

## Maternal Satisfaction and Postoperative Pain Severity in Mothers Who undergo Caesarean Section under General and Spinal Anesthesia in Gandhi Memorial Hospital, Addis Ababa, 2014

Review Article

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### Abstract

**Background:** The main purpose of health care system should be adequate and appropriate treatment and health care management of the patients. Body of evidence revealed that maternal satisfaction and postoperative pain control were better in mothers who gave birth under spinal anesthesia than general anesthesia. However evidences are lacking locally, hence, this study was aimed to compare maternal satisfaction and postoperative pain severity in mothers who undergo caesarean section under general anesthesia and spinal anesthesia.

**Methods:** After approval from institutional review Board (IRB), we studied 120 consecutive ASAI-II mothers who gave birth with cesarean section under spinal and General Anesthesia in Gandhi Memorial Hospital from august, 2013-July, 2014. Prospective effectiveness study design was employed. Patients were randomly allocated in two equal groups 60 patients each by lottery method after informed consent. Mothers with spinal Anesthesia group was preloaded with 1-1.5 litres of crystalloids before spinal Anesthesia and Spinal Anesthesia was given with 2-2.5ml of 0.5% bupivacaine in sitting position with strict aseptic technique. General Anesthesia was induced with rapid sequence induction with 3.5mg/kg of thiopental and 1-2mg/kg succinylcholine. General Anesthesia was maintained with 1-1.5v% halothane, 0.1mg/kg of vecronium and 1.5-2mg/kg of Pethidine. In the postoperative period, pain severity was measured at 2, 6 and 24hrs with Visual Analog Score (VAS) along with first analgesic request and satisfaction was assessed with Likert scale.

**Results:** The total response rate of the study was 120 (100 %). The study revealed that types of anesthesia were independent predictor of maternal postoperative pain severity. Postoperative pain severity is greater than two times in Mothers who underwent caesarean section under general anesthesia than spinal anesthesia [AOR=2.4, 95% CI=1.03, 5.6]. Maternal satisfaction had no significant association with types of anesthesia by independent chi square test (P>0.078). The median time of first analgesic request in mothers underwent caesarean section under spinal anesthesia and general anesthesia was 93±4.2 and 80±3.9 minutes respectively.

The mean intraoperative Systolic Blood pressure was lower in Anesthesia group as compared to general Anesthesia group unlike estimated blood loss which was higher in General Anesthesia group.

**Conclusion:** The median time of first analgesic request was better in spinal analgesia compared to general anesthesia. However, Spinal anesthesia was associated with high incidence of hypotension. Appropriate perioperative patient care by anesthetist and provision of drugs for treatment of pain and hypotension were recommended.

**Keywords:** Satisfaction; Maternal; Visual Analog Score; Addis Ababa; Ethiopia.

### Introduction

Caesarean Section is the most common obstetric surgery in the world [1, 2]. The rate of caesarean section increases dramatically in middle and high income countries [1-18]. However, the rate of caesarean section is still low in developing countries. According to Demographic Health Survey, 1990-2014, the global caesarean

section rate is 18.6%. The average caesarean section rate in Africa is 7.3%, the highest Egypt (51.8%) and 0.6% for Ethiopia which is very low. But the national caesarean section rate in Ethiopia varies from 2%-27% [6].

Maternal Satisfaction and postoperative pain severity after caesarean section are one of the main aspect of obstetric care

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which gets insight worldwide. If maternal satisfaction and postoperative pain severity are reliably measured, they can provide a good feedback on the quality of health care provision for medical specialties like Anesthesiology [19]. Therefore, it is very important to address which types of anesthesia provide better client satisfaction and postoperative management.

A study conducted in Nigeria showed that the mean maternal satisfaction on Visual analog scale was higher in regional Anesthesia as compared to General Anesthesia,  $9.0 \pm 1.5$  vs  $2.6 \pm 0.7$  respectively [19].

Study from Colombia showed that Postoperative pain is less in patients with regional anesthesia, because the time for the first analgesic request is longer (690 min versus 190 min in the general anesthesia group) and the VAS scores for pain are lower (54 mm vs. 72 mm [15].

Another study conducted in Rawalpindi indicated rate of maternal satisfaction and postoperative pain control were better in mothers underwent cesarean section under spinal than general anesthesia [14].

A Study conducted in Croatia showed that first analgesic request and Visual Analog score in 24hrs period was extended in mothers undergoes cesarean section under spinal anesthesia than general anesthesia. Similar finding was found in a study conducted in Turkey where first analgesic request was extended in spinal anaesthesia when compared to general anesthesia,  $185 \pm 340$   $340 \pm 401$  respectively [1].

However, a systemic review of the Cochrane Central Register of Controlled Trials showed that maternal satisfaction was similar in either of Anesthesia techniques in mothers underwent cesarean section unlike postoperative pain severity which is better in mothers who gave birth under spinal anesthesia than general anesthesia [13].

Access to quality Health care in Ethiopia did not meet the increments in the incidences and complications of anesthesia. Most of these patients had not been well addressed at large. As a consequence, there was increase the rate and economic burden over all. Proper management is crucial to keep the illness under control and taking the necessary action to protect their lives, health and well-being. Yet the dynamic nature of the problem exacerbate by lack of studies. Hence this study aimed to compare maternal satisfaction and postoperative pain severity in mothers who undergo caesarean section under general anesthesia and spinal anesthesia.

## Methodology

### Study setting and participants

After approval from institutional review Board (IRB), we studied 120 consecutive ASA I and II mothers who gave birth with cesarean section under spinal and General Anesthesia in Gandhi Memorial Hospital from august, 2013-July, 2014. Prospective effectiveness study design was employed. Maternal refusal to participate, fetal distress, mother who are ASA III and above were the exclusion criteria. Sample size was calculated with two

population proportion formulas by considering the following assumptions. It was determined by Level of significance (0.05), Power (0.80) and proportion of maternal satisfaction on VAS from previous study conducted in Rawalpindi was 31% and 92% with general and spinal anesthesia respectively [14], which results in the sample size of 110. Adding 10 % for allowance of non-response rate, the final sample size became 120 and assuming equal sample size for two groups.

Patients were randomly allocated in two equal groups 60 patients each by lottery method after obtaining informed consent. Preoperative evaluation in both study groups were conducted with a detailed history, physical examination, and review of antenatal care, including laboratory investigations such as the complete blood cell count, renal and liver function tests, and coagulation profile. Mothers with spinal Anesthesia group was preloaded with 1-1.5 litres of crystalloids before spinal Anesthesia. Spinal Anesthesia was given with 2.5-3ml (12.5-15mg) of 0.5% bupivacaine in sitting position with strict aseptic technique. General Anesthesia was induced with rapid sequence induction with 3.5mg/kg of thiopental and 1-2mg/kg succinylcholine. General Anesthesia was maintained with 0.75-1v% halothane, 0.1mg/kg of vecronium and 1.5-2mg/kg of Pethdine. Patients with general anesthesia were received Pethdine analgesics throughout the procedure unlike spinal who didn't take any Adjuvants.

In the postoperative period, pain severity was measured at 2, 6 and 24hrs with Visual Analog Score (VAS) along with first analgesic request and satisfaction was assessed with Likert scale.

### Data collection method and measurement of variables

Data were collected using a pre-tested structured questionnaire. The trained data collectors manage the data in intraoperative and postoperative period and were not responsible for the anesthetic management for that particular subject. After having informed consent from the mothers, pain severity in 2, 6, and 24hrs with visual analogue score were assessed.

Intraoperatively, blood pressure was measured every three minutes and blood loss was estimated by counting the soaked packs, gauze and blood on the surgical field and suction bottle.

Satisfaction level was measured using a five point scale ranging from very satisfied to very unsatisfied and clients with satisfaction scale of very unsatisfied, unsatisfied and no opinion were considered unsatisfied and the other were taken as satisfied. The reliability of pain and satisfaction scale was determined with Cronbach's Alpha which was 0.755 and 0.72 respectively.

### Data processing and analysis

Data were entered and analyzed by using SPSS version 16. Descriptive statistics were run to see the overall distribution of the study subjects with regard to the variables under study. Chi square test and odds ratio were used to determine the association between hypothesized independent and dependent variables. Finally, multivariate analysis was used to control possible confounders and identify independent predictor of postoperative pain severity and maternal satisfaction. A Significance level was determined at  $\alpha < 0.05$  to decide the significance of statistical tests.

## Results

### Socio-demographic characteristics

The total response rate of the study was 120 (100 %). The mean age of mothers were 28 (SD  $\pm$  5) and 27 (SD  $\pm$  5) for spinal and general groups respectively. The mean body mass index of mothers were comparable among each groups, which accounts 24.3 (SD  $\pm$  4.2) and 24.2 (SD  $\pm$  4.3) for spinal and general groups respectively. The majority of cases were house wife (61.7%), Orthodox Christian followers (67.5%) and Amhara ethnic group (45.8%) by ethnicity. In terms of procedures all cases were performed by residents and majority of cases (90%) were managed by BSc Anesthetists who are generic and nurse Anesthetists trained four years and three years respectively (Table 1).

### Preoperative related history of study participants

Among the total cases, majority of cases (65%) were emergencies patients that underwent caesarean section under general and spinal anesthesia. About 57.5% of cases had no history of previous caesarean section. The preoperative hematocrit (Hct) was 38.6 (SD  $\pm$  3.4) and 39.6 (SD  $\pm$  4.8) for spinal and general respectively (Table 2).

### Intraoperative outcomes of study participants

Intraoperative maternal systolic blood pressure values were summarized in Table -3. There were a significant mean difference between the two groups on the mean Intraoperative systolic blood pressure. More women who received spinal anesthesia had lower intraoperative systolic blood pressure when compared to women who received general anesthesia ( $P < 0.05$ ). There was a significant mean difference on mean maternal total fluid requirement when spinal anesthesia is compared with general Anesthesia, 2075  $\pm$  595 milliliter VS 1858  $\pm$  653 milliliter respectively, ( $P = 0.0148$ ).

### Postoperative maternal outcomes among the study cases

The median time of first analgesic request was extended in spinal anesthesia group cases (93  $\pm$  4.2) minutes than general anesthesia groups 80 (SD  $\pm$  3.9) minutes. The first time analgesic request mean difference was significant with Mann-Whitney U test at ( $p < 0.0005$ ).

There was no significant mean difference between spinal and general groups for postoperative pain severity assessment on Visual Analogue Score (VAS) at 2hrs,  $P > 0.054$ . However, there were mean differences between spinal and general groups for postoperative pain severity assessment on VAS of 6 and 24hrs,  $P < 0.0001$  and  $P < 0.005$  respectively (Figure-1).

### Maternal satisfaction

The maternal satisfaction didn't show any significant association with the fisher's exact test ( $P > 0.266$ ) (Figure-2).

### Factors affecting maternal satisfaction and postoperative pain severity

Crude analysis of socio-demographic variables on binary logistic regression showed no significant association with maternal satisfaction and postoperative pain severity, ( $P > 0.05$ ). Among the preoperative variables, only types of anesthesia was significantly associated with postoperative pain severity after six hours at  $P < 0.05$ . Among the intraoperative variables, the mean intraoperative systolic and diastolic Blood Pressure, total Intravenous fluid requirement and vasopressor requirement were not significantly associated with maternal satisfaction and postoperative pain severity at  $P > 0.05$ .

Multivariate analysis involving all associated variables was performed to identify independent predictors of maternal satisfaction and postoperative pain severity. Therefore, types of

**Table 1. Socio - Demographic Characteristics of Patients who underwent C/S under general and spinal anesthesia in Gandhi Memorial Hospital, Addis Ababa, and July 2014.**

Variable	Number [%]	Number [%]	Total
	General	spinal	
Age (Mean $\pm$ SD)	27 $\pm$ 5	28 $\pm$ 5	
15-19	2 [3.3]	1 [1.7]	3 [2.5]
20-24	18 [30]	15 [25]	33 [27.5]
25-29	20 [33.3]	26 [43.3]	46 [38.3]
30-34	14 [23.3]	11 [18.3]	25 [20.8]
35-39	6 [10]	6 [10]	12 [10]
40-45	0 [0]	1 [1.7]	1 [0.8]
BMI (Mean $\pm$ SD)			
<18.5	1 [1.7]	1 [1.6]	2 [1.6]
18.5-24.9	33 [55]	40 [66.7]	63 [52.5]
25-29	20 [33.3]	11 [18.3]	31 [51.7]
30-35	6 [10]	6 [10]	12 [10]
>35	0 [0]	2 [3.3]	2 [1.67]

BMI: Body Mass Index; SD: standard deviation

**Table 2. Preoperative characteristics of patients who underwent C/S under general and spinal anesthesia in Gandhi Memorial Hospital, Addis Ababa, July 2014.**

Variables	Variables	Number [%]	Total
ASA	General	Spinal	
ASAI	51 [85]	53 [88.3]	104 [86.7]
ASAI	9 [15]	7 [11.7]	16 [13.3]
<b>Urgency of caesarean section</b>			
Elective	21 [35]	21 [35]	42 [35]
Emergency	39 [65]	39 [65]	78 [65]
<b>Previous caesarean section</b>			
Yes	23 [38.3]	28 [46.7]	51 [42.5]
No	37 [61.7]	32 [53.3]	69 [57.5]
<b>Preoperative Hct</b>			
Mean ±SD	38.6 ± 3.4	39.6±4.8	
<b>Mean preoperative systolic BP</b>			
Mean±SD	129 ± 12.5	128 ± 12.6	

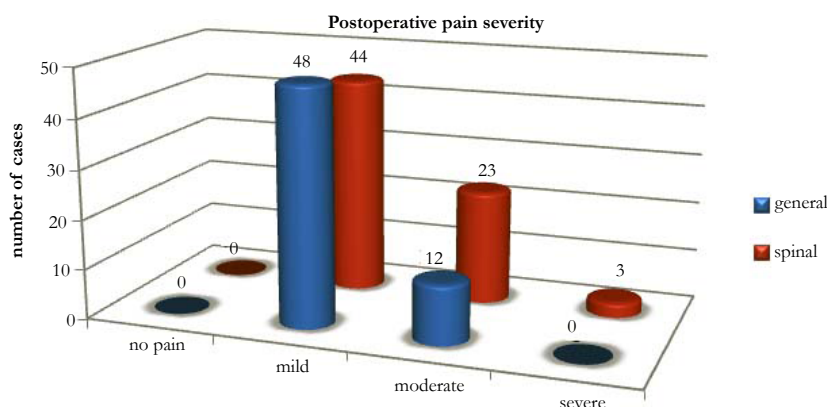
ASA: American Society of Anesthesiology; BP: Blood Pressure; Hct: hematocrit.

**Table 3. Intraoperative maternal systolic blood Pressure (mmHg).**

Variables	spinal Anesthesia (n=100)	general anesthesia (n=100)	P value
Base line	122.10 ± 9.13	122.05 ± 14	0.798
3 <sup>rd</sup> minute	117.60 ± 12.23	119.53 ± 14	0.301
6 <sup>th</sup> minute	102.20 ± 11.59	114.35 ± 19.78	0.000*
9 <sup>th</sup> minute	97.8 ± 11.69	111.40 ± 19.12	0.000*
12 <sup>th</sup> minute	100.32 ± 9.44	122.55 ± 14.95	0.000*
15 <sup>th</sup> minute	103 ± 20.72	115.95 ± 12.06	0.000*
PACU entry	116.65 ± 14.98	117.19 ± 10.40	0.768

\* Significant at P < 0.05; Data were expressed as mean ± SD, PACU: Post Anesthetic Care Unit.

**Figure 1. Comparison of 6 hr regular pain assessment in mother underwent C/s under spinal and general anesthesia in Gandhi Memorial Hospital, Addis Ababa, 2014.**



anesthesia was the independent predictor of postoperative pain severity after six hours (AOR=2.4, 95% CI= [1.03, 5.6]).

**Discussion**

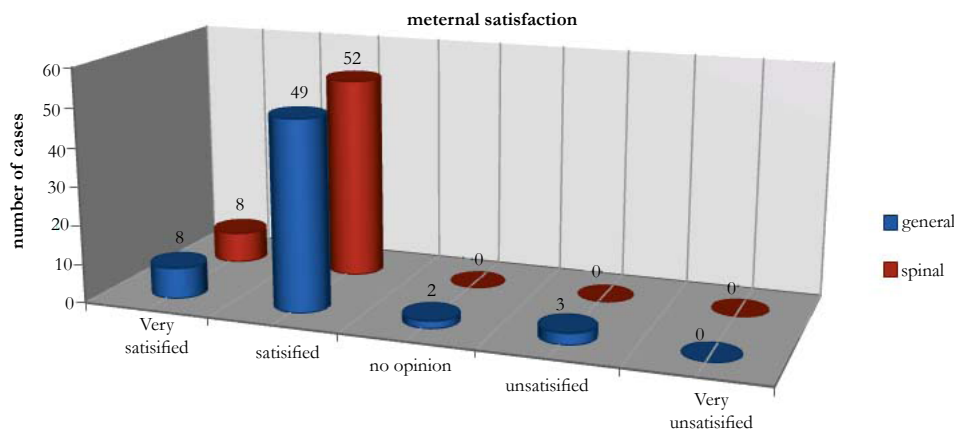
This study compared maternal satisfaction and postoperative pain severity in mothers who underwent C/S under General and spinal

Anesthesia in Gandhi Memorial Hospital. The factors affecting maternal satisfaction were identified in literatures.

One study [19] noted that nausea or vomiting, postoperative pain and failure to breast fed babies immediately after caesarean section were the factors for low maternal satisfaction.

In this study, the median time of first analgesic request in mothers

**Figure 2. Satisfaction level of patients who underwent C/S under spinal vs general anesthesia in Gandhi memorial hospital, Addis Ababa, 2014.**



underwent C/S under spinal anesthesia ( $93 \pm 4.2$ ) minutes were extended when compared to general anesthesia group ( $80 \pm 3.9$ ) minutes.

Three studies [1, 15, 17] reported on first analgesic request and noted that the first analgesic request was extended in mothers receiving spinal anesthesia when compared to mothers induced with general Anesthesia, ( $159 \pm 39$  vs  $119 \pm 44$ ), 690 min versus 190 min and  $185 \pm 340$   $340 \pm 401$  respectively.

This study finding on first analgesic request is in line with the findings of the above three studies. However, the median times in this study were shorter compared to [1] study findings and this might be due to patient variation, intraoperative drugs durations of action (analgesics, local anesthetics) and data collection bias.

Pain severity assessment on VAS after two hours postoperatively was not significant on types of anesthesia administered. However, pain severity assessment on VAS after six hours ( $41 \pm 15$  vs  $32 \pm 14$  mm) and twenty four hours ( $20 \pm 12$  vs  $13.81$  mm) were significant in general and spinal at  $P < 0.01$  and  $P < 0.02$  respectively.

Two studies [1, 18] showed that postoperative pain severity is worse in mothers underwent cesarean section under General Anesthesia compared to Regional Anesthesia which was in line with this study finding where the postoperative pain was lower in mothers with regional anesthesia and the VAS score was 54mm vs 72mm respectively.

One study [17] showed that postoperative pain in the first hour with verbal rating scale didn't show any significant difference,  $6.7 \pm 1.9$   $6.3 \pm 2.3$  respectively which is in line with this study finding.

Three studies [4, 16, 18] showed that maternal satisfaction was higher in mothers with spinal anesthesia when compared to general anesthesia, 75% vs 60% respectively.

One study [4] noted that spinal Anesthesia is associated with high rate of maternal satisfaction and less intraoperative and postoperative Anesthesia related complications. However, this study didn't show significant association on maternal satisfaction between the groups. This discrepancy might be due to maternal knowledge, attitude towards anesthesia, hospital set up and data

collection bias.

In this study, there were a significant mean difference between the two groups regarding intraoperative mean systolic and diastolic blood pressure  $t(118) = 9.19$ , vs  $t(118) = 8.1$  at  $p < 0.0005$ , two tailed for systolic and diastolic blood pressure respectively.

## Conclusion

Severity of pain assessment on VAS after six and twenty four hours postoperatively was higher in general anesthesia. Moreover, there was no significant difference in General and spinal anesthesia on maternal satisfaction level.

Incidence of lower mean intraoperative systolic and diastolic pressure was associated with spinal anesthesia. Even though the intraoperative blood pressure of general anesthesia groups was normal, estimated blood loss was higher than spinal anesthesia.

Generally, it is not possible to say spinal anesthesia is superior over general on maternal satisfaction and postoperative analgesia. Therefore, further research with clinical trial should be conducted.

## Limitation of the study

This study had small sample size and short duration of follow up from which it is difficult to give generalization on safety of types of anesthesia for maternal satisfaction. Further study with large sample size is required.

## Authors' contribution

Semagn Mekonnen conceived and designed the study and collected data in the field, performed analysis, interpretation of data, and draft the manuscript. Akine Eshete involved in the design, analysis, and interpretation of data and the critical review of the manuscript.

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