



The Effectiveness of Using Patient-Controlled Analgesia for Managing Post-Cesarean Pain in Maternity Hospitals : Quantitative Study

Olian Saeed Kheder ¹, Yamama Zuhir Abdulkareem ²

¹ College of Nursing, University of Mosul, Mosul, Iraq.

² College of Nursing, University of Mosul, Mosul, Iraq.

ABSTRACT

CORRESPONDING AUTHOR: Olian Saeed Kheder, College of Nursing, University of Mosul, Mosul, Iraq.
Email: olian.24nup14@student.uomosul.edu.iq

Background: patient-controlled analgesia (PCA device) is one of the most efficient method for relieving pain, such as pain result from tissue injury after surgery, labor pain, chronic pain in patient how experience sever pain for a long period such malignant pain in cancer patients.

Objectives: The aim of this study is to assess the effectiveness of PCA device in reliving post cesarean pain at maternity hospitals.

Methodology: quantitative descriptive study was conducted at two hospitals (Al- Salam and Al-Bahthy) located in Mosul city, from 1st November 2025 until 1st march 2026. A non-probability purposive sample consist of 60 women who use PCA device for managing post-cesarean pain. the questionnaire consist of socio-demographic variables, analgesia being used in the device and analgesia mechanism of action, general information related to PCA device, pain intensity after PCA device use women opinion about the device. Data were analysis using SPSS version 27.

Results: The participants age groups distribution were near to be the same, the majority of the participants have bachelor degree 61.7% in term of educational level, 50.0% of the participants were employment and 98.3% of the study participants live in the urban area. pain intensity after cesarean has been reported as intolerable. The pain intensity decrease from 4.57 to 2.53 after one hour of using the device and continuous to decrease.

Conclusion: PCA device decrease the women pain intensity at frequent periods and increase the women ability to perform the required activity such as (breastfeeding, bounding, rest and sleep).

Keywords: cesarean section, patient-controlled analgesia, post cesarean pain.

INTRODUCTION

Patient controlled analgesia :is one of the most common used methods for controlling postoperative pain such as cesarean pain (Motamed, 2022) ,patient controlled analgesia is refers to the pre-programmable device with pre-determined doses of medications through infusion pump that considers several variables such as the initial loading dose, demand dose, lockout interval, and background

infusion rate, the women are directed to push the demand button whenever she have pain. The recommended demand and continuous doses were determined according to the physician order and the type of opioid used in the IV PCA. Therefore, it is important to determine the appropriate variables for IVPCA, as well as the type of medications to be included, according to the expected severity of pain

after surgery (Jun et al., 2023). PCA device has been use since a long time since 1971 in managing acute pain and chronic pain in people with palliative care (Hicks et al., 2025).while cesarean section rate increase globally there is an increase need to find out the most preferred method of managing post cesarean pain due to this pain effect on the mother and her new baby (Thomaidi et al., 2025) ,this device is based on the idea that taking minimum amount of the prescribed analgesic medication at frequent period can be more satisfied to the patients than taking all the prescribed dose once, the limited use of the PCA device after cesarean in our hospitals setting is due to the limited availability of the PCA device because this has been introduce recently in Mosul city for managing post cesarean pain and due to the high price of the device impact the women ability to use it. The process consists of a mini-computer-controlled infusion pump allows the administration of on-demand, continuous, or combined doses of medication (mainly opioid) variations in response to therapy, which helps in control the pain significantly..

AIMS OF THE STUDY

The aim of this study is to assess the effectiveness of PCA device in reliving post cesarean pain at maternity hospitals.

METHODOLOGY

Quantitative descriptive study has been conducted at two hospitals in Mosul city (Al-Salam teaching hospital and Al-Bahthi) from 1st of November 2025 until 1st of march 2026 A non-probability purposive sample of 60 women how perform cesarean section under general anesthesia who use patient-controlled analgesia with meperidine to control post cesarean pain . the questionnaire introduce to the participants at post surgery care unit .the questionnaire is divided into four parts ,part one (socio-demographic characteristic of the participants, part two the analgesia being used and the analgesia

mechanism of action. obstetric and gynecological history of the participants, part three general information regarding to PCA device, part four pain intensity after cesarean and using PCA device, the pain intensity after cesarean has been assessed after cesarean then on frequent period (1,2,4,6,8,10 hours) after using the device overall pain intensity has been assessed and women opinion about the PCA device has been taking after this periods.

RESULTS

The result of the table 1 indicate that the all the participants age are between 20-35, 61.7% of the study participants has bachelor's degree, 50% are employment with 98.3 who live in the urban, in term of economics status 71.7 % of them has moderate economic status, and 63.3% of the study participants are normal weight.

The result of the table 2 shows that major of the participants take meperidine medication in PCA device. 96.7% of the participants took the first dose at post- operative care unit, 66.7 of the participants record that the analgesia start working after only quarter hour and 60.0% of the study sample need another dose after half hour. only 1 participant need another type of analgesic medication the all other participants recommended that the device have high quality of pain controlling.

The result of table 3 indicate that majority of the participants who use PCA device have high level of information about the device works.

The table 4 shows that the women pain intensity has been decrease after the PCA device use on different interval most of the study participants report their pain as mild on the numerical rating scale.

The result of the table 5 indicate that the majority of the participants prefer this method of pain management 93.3 % indicate their preference about using this device in the future and 93.3% of the participants record their preference to recommended this method to other women.

DISCUSSION:

The cesarean section rate increase globally this large increase in the cesarean number put the women at high risk of severe pain after cesarean which impact the women ability to take care of her new baby (Abdullah & Mohammed Ali, 2025). participants age group are between 20-35 this age group are peak fertile rates and higher likelihood of childbearing this align with the finding of the previous research (Eminov & Eminov, 2025). Most of the participants with PCA device has high level of education and 50% of the study participants are employers. majority of the study participants are taking meperidine medication with only 3.3% of them took Diclofenac al-sodium then they change to PCA with meperidine due to un adequate pain control this finding is opposite to the finding of the previous research (Darvish et al., 2013), with 5% of the study participants are using tramadol but they suffer from in adequate pain relieving which lead them to shift to PCA device this finding is opposite to the finding of the previous research (Otte et al., 2025). the women pain intensity after cesarean has been reported as intolerable by major of the participants 34 in average of 60 participants, pain is the major concern after cesarean because it's performance effects on the women and her new baby (Sangkum et al., 2024) the pain intensity after using PCA device has been decrease from 4.57 to 2.55 this align with the finding of previous research (Vishnu Narayanan et al., 2024), PCA has gained acceptance among women despite the lack of evidence supporting clinical advantages from previous reviews. Low quality evidence demonstrates that women report greater satisfaction with, and in general prefer, PCA. While the reasons for this preference are unclear, they may be due to increase in the autonomy of pain controlling through the use of this device and rapid administration of opioid without delay. Most of the women report low level of pain after PCA device use, most of the participants report increase in the autonomy in their ability to take care of their baby, in addition to

increase the new mother ability to rest, sleep and enhance women early mobility and recovery with less side effects and less amount of analgesia consumption this align with the finding of previous research (Jun et al., 2023) (Hicks et al., 2025).

CONCLUSIONS:

PCA device decrease the women pain intensity at frequent periods and increase the women ability to perform the required activity such as (breastfeeding, bounding, rest and sleep).

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TABLES:

Table (1): distribution of the socio-demographic variables of the study samples

Variable	Class	PCA Participants	No.	%
Age	20-24 year	PCA	18	30.0
	25-30 year	PCA	21	35.0
	31-35 year	PCA	21	35.0
Educational level	Illiterate	PCA	0	0.0
	Read and write	PCA	0	0.0
	Primary	PCA	7	11.7
	Secondary	PCA	8	13.3
	Bachelor	PCA	37	61.7
	Other	PCA	8	13.3
Occupation	Employment	PCA	30	50.0
	Student	PCA	3	6.7
	Housewife	PCA	27	45.0
Residence	Urban	PCA	59	98.3
	Rural	PCA	1	1.7
BMI	Under weight	PCA	1	1.7
	Normal weight	PCA	38	63.3
	Over weight	PCA	18	30.0
	Obese	PCA	3	5.0
Economic status	Low(<500)	PCA	7	11.7
	Moderate(500-1,000,000)	PCA	43	71.7
	High(>1,000,000)	PCA	10	16.7

Table (2): The analgesia used in the device and analgesia mechanism of action

Variable	Sub variable		No.	%
Which analgesic medication was used for you after cesarean	Paracetamol	PCA	0	0.0
	Diclofenac sodium	PCA	2	3.3
	Pethidine (meperidine)	PCA	55	91.7
	Tramadol	PCA	3	5.0
What was the rout used to administer the analgesic medication	Intramuscular	PCA	0	0.0
	Intravenous	PCA	60	100
	Oral	PCA	0	0.0
	Other	PCA	0	0.0
When you take the first dose of analgesic medication	At operation room	PCA	0	0.0
	At post -operative care unit	PCA	58	96.7
	At ward	PCA	2	3.3
	Other	PCA	0	0.0
When did the analgesia start working	Directly	PCA	5	8.3
	After quarter hour	PCA	40	66.7
	After half hour	PCA	10	16.7
	After one hour	PCA	5	8.3
When you need the second dose of PCA medication	After half hour	PCA	36	60.0
	After 1 hour	PCA	24	40.0
	After 2 hours	PCA	0	0.0
	After 3 hours or more	PCA	0	0.0
Did you need another analgesia	Yes	PCA	1	1.7

Table (3): Assess the women information regarding to PCA device work

Variable	Sub variable	%	No.	Fisher's exact test (P-value)
Related to how the device works	What the lockout interval mean	Correct	38	0.006
		In correct	22	
	Does the device give analgesia when pressing on the button when the device is on lock-out interval	Correct	37	0.017
		In correct	23	
	Is it possible for the women to take an overdose of analgesia while using the device	Correct	37	0.017
		In correct	23	
	What is needed to use this device	Correct	41	0.000
		In correct	19	
	When will the device stop working	Correct	35	0.100
		In correct	25	

Question	Group	No pain	mild pain	moderate	sever pain	Intolerable	Mean	St.d	T (p-value)
Rate your pain intensity after surgery	PCA	0	0	0	26	34	4.57	0.50	1.00
Rate your pain intensity (after 1 hour of analgesia use)	PCA	2	29	23	6	0	2.55	0.72	0.000
Rate your pain intensity (after 2 hour of analgesia use)	PCA	2	45	12	0	0	2.20	0.51	0.000
Rate your pain intensity (after 4 hours of analgesia use)	PCA	2	51	6	1	0	2.10	0.44	0.000
Rate your pain intensity (after 6 hours of analgesia use)	PCA	1	52	6	1	0	2.12	0.42	0.000
Rate your pain intensity (after 8 hours of analgesia use)	PCA	5	49	5	1	0	2.03	0.30	0.000
Rate your pain intensity (after 10 hours of analgesia use)	PCA	8	46	5	1	0	2.51	0.31	0.000
Overall pain intensity							2.53	0.35	
No pain (0 - 1), mild pain (1.1 - 2), moderate pain (2.1 - 3), sever pain (3.1 - 4), intolerable pain (4.1 - 5).									

Table (4): the mother's opinion related to the use of the PCA device:

Variable	Sub variable	Group		No.	%
Related to mothers' opinions	Would you use this method in the future	PCA method	Yes	56	93.3
		PCA method	No	4	6.7
	Would you recommend this method to other women	PCA method	Yes	56	93.3
		PCA method	No	4	6.7