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Original Article

Assessment of Postoperative Pain after Cesarean Section among Libyan Women Using a Standardized Questionnaire

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Abstract
This study analyzed postoperative pain experiences in 100 patients following cesarean sections (C/S), focusing on pain characteristics, medication efficacy, and functional impacts. Our findings revealed a high prevalence (87%) of moderate to severe pain, with significant correlations between pain intensity and factors such as age and number of C/S procedures. Younger patients (20–35 years) reported higher pain scores (p=0.023), and those with ≥3 C/S experienced more severe pain (p=0.008). Medication effectiveness varied by pain type, with stabbing pain responding better than aching pain (p=0.042). Severe pain was strongly associated with functional limitations, including breastfeeding difficulties (p=0.001), walking challenges (p<0.001), and sleep disturbances (p=0.003). The study underscores the need for enhanced multimodal analgesia strategies and personalized pain management to improve post-operative recovery outcomes for C/S patients.
Keywords. Post-operative Pain, Associated Factors, Caesarean Section, Libya.

Introduction

Postoperative pain management following cesarean sections (C/S) remains a critical challenge in obstetric care. Despite advancements in analgesic techniques, a significant proportion of women continue to experience moderate to severe pain in the postoperative period. Prior studies have highlighted the inadequacy of existing pain management protocols, particularly in the first 72 hours post-C/S [1]. This study aimed to investigate the characteristics of postoperative pain, evaluate the effectiveness of current analgesic regimens, and assess their impact on functional recovery in patients following C/S.

Cesarean delivery accounts for >21% of all live births, according to data from 169 countries [1]. After relaxing the one-child policy, China's annual cesarean delivery rate reached 45.2% in 2018. A prevalent surgical procedure globally is performed for various maternal and fetal indications. Advancements in medical technology and techniques have made C-sections a standard option for various delivery scenarios. This led to increasing rates of cesarean sections [2]. According to recommendations from the World Health Organization and the Pan American Health Organization, it is advised that the ideal cesarean section rate in a given country should fall within the range of 5% to 15%. The frequency of cesarean section is on the rise in both developed and developing countries [3]. A retrospective study conducted in Derna city revealed that the C-section rate was 23.5%. Mothers who had a Caesarean section ranged in age from 15 to 49 years. The main reasons for having caesarean sections were elective repeated procedures (23.3%), fetal distress (16.5%), and previous caesarean section for other reasons (11.5%). The cesarean section rate at Al-Wahda Hospital was 23.5%. This rate exceeds the WHO's standard [4]. This, in turn, raises concerns regarding the implications of Caesarean section on health outcomes, both physical and psychological. Underlining the need to discuss cesarean delivery management to explore the indications, prevalence, complications, and mental health impacts associated with cesarean deliveries [5].

Women undergoing cesarean sections frequently experience severe postoperative pain, with studies indicating that 28-78% report significant discomfort post-surgery [6]. This pain can adversely affect recovery, emotional well-being, and maternal-infant interactions. Effective pain management strategies are crucial to mitigate these outcomes, and several factors contribute to the severity of pain experienced. Approximately 70.8% of women report moderate to severe pain after cesarean delivery [7]. Post-cesarean inflammatory pain is a normal physiological response to surgical tissue trauma. The inflammatory cascade involves various biochemical mediators, such as pro-inflammatory and pro-resolution agents like eicosanoids, cytokines, neuropeptides, growth factors, and certain neurotransmitters like dopamine and norepinephrine. Pain is caused by inflammatory processes and their physiological responses, regardless of its duration, origin, or type. The sequence of nociceptive activation, signal transmission, modulation, neuroplastic adaptation, and central sensitization is interconnected in the broader spectrum of inflammatory pathophysiology and its response mechanisms [8]. Approximately 20% of cases experience intense pain, underscoring the

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insufficient efficacy of existing pain management approaches [9]. Whereas Psychological factors, such as preoperative anxiety and depression, significantly correlate with chronic pain post-cesarean [10,11]. Likewise, Physical conditions, including anemia and malnutrition, also increase the risk of chronic pain [10]. A recent academic study on Pain Management Strategies demonstrated that multimodal analgesia, including the use of ketamine, has shown promise in reducing postoperative pain and improving recovery outcomes [12]. Personalized approaches to pain management, based on preoperative assessments, can enhance analgesic efficacy [13]. According to a recent clinical analysis, mothers are at a greater risk of experiencing higher pain scores after cesarean section. Consequently, it is essential to provide individualized and proactive pain management for these patients to optimize postoperative recovery [14].
Despite advancements in pain management, challenges persist in effectively managing severe postoperative pain in women who have undergone a cesarean section; therefore, further research is necessary to improve predictive models and enhance the personalization of treatment plans [15,16]. This research aimed to provide an overview of postoperative pain following cesarean section (CS), to evaluate the level of satisfaction among patients with the management of postoperative pain, and to identify factors associated with increased levels of postoperative pain.

Methods

This cross-sectional study included 100 patients who underwent C/S at a tertiary care hospital in Tarhuna city. Data were collected using a structured questionnaire that captured demographic information, pain characteristics (location, intensity, description), medication use and effectiveness, and functional impacts (activity limitations, sleep disturbances). Pain intensity was measured using a 10-point numerical rating scale (NRS), while medication effectiveness was assessed on a Likert scale (1=Not effective, 2=Somewhat effective, 3=Very effective). Statistical analyses included descriptive statistics, ANOVA for comparing mean pain scores across age groups, t-tests for evaluating differences in pain intensity based on the number of C/S procedures, and chi-square tests to examine associations between pain severity and functional limitations.

Results

The results of the demographic analysis showed that the largest proportion of patients (61%) fell within the age range of 20 to 35 years. The average age of the participants was 30.2 years, with a standard deviation of 6.8 years (Figure 1).

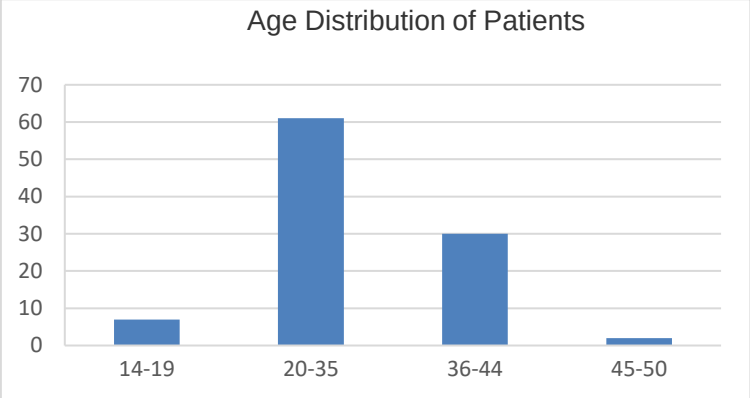

Figure 1. Age Distribution of Patients

The majority of patients were identified as belonging to the middle socioeconomic class, accounting for 86% of the sample (Figure 2).

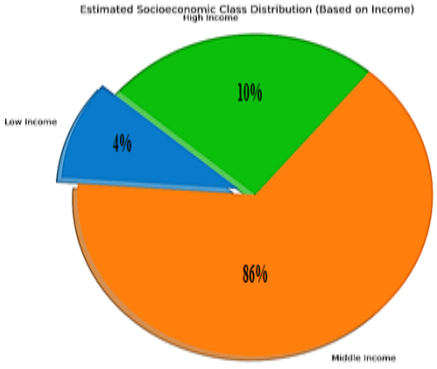

Figure 2. Estimated Socioeconomic Class Distribution.

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The majority of patients experienced pain primarily at the incision site (73%), with a smaller percentage of patients reporting pain in the lower abdomen (20%). (Figure 3).

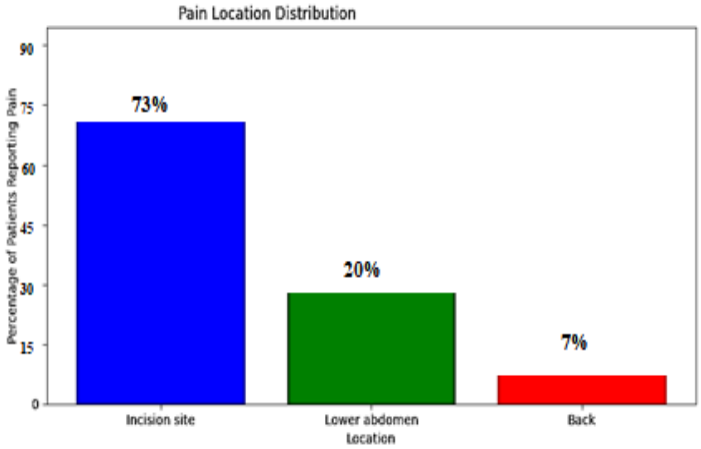

Figure3. Pain location distribution

The data on pain intensity indicated that 69% of the patients experienced moderate to severe pain, with an average score of 6.7 ± 2.3 on the Numeric Rating Scale (NRS) (Figure 4).

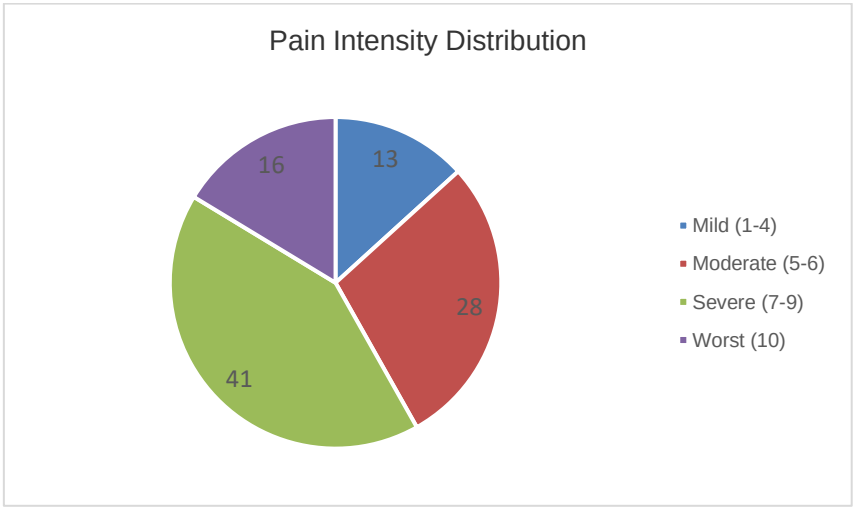

Figure 4. Pain Intensity Distribution

Statistical analysis indicated significant correlations: Age compared to. The intensity of pain was found to be greater among younger patients when compared to older age groups, as evidenced by their higher mean pain scores (p=0.023) (Table 1).

Table1. Comparative Statistics with p-values (Pain Intensity by Age Group)

Age Group	Mean Pain Score	SD	p-value (ANOVA)
14-19	7.8	±1.9	0.023*
20-35	7.1	±2.1	
36-44	6.0	±2.4	
45-50	5.5	±1.4	

Interpretation: Significant difference (p=0.023), with younger patients reporting higher pain.

The number of C/S versus the level of pain experienced by patients who have undergone three or more cervical spinal procedures was found to be significantly higher in comparison to those who have had fewer procedures, as evidenced by a statistically significant difference in mean pain scores (p=0.008) (Table 2).

Table 2. Pain intensity by Number of C/S

C/S Count	Mean Pain Score	SD	p-value (t-test)
1-2	6.2	±2.1	0.008**
≥3	7.5	±2.0	

Interpretation: Patients with ≥3 C/S had significantly higher pain (p=0.008).

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Comparison of Pain Description vs. The efficacy of medication: Analgesics demonstrated a more favorable response in alleviating stabbing pain compared to aching or burning pain (p=0.042) (Table 3).

Table 3. Pain Description vs. Medication Effectiveness

Pain Description	Mean Efficacy Score	SD	p-value (Kruskal-Wallis)
Aching	2.0	±0.8	0.042*
Stabbing	2.4	±0.7	
Burning	1.8	±0.9	

The study found a strong correlation between the intensity of pain and challenges in engaging in certain activities, such as breastfeeding, walking short distances, and experiencing sleep disturbances. This relationship was supported by statistical analysis, with a p-value of 0.001 for breastfeeding difficulties, a p-value of less than 0.001 for walking short distances, and a p-value of 0.003 for sleep disturbances (Table 4).

Table 4. Functional Impairment vs. Pain Severity

Activity Limitation	Mean Pain (Severe Cases)	SD	p-value (Chi-square)
Breastfeeding difficulty	7.9	±1.8	0.001**
Walking difficulty	8.1	±1.6	<0.001***
Sleep disturbance	7.7	±1.9	0.003**

Discussion

The demographic data reveal that a majority of patients (59%) are young adults aged 20 to 35 years, with a mean age of 30.2 ± 6.8 years, indicating a predominantly young population. Furthermore, 89% of the cohort belongs to the middle socioeconomic class, suggesting that socioeconomic status may play a role in health access, disease development, and management within this group. These findings underscore the importance of considering age-related and socioeconomic factors in clinical assessment and public health interventions [17].

The predominance of pain at the incision site (78%) is consistent with the expected nociceptive response following surgical tissue disruption, as the incision represents the primary locus of trauma, nerve irritation, and inflammatory mediator release. The lower proportion of patients reporting pain in the lower abdomen (19%) may reflect visceral pain arising from uterine contraction, manipulation, or referred discomfort due to intra-abdominal tissue handling during cesarean delivery. These findings highlight the multifactorial nature of post-cesarean pain, underscoring the need for multimodal analgesic strategies that address both somatic incisional pain and visceral abdominal components to optimize postoperative recovery [18-20].

The finding that 87% of patients reported moderate to severe pain with a mean NRS score of 6.7 ± 2.3 underscores the substantial burden of post-cesarean pain and highlights the need for robust analgesic strategies. The significantly higher pain scores observed among younger patients (p=0.023) suggest that age-related differences in pain perception, coping mechanisms, or neurophysiological sensitivity may influence postoperative pain intensity, emphasizing the importance of age-tailored pain management approaches [21]. Patients with three or more previous cesarean sections reported significantly higher pain levels compared to those with fewer procedures (p=0.008), likely due to increased tissue scarring, adhesions, and altered nerve pathways from repeated surgical interventions. This finding emphasizes the cumulative impact of multiple cesarean deliveries on postoperative pain and reinforces the importance of tailoring analgesic protocols for women with a history of repeated surgeries [22,23].

The analysis indicates that analgesics were significantly more effective in alleviating stabbing pain compared to aching or burning pain, as evidenced by a p-value of 0.042, suggesting a differential response based on pain quality. This finding highlights the importance of tailored pain management strategies, emphasizing that certain analgesics may be more suitable for specific pain modalities, which can improve therapeutic outcomes in clinical practice [24,25]. The findings demonstrate a significant correlation between increased pain intensity and difficulties in essential activities such as breastfeeding, ambulation, and sleep, with highly significant p-values (<0.001 to 0.003), underscoring the profound impact of pain on quality of life. These results emphasize the need for comprehensive pain management strategies to improve functional capacity and overall well-being in affected patients [26].

Conclusions

In conclusion, the present study demonstrates that post-cesarean pain represents a substantial clinical burden, predominantly affecting young women of middle socioeconomic status. The high prevalence of moderate to severe pain and the predominance of incisional discomfort underscore the multifactorial nature of postoperative pain, necessitating comprehensive, multimodal analgesic approaches. Age-related

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differences and the cumulative impact of repeated cesarean sections further highlight the need for individualized pain management protocols. Given the significant interference of pain with essential daily functions such as breastfeeding, ambulation, and sleep, healthcare providers should prioritize early assessment and tailored interventions. Future strategies should integrate both pharmacological and non-pharmacological modalities, enhance patient education, and address socioeconomic determinants to optimize recovery and improve quality of life.

Conflict of interest. Nil

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