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# Measurement of the Outcome of Low Dose of 0.5% Bupivacaine Heavy in Spinal Anesthesia during Lower Segment Cesarean Section (LSCS)

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***Authors' contributions***

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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## ABSTRACT

**Background:** Spinal anesthesia for lower segment cesarean sections is not without its challenges for anesthesiologists, such as severe hypotension from too much bupivacaine or insufficient anesthetic from too little.

**Objective:** In this study our main goal is to measure the efficacy of low dose of 0.5% Bupivacaine in spinal anesthesia during lower segment cesarean section.

**Methods:** This investigation was conducted at a tertiary medical institution as a cross-sectional comparison study between January 2020 and January 2021, where one hundred pregnant ladies participated.

Patients who volunteered to take part in the trial were randomly split into two groups: Group A got an intrathecal injection of 3 mL of bupivacaine 0.5% (n=50), while Group B received an intrathecal injection of 2.5 mL of bupivacaine 0.5% (n=50). Tossing a coin was used as a randomizer. The patient's heart rate, blood pressure, and oxygen saturation were taken before receiving anesthesia. Each patient underwent a subarachnoid block (SAB) using a 25-gauge Quincke spinal needle using a midline route after being preloaded with 800 ml to 1000 ml of isotonic intravenous fluid. The entire process of injecting the hyperbaric bupivacaine took no more than twenty to thirty seconds.

The needle's bevel was aligned with the dura's fibers. All of the data was entered into SPSS-25 after being coded. Statisticians used both descriptive and inferential methods. Percentages, means, standard deviations, graphs, tables, figures, and inferential statistics were all part of the descriptive statistics.

**Results:** Most participants were between the ages of 26 and 33, and between 60% and 70% were multiparous over the course of the research.

In both groups, all patients were able to reach a suitable sensory level for surgical intervention, as shown below. However, ephedrine was advised for 89% of Group B patients to help stabilize their blood pressure, whereas only 19% of Group A patients needed ephedrine. There were no significant variations in fluid consumption ($P > 0.05$) between Groups A and C (894 126 mL vs. 720 212 mL). The newborn's Apgar score was 9 at 1 minutes and 10 at 5 minutes. Also, although 19% of people in group A reported feeling sick, 23% of people in group B did.

**Conclusion:** A lower segment cesarean section performed under an optimal dose of hyperbaric bupivacaine in the spinal anesthesia will produce excellent surgical conditions with little hypotension, in contrast to the low dose. Improved results require more research..


*Keywords: Bupivacaine; spinal anesthesia; lower segment cesarean section (LSCS).*

## 1. INTRODUCTION

These days, spinal anesthesia is frequently used instead of general anesthetic for most cesarean deliveries.

Just as concerns have been raised about the reasons and potential solutions to the opioid crisis, so too has Egypt's fast rising C-section rate.

Prior research has demonstrated that 56–74 percent of individuals have hypotension following intrathecal bupivacaine injection [1-3].

Because spinal anesthetic encourages sympathectomy, which lowers blood pressure, several studies have been conducted to find ways to reduce the quantity of bupivacaine used to treat this condition.

All of these studies, however, found that decreasing the dose resulted in a lower block level, which in turn led to an unpleasant surgical experience and increased pain for the patient.

Furthermore, it has no influence on the occurrence of hypotension, indicating that the cause of hypotension is multifaceted and may be significantly linked to uterine compression and increased intra abdominal pressure [4-6].

Using the second notion, that the gravid uterus causes significant vascular compression, several researchers have studied the impact of sitting on hypotension [7].

The primary purpose of this research was to evaluate the safety and effectiveness of 0.5% Bupivacaine spinal anesthetic for lower segment cesarean delivery.

### 1.1 Objective

To compare with optimum dose,the efficacy of low dose of 0.5% Bupivacaine heavy in spinal anesthesia during lower segment cesarean section.

## 2. METHODOLOGY

From the beginning of 2020 to the beginning of 2021, a total of one hundred pregnant women participated in a cross-sectional comparison research at a Tertiary medical College.

Patients who consented to take part in the trial were randomly assigned to either Group A (receiving 3 mL of 0.5% bupivacaine intrathecally, n=50) or Group B (receiving 2.5 mL of bupivacaine intrathecally, n=50) throughout the duration of the study.

We flipped coins to determine the order of events. The patient's heart rate, blood pressure, and oxygen saturation were all taken before receiving anesthesia.

Each patient was preloaded with 800 ml to 1000 ml of isotonic intravenous fluid before receiving SAB using a 25 gauge Quincke spinal needle inserted through a midline incision. Hyperbaric Bupivacaine was injected without barbotage in 20-30 seconds. The needle's bevel was perpendicular to the dura mater. Bevel was turned directly cephalad before local anesthetic (L.A.) injection.

Patients were supine with the wedge beneath their right buttock after receiving a LA injection. A 25-gauge needle was used to pinprick the skin at the anterior axillary line on both sides to determine the degree of sensory blockage.

The level of motor block was determined by observing how the patient moved their legs (0 = able to rise on their own with their legs extended, 1 = unable to flex their knee, 2 = unable to flex their ankle, 3 = complete block).

Blocking to at least T6 is considered sufficient. The obtained information was entered into SPSS-25 and coded. The data was analyzed using both descriptive and inferential statistics. Percentages, means, and standard deviations, as well as graphs, tables, figures, and inferential statistics, were all used as descriptive measures.

## 3. RESULTS

In Fig. 1 shows age distribution of the study group where majority were belonging to 26-33 years age group, 60%. Followed by 25% belong to 18-25 years group and 15% belong to 34-39 years age group. The following figure is given below in detail:

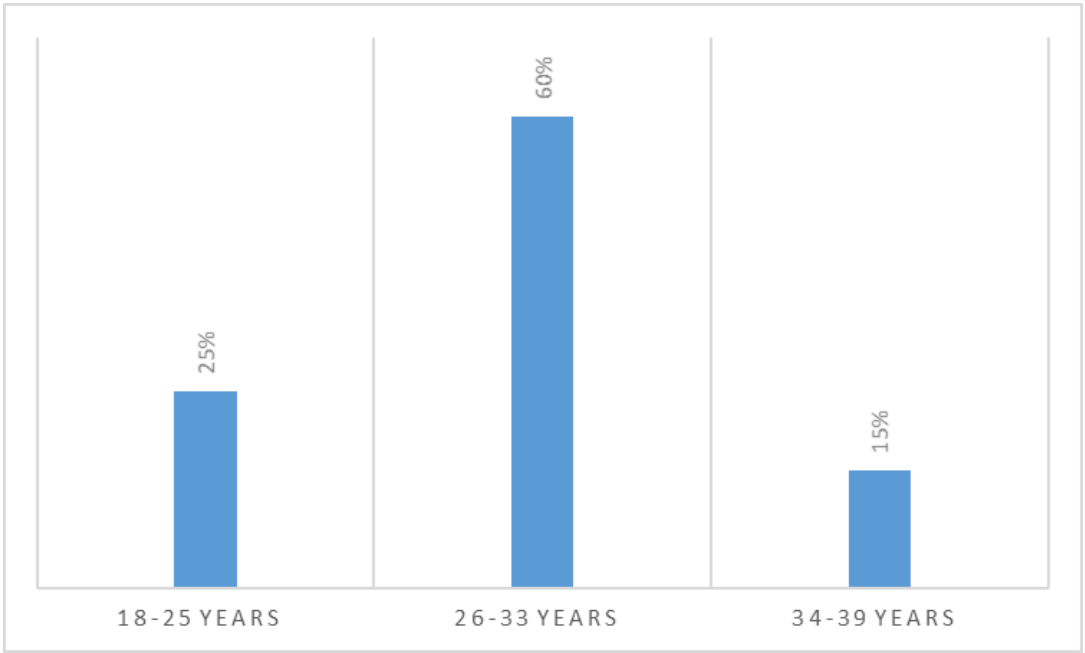


**Fig. 1. Age distribution of the patients**

In Table 1 shows demographic status of the patients where majority were literate, 70% and 72% were housewife. The following table is given below in detail.

In Fig. 2 shows parity distribution of the study group where the peak incidence was among the multiparous (70%). The following figure is given below in detail.

In Table 2 shows Sensory level among two group where the satisfactory surgical sensory level was achieved in all cases in both groups with the following distribution. However, 90% cases were at T4 level, and only 10% cases were at T2 level in Group B while all cases in Group A were at the T4 level. The following table is given below in detail.

In Table 3 shows distribution of the groups according to clinical and Neurologic and Adaptive Capacity Score where just 19% of Group A patients needed ephedrine to help regulate their blood pressure, 89% of Group B patients did.

**Table 1. Demographic status of the patients**

| **Mean BMI** | **31.51±4.9** |
|---|---|
| Educational status | **%** |
| Literate | 70% |
| Illiterate | 30% |
| Occupational status | **%** |
| Housewife | 72% |
| Service holder | 18% |
| Student | 10% |
| Monthly family income (monthly) | **%** |
| <10000 Tk | 20% |
| 10001-20000 Tk | 50% |
| >20000 Tk | 30% |

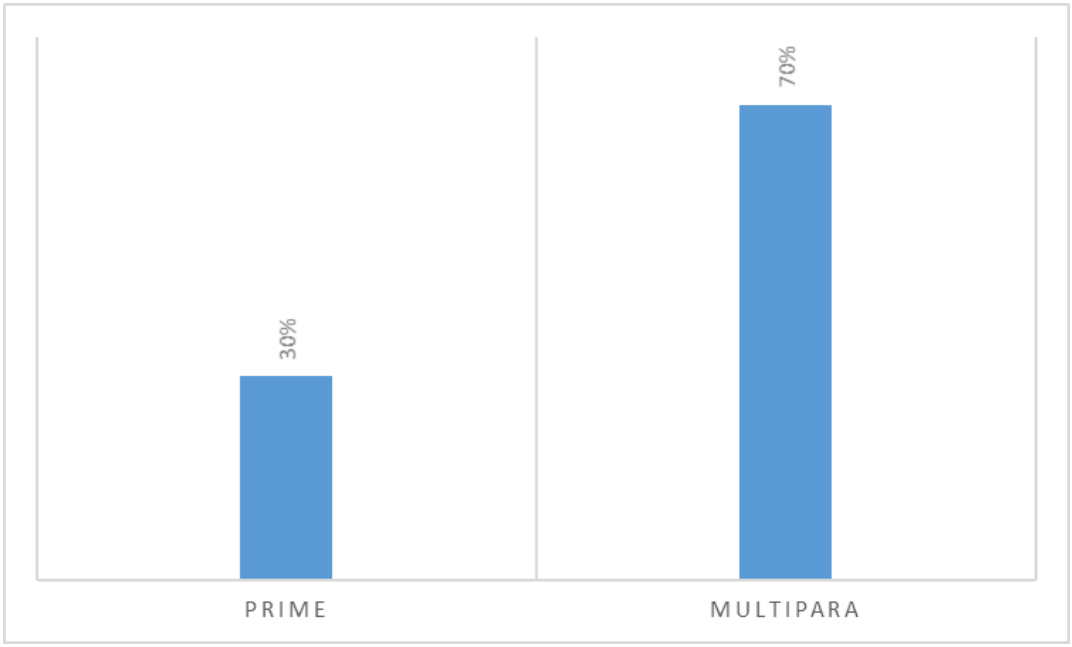


**Fig. 2. Parity in patients with ectopic pregnancy**

**Table 2. Sensory level among two group**

| **Sensory level** | **Group A, %** | **Group B, %** |
|---|---|---|
| T2 | 0% | 10% |
| T4 | 100% | 90% |

**Table 3. Distribution of the groups according to clinical and Neurologic and adaptive capacity score**

| | Group A, % | Group B, % | P value |
|---|---|---|---|
| Ephedrine | 19% | 89% | 0.001 |
| Fluids (mL) | 894 ± 126 | 720±212 | >0.05 |
| Apgar at 1 min | (8-9) | (9-9) | >0.05 |
| Apgar at 5 min 10 | (10-10) | (9-10) | >0.05 |

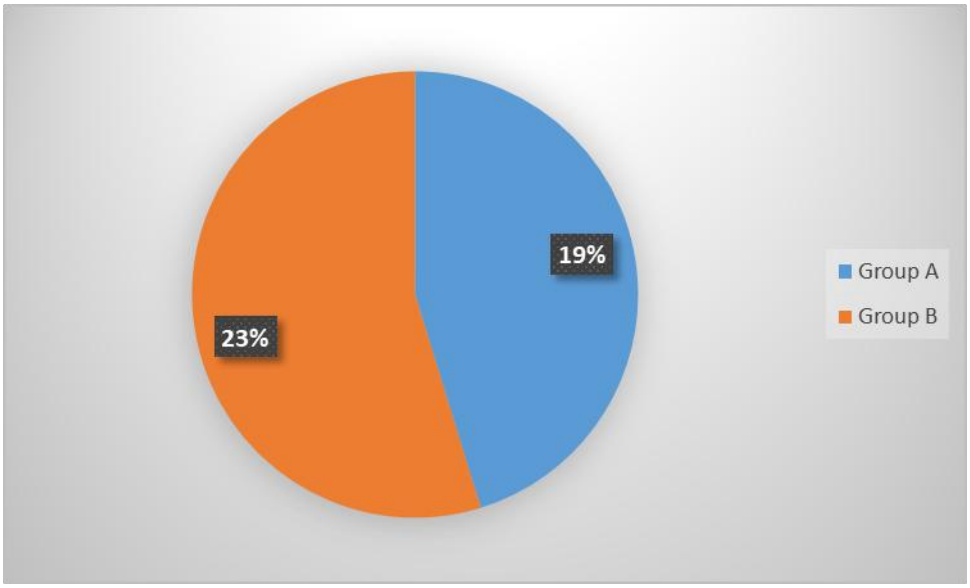


**Fig. 3. Distribution of the study group according to clinical symptom**

The consumption of fluids was not different between Group A (894 126 mL) and Group C (720 212 mL; P > 0.05). The Apgar score for newborns was 9 in the first minute and 10 after the next five minutes.The following table is given above in detail.

In Fig. 3 shows distribution of the study group according to clinical symptom where in group A nausea and vomiting cases were seen in 19 % cases whereas in group B it was 23%. The following table is given above in detail:

## 4. DISCUSSION

Numerous research efforts have focused on decreasing bupivacaine volume or dosage in the hopes of resolving hypotension [7,8].

According to one study, the ED 95 of bupivacaine, researchers discovered that 11.2 mg is sufficient to produce a good sensory level and pain-free operation.

They used a logistic regression model and discovered that the ED50 was 7.6 mg [9]. Most doctors prescribe hyperbaric bupivacaine at a dosage between 7.5 and 15 milligrams.

Those who choose for the lower dose in an effort to reduce the prevalence of side effects like hypotension or nausea have paid the price in the form of dissatisfied patients and abdominal discomfort.

Research found that individuals receiving dosages of 10 mg were more likely to experience an insufficient surgical sensory block [10,11].

Similarly, a retrospective research comparing 8 mg and 10 mg in 1252 patients indicated that the 8 mg group had a greater probability of conversion to general anesthesia (the relative risk was 4.88 [95% CI 1.41-16.85]) [12].

Two researchers analyzed fifteen studies and came to the conclusion that dosages of 8 mg or fewer lead to an increase in the need for analgesics, such as a higher risk of conversion to general anesthesia, and a decrease in hypotension and vomiting [13,14].

We employed high dosages in this study to get around this problem, as it is obvious that modest doses won't work.

However, proponents of the "standard dosage" or "low dose in a big volume" approach would argue that these are the best options [15].

In our study, we found that just 19% of patients in Group A were recommended to take ephedrine to help control their blood pressure, whereas 89% of patients in Group B were given this recommendation.

Fluid consumption was similar between groups, with Group A taking in 894 126 mL and Group B taking in 720 212 mL ($P > 0.05$). In the first minute of life, the Apgar score for the newborn was 9, and by the fifth minute, it had reached [10].

The second group was dissatisfied with their experience with isobaric bupivacaine since no differences were seen between the two drugs (isobaric and hyperbaric) in terms of hemodynamic and the incidence of hypotension. That was corroborated by other research, so there's that [16].

## 5. CONCLUSION

We may state that, unlike low dose, an optimum dose of hyperbaric bupivacaine in the spinal anesthesia for a cesarean delivery will result in great surgical conditions with minimum hypotension. Further investigation is needed for improved outcome.

## CONSENT

As per international standard or university standard, patient(s) written consent has been collected and preserved by the author(s).

## ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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