. The ethnicity distribution of the studied group.

Ethnicity				
	Frequency	Percent	Valid Percent	Cumulative Percent
Arabic	114	58.5	58.5	58.5
Turkmen	48	24.6	24.6	83.1
Kurdish	33	16.9	16.9	100.0
Total	195	100.0	100.0	

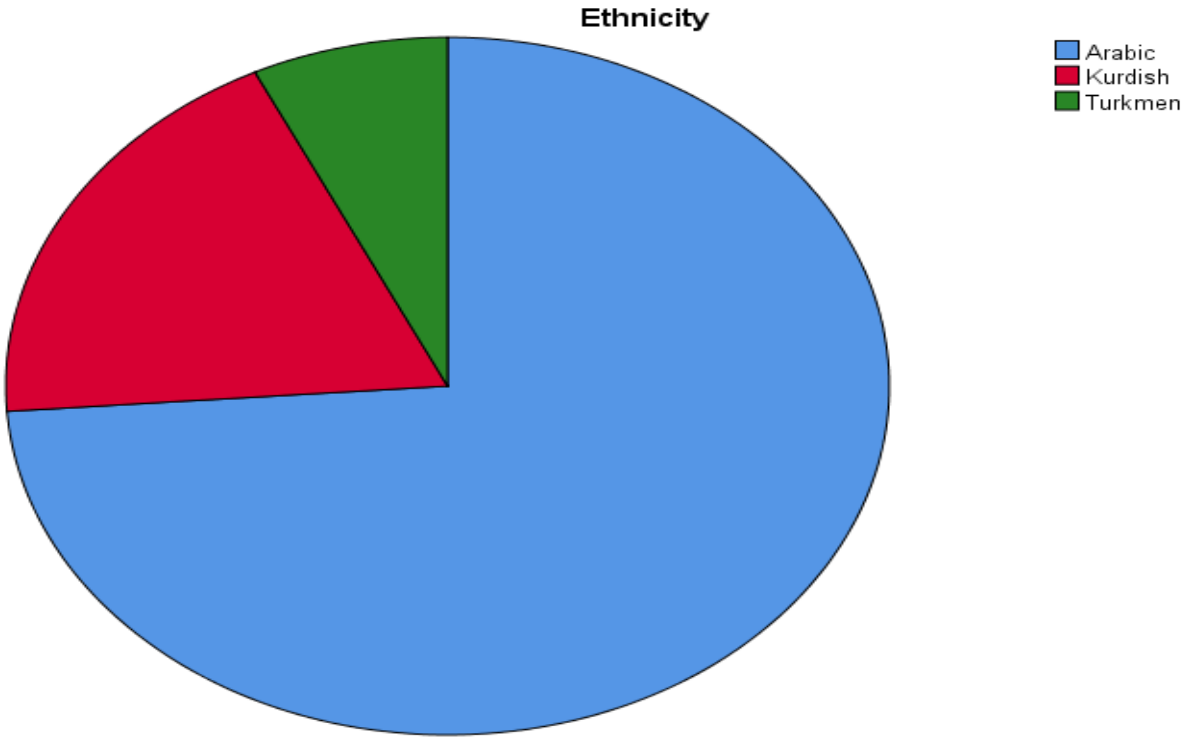

Fig 3. The ethnicity distribution of the studied sample.

The education of the studied sample was summarized in table 3. The majority of the them were in primary school level (45.4%). (Fig 5)

Table 3. The education distribution of the studied group.

Education level				
	Frequency	Percent	Valid Percent	Cumulative Percent
Illiterate	40	19.3	19.3	19.3
Primary school	94	45.4	45.4	64.7
Intermediate school	21	10.1	10.1	74.9
High school	9	4.3	4.3	79.2
Diploma &/or University	43	20.8	20.8	100.0
Total	207	100.0	100.0	

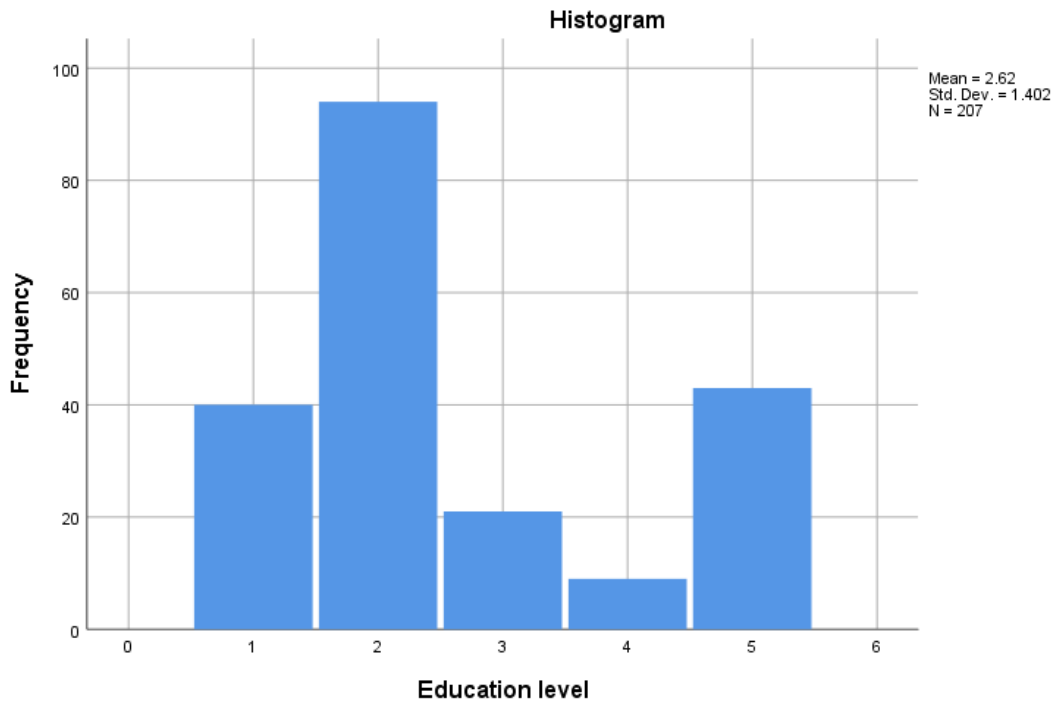

Fig 5. The education distribution of the studied sample.

The occupation of the studied sample was summarized in table 4. Most of the studied sample were employee (73.9%).

Table 4. The occupation distribution of the studied group.

Occupation				
	Frequency	Percent	Valid Percent	Cumulative Percent
Employee	153	73.9	73.9	73.9
None employed	36	17.4	17.4	91.3
Retired	18	8.7	8.7	100.0
Total	207	100.0	100.0	

3.2. Pain characteristic of the studied sample:

The studied sample (n=207) were post cesarean patients. Pain scale rating for them was 7/10 & 8/10 in (24.2%) consequently. (Table 5) The effectiveness level was (56.9%) among the studied patients. Table 6

Table 5. The pain intensity of the studied group.

Pain intensity				
	Frequency	Percent	Valid Percent	Cumulative Percent
1	1	.5	.5	.5
2	1	.5	.5	1.0
3	7	3.4	3.4	4.3
4	11	5.3	5.3	9.7
5	9	4.3	4.3	14.0
6	21	10.1	10.1	24.2
7	50	24.2	24.2	48.3
8	50	24.2	24.2	72.5
9	33	15.9	15.9	88.4
10	24	11.6	11.6	100.0
Total	207	100.0	100.0	

The satisfaction level was scored of the studied sample as in table 6. The majority reported an effective analgesia (57%) while only (3.9%) reported a very infective analgesia.

Table 6. The analgesia effectiveness level distribution of the studied group.

Analgesia effectiveness				
	Frequency	Percent	Valid Percent	Cumulative Percent
Very effective	7	3.4	3.4	3.4
Effective	118	57.0	57.0	60.4
Neither effective nor ineffective	46	22.2	22.2	82.6
Ineffective	28	13.5	13.5	96.1
Very ineffective	8	3.9	3.9	100.0
Total	207	100.0	100.0	

Crosstabulation was done in between pain intensity & age distribution as in table 7. The highest pain intensity level was reported as (7/10 & 8/10) in between two age groups from 20 years -39 years old.

Table 7. The pain intensity & age distribution crosstabulation of the studied group.

Pain intensity * Analgesia effectiveness Crosstabulation							
Count							
		Analgesia effectiveness					Total
		Very effective	Effective	Neither effective nor ineffective	Ineffective	Very ineffective	
Pain intensity	1	0	1	0	0	0	1
	2	1	0	0	0	0	1
	3	0	2	2	1	2	7
	4	0	5	4	1	1	11
	5	2	4	1	1	1	9
	6	3	11	3	4	0	21
	7	0	30	13	5	2	50
	8	1	32	9	8	0	50
	9	0	22	6	5	0	33
	10	0	11	8	3	2	24
Total		7	118	46	28	8	207

The duration of the pain post cesarean section is mostly encountered within one day duration post operatively (53.1%), while (37.7%) perceived the pain in a 2-3 days duration period post cesarean section. Table 8

Table 8. The post operative pain duration among the student sample

Post surgery pain duration					
Time		Frequency	Percent	Valid Percent	Cumulative Percent
	One day	110	53.1	53.1	53.1
	2-3 days	78	37.7	37.7	90.8
	4-5 days	11	5.3	5.3	96.1
	More than 5 days	8	3.9	3.9	100.0
	Total	207	100.0	100.0	

3.3. Analgesia type of the studied sample:

The analgesia had been used in the post cesarean section was distributed as below in table 9. The highest pain medication controlling protocol usage was IV opioid (90.3%).

Table 9. The distribution of analgesia type among the student sample

Analgesia type					
		Frequency	Percent	Valid Percent	Cumulative Percent
	Epidural analgesia	4	1.9	1.9	1.9
	IV opioid analgesia	187	90.3	90.3	92.3
	Oral analgesia	7	3.4	3.4	95.7
	Other type of analgesia	9	4.3	4.3	100.0
	Total	207	100.0	100.0	

Crosstabulation was done in between analgesia usage & age distribution as in table 10. The most common protocol of pain controlling was IV opioid in between two age groups from 20 years -39 years old.

Table 10. The analgesia usage & age distribution crosstabulation of the studied group

Analgesia type * Age distribution Crosstabulation							
Count							
		Age distribution					
		< 20 years old	20-29 years old	30-39 years old	40-49 years old	50-59 years old	
Analgesia type	Epidural analgesia	0	3	1	0	0	
	IV opioid analgesia	9	97	63	15	3	
	Oral analgesia	0	2	1	4	0	
	Other type of analgesia	0	3	1	4	1	
Total		9	105	66	23	4	

Regarding the analgesia side effects encountered among the studied patient. Drowsiness were the most common side effects encountered with a percentage of (39%), constipation (19.7%). (fig.6)

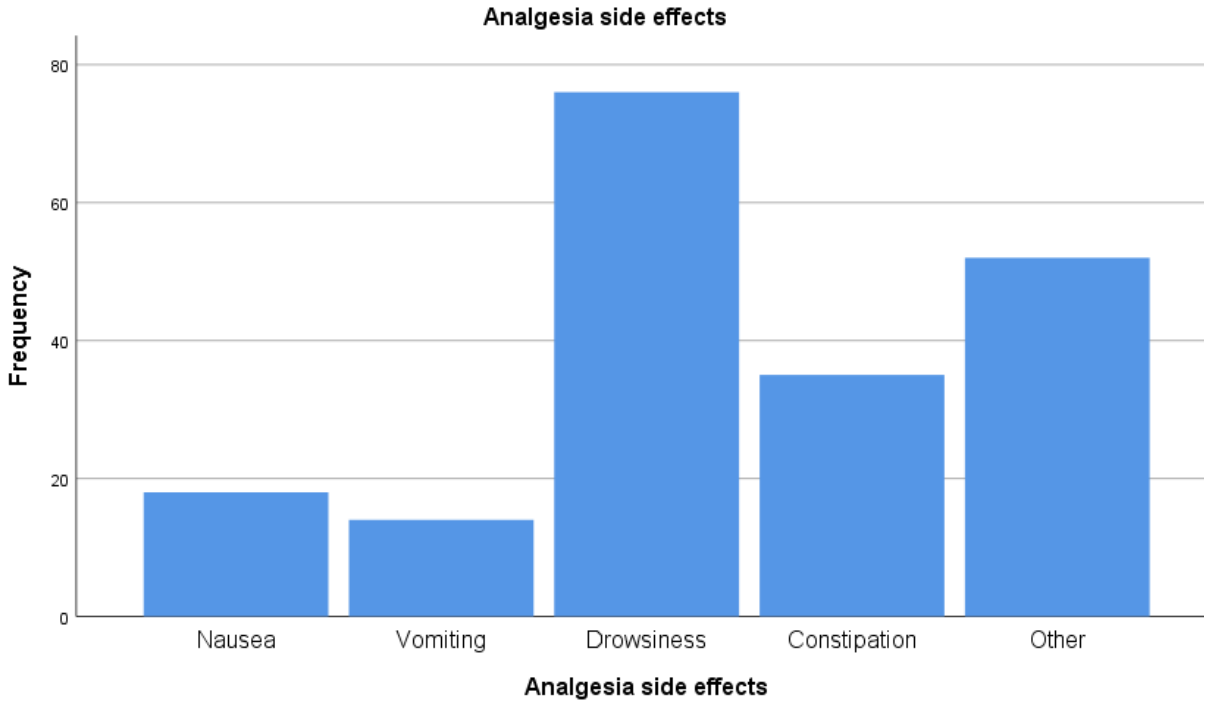

Fig 6. The analgesia side effects distribution of the studied sample

3.4. The cesarean section characteristic of the studied sample

The operation time for the studied sample range from 15 min to 120 min. The highest time percentage was 30-45 minutes duration with a (33.3%). (Fig 7) The recovery time ranged from 20 minutes to 60 minutes. Most of the studied sample were at their 20 minutes recovery with a percentage of (53.8%). (Fig 8).

3.4 The analgesia preferences distribution of the studied sample

The majority of the studied sample preferred a usage of different type of analgesia (87.9%) as shown in table 11.

Chi -Square (X2) had been used to test the association between ethnicity versus satisfaction level and analgesia type versus satisfaction level as follow. The data suggests significant differences in both ethnicity representation and perceptions of analgesia effectiveness. The chi-square tests indicate that these differences are statistically significant, implying that ethnicity and analgesia effectiveness are not independent of one another in this sample. Table 12

There is a significant perception that the analgesia is effective, with a notable absence of responses in the "very effective" and "very ineffective" categories. Although, IV opioid analgesia is overwhelmingly preferred, while other types are underrepresented. The chi-square

tests confirm that both effectiveness perceptions and analgesia types are not independent of one another, indicating significant associations in the data. Table 13

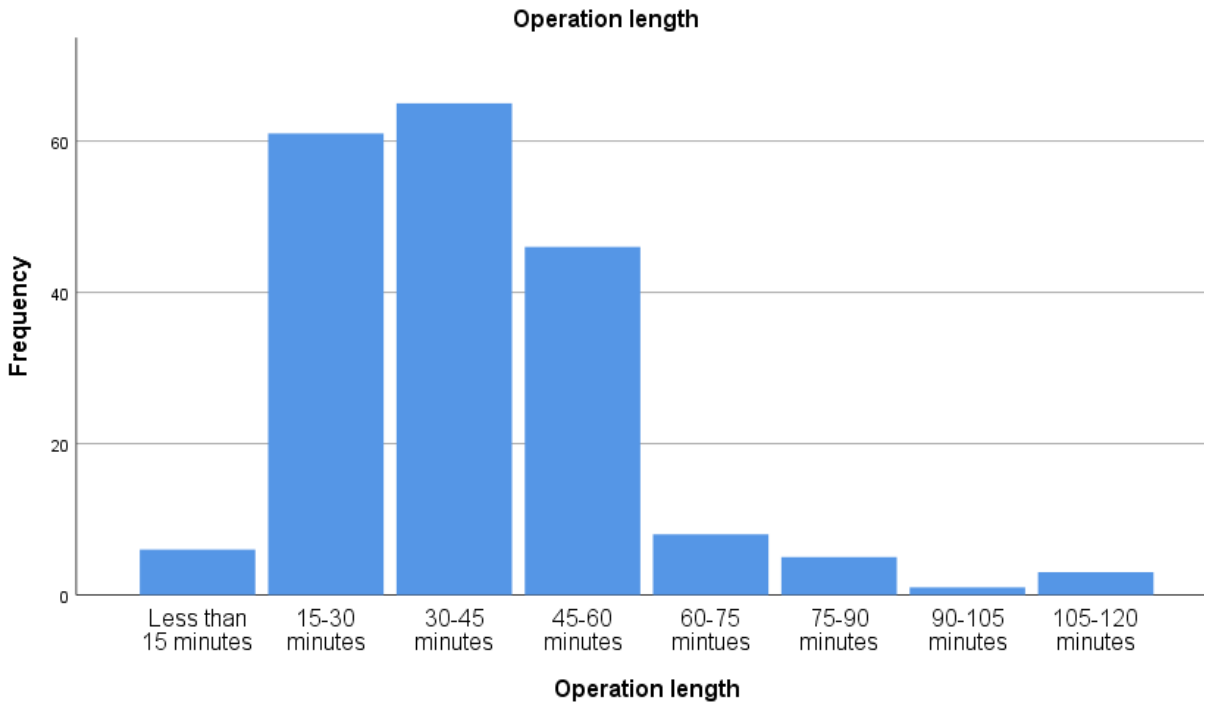

Fig 7. The distribution of the operation time for the studied sample

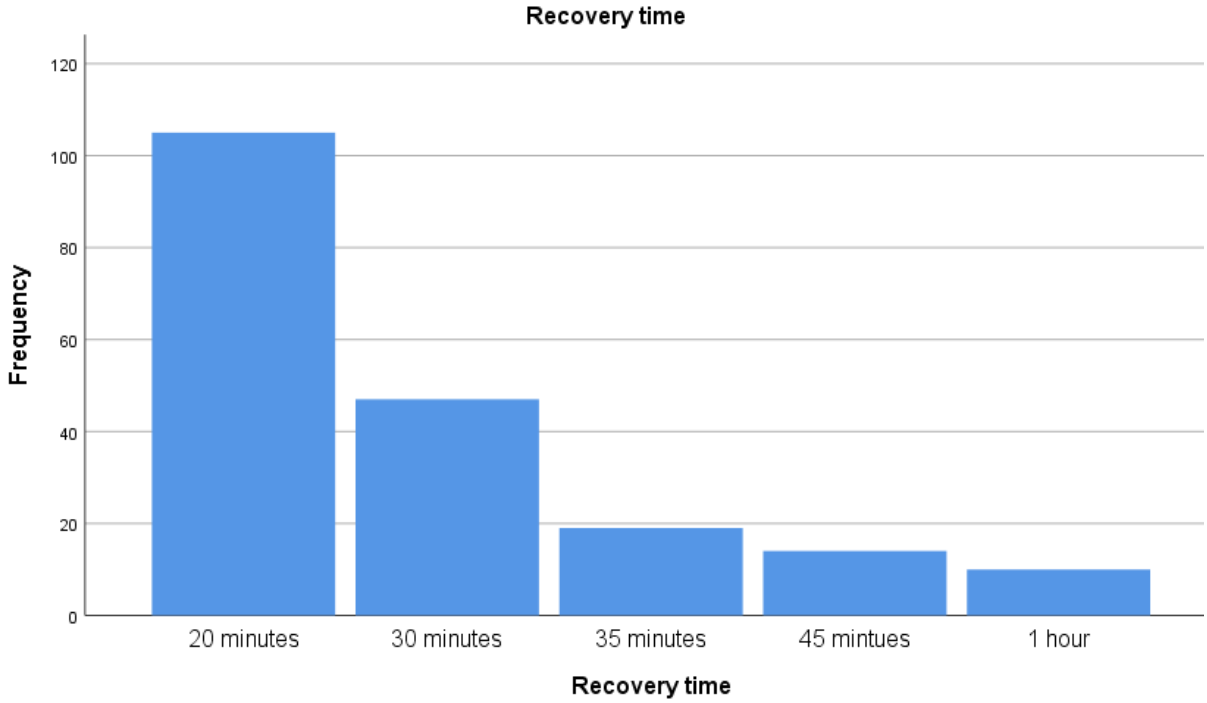

Fig 8. The distribution of the recovery time for the studied sample

Table 11. The distributions of different pain management of the studied sample

Different pain management preferences					
		Frequency	Percent	Valid Percent	Cumulative Percent
	Yes	25	12.1	12.1	12.1
	No	182	87.9	87.9	100.0
	Total	207	100.0	100.0	

Table 12. The non parametric Chi square testing of the ethnicity & satisfaction level from analgesia

Ethnicity			
	Observed N	Expected N	Residual
Arabic	120	69.0	51.0
Turkmen	52	69.0	-17.0
Kurdish	35	69.0	-34.0
Total	207		
Analgesia effectiveness			
	Observed N	Expected N	Residual
Very effective	7	41.4	-34.4
Effective	118	41.4	76.6
Neither effective nor ineffective	46	41.4	4.6
Ineffective	28	41.4	-13.4
Very ineffective	8	41.4	-33.4
Total	207		
Test Statistics			
	Ethnicity	Analgesia effectiveness	
Chi-Square	58.638[a]	202.106[b]	
Df	2	4	
Asymp. Sig.	.000	.000	
a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 69.0.			
b. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 41.4.			

Table 13. The non parametric Chi square testing of the analgesia type usage & satisfaction level of the studied sample.

Analgesia effectiveness			
	Observed N	Expected N	Residual
Very effective	7	41.4	-34.4
Effective	118	41.4	76.6
Neither effective nor ineffective	46	41.4	4.6
Ineffective	28	41.4	-13.4
Very ineffective	8	41.4	-33.4
Total	207		

Analgesia type

	Observed N	Expected N	Residual
Epidural analgesia	4	51.8	-47.7
IV opioid analgesia	187	51.8	135.3
Oral analgesia	7	51.8	-44.7
Other type of analgesia	9	51.8	-42.7
Total	207		

Test Statistics

	Analgesia effectiveness	Analgesia type
Chi-Square	202.106[a]	471.551[b]
Df	4	3
Asymp. Sig.	.000	.000

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 41.4.

b. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 51.8.

3.5 The pain intensity correlation of the studied sample

We ran a spearman correlation analysis between the pain intensity appreciated by the patients (7.37±1.841) with satisfaction level (2.57±0.905). There was a weak negative correlation in between the pain intensity & their corresponding patient stratification level (r>-0.5), P<0.01 (Table 14)

Table 14. Bivariate spearmen correlation between pain intensity & satisfaction

Correlations				
			Pain intensity	Analgesia type
Spearman's rho	Pain intensity	Correlation Coefficient	1.000	-.253**
		Sig. (2-tailed)	.	.000
		N	207	196
	Analgesia type	Correlation Coefficient	-.253**	1.000
		Sig. (2-tailed)	.000	.
		N	196	196
**. Correlation is significant at the 0.01 level (2-tailed).				

3.6 Influences of sociodemographic factor on pain intensity

Many sociodemographic factors have been studied against pain scale for the studied sample. The ANOVA results indicate that there are statistically significant differences among the groups for all the dependent variables listed (age distribution, residency locality, religion, ethnicity, occupation, and education level). The p-values for each variable are below the common alpha level of 0.05, suggesting that the means of these groups differ significantly from one another. This analysis supports the hypothesis that religion differs from the others in terms of the F factor (14.471). (Table 9)

4. Discussion

The findings of the present study showed that postoperative pain after caesarean section remains a common problem among women during the early postoperative period. Most patients reported pain scores of 7/10 and 8/10, while more than half of the studied sample considered the analgesic methods effective. These findings indicate that although pain management protocols provided acceptable pain relief for many patients, a considerable number of women

still experienced moderate to severe pain after surgery. Regarding age distribution, the majority of patients were within the age group of 20–29 years (50.7%) followed by 30–39 years (31.9%). This may be explained by the fact that these age groups represent the most active reproductive period among women, which increases the frequency of caesarean section procedures. Similar findings were reported in previous studies that demonstrated a higher prevalence of caesarean delivery among women in middle reproductive age groups [11].

Table 15. The One-way ANOVA to compare sociodemographic factors influences on pain intensity.

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Age distribution	Between Groups	14.729	9	1.637	2.592	.008
	Within Groups	124.382	197	.631		
	Total	139.111	206			
Residency locality	Between Groups	5.841	9	.649	2.914	.003
	Within Groups	43.879	197	.223		
	Total	49.720	206			
Religion	Between Groups	5.195	9	.577	14.471	.000
	Within Groups	7.858	197	.040		
	Total	13.053	206			
Ethnicity	Between Groups	11.055	9	1.228	2.219	.022
	Within Groups	109.041	197	.554		
	Total	120.097	206			
Occupation	Between Groups	14.153	9	1.573	4.503	.000
	Within Groups	68.803	197	.349		
	Total	82.957	206			
Education level	Between Groups	55.216	9	6.135	3.161	.001
	Within Groups	382.330	197	1.941		
	Total	437.546	206			

In terms of analgesic methods, intravenous opioid analgesia was the most commonly used technique among the studied patients. This finding agrees with previous studies which

reported that opioids remain the standard postoperative analgesic therapy after caesarean section because of their strong analgesic effect [13]. However, despite their effectiveness, opioids are associated with several side effects. In the present study, drowsiness was the most common side effect followed by constipation. Similar results were reported in previous studies which showed that sedation and constipation are common complications associated with opioid analgesics [16].

The current study also demonstrated that postoperative pain duration was most commonly limited to one day after surgery, while a smaller percentage of patients experienced pain for two to three days. This finding may reflect the effectiveness of the analgesic regimens used during the immediate postoperative period. Previous studies also demonstrated that effective postoperative analgesia significantly reduced pain severity during the first postoperative hours following caesarean section [11]. The findings also revealed a statistically significant negative correlation between pain intensity and patient satisfaction. This means that higher pain scores were associated with lower levels of patient satisfaction regarding analgesia effectiveness. Similar findings were reported in previous studies, which showed that improved postoperative pain management reduced pain severity and enhanced patient satisfaction after caesarean delivery [13].

5. Conclusions

Postoperative pain after caesarean section was common among the studied patients, with most women reporting moderate to severe pain levels. The majority of patients were within the age group of 20–39 years, which represents the most active reproductive age. Intravenous opioid analgesia was the most frequently used method for postoperative pain control after caesarean section. Most patients considered the analgesic methods effective despite the presence of moderate postoperative pain in many cases. Drowsiness and constipation were the most common side effects associated with analgesic use. Most patients experienced postoperative pain for one to three days after surgery. There was a significant relationship between pain intensity and patient satisfaction, as lower pain scores were associated with higher satisfaction levels.

6. Recommendations

Improve postoperative pain management protocols for women undergoing caesarean section. Encourage the use of multimodal analgesia techniques to reduce opioid consumption and minimize side effects. Moreover, it is recommended to provide regular pain assessment using standardized pain scales such as the Visual Analog Scale (VAS).

Increase awareness among healthcare workers regarding the importance of adequate postoperative pain control. Monitor patients carefully for opioid-related side effects such as drowsiness and constipation. Educate patients about postoperative pain management and the importance of early reporting of severe pain. Promote the use of safer and more effective analgesic methods to improve maternal satisfaction and recovery outcomes.

Further research direction

Conduct further analytical studies with larger sample sizes to evaluate the effectiveness of different analgesic techniques after caesarean section.

ETHICAL APPROVAL

The research protocol was approved by the Ethical Research Committee of the College of Health and Medical Techniques, Al-Qalam University. We declare that the Helsinki Declaration had been followed in the study.

INFORMED CONSENT

Participants were aware of the purpose of the study and provided informed consent prior to the participations.

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The authors utilized DeepSeek-V3 (DeepSeek AI Inc.) for assistance in structuring the statistical analysis pipeline, generating code, and interpreting the output. All analytical decisions were made by, and the final responsibility for the analysis lies with, the human authors. The authors defined the research questions, designed the analytical strategy, prompted the AI, and critically reviewed, validated, and interpreted all output. The final manuscript was written and approved by the human authors.

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