ADDIS ABABA UNIVERSITY

COLLAGE OF HEALTH SCIENCE

SCHOOL OF MEDICINE

DEPARTMENT OF ANESTHESIA

COMPARISION OF HEMODYNAMIC AND ANALGESIC EFFECT OF PRE MIXED VERSUS SEQUENTIAL ADMINISTRATION OF INTRATHECAL FENTANYL WITH HYPERBARIC BUPIVACAINE FOR PATIENTS UNDER GOING ELECTIVE CESAREAN SECTION AT EMPRESS ZEWIDITU MEMORIAL HOSPITAL, ADDISS ABABA ETHIOPIA, 2020 G.C: INSTITUTIONAL BASED PROSPECTIVE COHORT STUDY.

INVESTIGATOR: ANIMUT TILAHUN (Msc student)

THESIS SUBMITTED TO SCHOOL OF MEDICINE, DEPARTMENT OF ANESTHESIA FOR PARTIAL FULFILMENT OF THE REQUIRMENT OF MASTER OF SCIENCE DEGREE IN ANAESTHESIA.

JUNE, 2020 G.C

ADDIS ABABA, ETHIOPIA.

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Full title of research project	Comparison of hemodynamic and analgesic effect of pre mixed versus sequential administration of intrathecal fentanyl with hyperbaric bupivacaine on patients who undergo elective cesarean section.
Duration of project	January 01/2020- march 30/April 2020 G.C.
Total cost of project	25,000 ETB
Source of funding	Addis Ababa university
Study area	Empress Zewditu memorial hospital
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Declaration

I, the undersigned declare that this thesis is my original work in partial fulfillment of the requirement for the Master of Science degree in anesthesia. I understand that plagiarism will not be tolerated and all directly quoted materials had been appropriately referenced.

Name: _____

Signature: _____

Submission to Msc Tutor, Department of Anesthesia, Addis Ababa University

Date of submission:_____

This thesis work has been submitted for examination with my/our approval as Advisors and tuore on the Master of Science degree in anesthesia.

Name	signature
1._____	_____
2._____	_____
3._____	_____

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List of acronyms

ASA	American society of anesthesiology
BMI	body mass index
Cm	centimeter
CS	cesarean section
CSF	cerebiro spinal fluid
ETB	Ethiopian birr
G.C	Gregorian Calendar
HB	hyper baric bupivacaine
HR	Heart rate
Hr	hour
IQR	interquartile range
K.G	kilogram
M	pre mixed group
MAP	mean arterial blood pressure
Min	minutes
Mg	milligram
S	Sequential group
SA	spinal anaesthesia
SD	standard deviation
SPSS	Statistical Package for Social Sciences
VAS	visual analogue scale

Abstract

Background: *Spinal anesthesia (SA) is the most commonly used thechiniqe of anesthesia for elective cesarean section. The main drawback of Spinal anesthesia is hemodynamic instability and short duration of analgesia. To minimize this draw back adding opoids like fentanyl either pre mixed with local anesthetics or sequentially with separate syringe become common practice. But pre mixing alters their density and then their analgesic and hemodynamic effect.*

Objective*: To compare the hemodynamic and analgesic effect of sequential versus pre mixed injection of intrathecal fentanyl with hyperbaric bupivacaine for patients who underwent elective CS under SA at Empress Zewiditu memorial hospital from January 01 to March 30, 2020 G.C.*

Method*: Institutional based prospective cohort study was employed on 66 parturients who undergone elective cesarean section under SA fulfilling the inclusion criteria. Those who had received pre mixed technique were grouped as (M-group) and those who received sequentially were grouped as (S- group). Data was collected perioperatively at different time interval. Based on normality assumption, analysis was done by independent t test for normally distributed data, Mann –Whitney U test for non-normally distributed data and* x^2 *test for categorical variable. P-value <0.05 was consider as statistically significant.*

Result*: There was significant decreament in Perioperative mean atrial blood pressure in M-group compared to S- group at* 5^{th} *,* 10^{th} *and* 15^{th} *minute, (p=<0.001). There was no significance difference in Perioperative mean hear rate change between groups, (p> 0.05). The mean time for the first rescue analgesic request time was prolonged in S- group compared to M- group (287.909±15.255 vs 261.39 ± 25.378) min respectively, (p < 0.001). The median Postoperative pain VAS score was significantly lower in S- group compared to M- group at* 4^{th} *,* 5^{th} *and* 6^{th} *hr, (p<0.05). The incidence of hypotension was higher in M- group compared to S- group, (p< 0.05).*

Conclusion and recommendation*: Sequential intrathecal injection of fentanyl and hyperbaric bupivacaine provided significant improvement in the quality of sensory block and hemodynamic stability compared to injection of premixed medications. We recommended sequential technique of spinal anesthesia for elective cesarean section compared to pre mixed.*

Key words*: hyperbaric bupivacaine, fentanyl, spinal anesthesia, pre mixed, sequential, cesarean section.*

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Chapter One: Introduction

1.1 Background

Caesarean section (CS) is life saving both to mother and fetus by preventing poor obstetric outcomes. The rate of CS increases dramatically from time to time. A recent analysis of global, regional and national estimate of birth by cesarean section provided an evidence of 15% for the world, 3.5% for African region, 2% in Ethiopia and 24.4% in Addis Ababa [1].

Regional anesthesia techniques are increasingly preferred for CS compared to general anesthesia. Spinal anesthesia (SA), irrespective of medication used is now the safest and most popular method for CS [2, 3]. SA is a reversible nerve transmission interruption caused by injection of local anesthetics in sub arachnoid space. In doing so we are using spinal anesthetic of various baricity. Baricity of anesthetics represents the ratio of the specific density of anesthetics and cerebrospinal fluid (CSF) at a temperature of 37oC. In practice, the most commonly used are hyperbaric and isobaric bupivacaine. In the liquor space anesthetic drugs act depending on their own baricity: hyperbaric trying as heavier than the fluid to go in the lowest part of liquor space of patient in lying position while isobaric anesthetic is floating in liquor space [4].

Even though spinal anesthesia is preferable for CS it is associated with different complications among these hypotension is the most common complication [5]. This is mainly due to sympathetic blockade leading to peripheral vasodilatation and pooling of blood in dilated vascular bed with subsequent decrease of venous return and cardiac output. This problem is magnified in parturient who is liable to develop hypotension by her virtue due to positional causes wherein the supine position, the gravid uterus compresses the aorta and the inferior vena cava against the bodies of the lumbar vertebra resulting in decreased venous return, which may decrease maternal cardiac output and blood pressure leading to a compromised uteroplacental perfusion [3, 6].

Multiple trials to prevent or combat hypotension using positional changes during or immediately after spinal injection were made [7, 8]. Fluid therapy was one therapeutic option, but still there is a debate about the administration of crystalloids or colloids; preloading or co loading [9]. The use of vasopressor was tried to induce vasoconstriction so as to combat vascular bed dilatation;

however, the drug choice and mode of administration as either bolus or infusion is still a matter of debate [10, 11].

Opioids like fentanyl are administered together with hyperbaric bupivacaine intrathecally, which have potent analgesia. Intrathecal fentanyl enhance analgesia from sub therapeutic dose of hyperbaric bupivacaine and achieve successful subarachnoid block by acting on mu- receptor in spinal cord, it opens k+ channels & reduced influx of ca^{2+} so that it inhibits release of neuro transmitters. Opoids like fentanyl acts on the afferent nociceptives path way not on the efferent sympathetic pathway so that it causes less adverse hemodynamic effects. Fentanyl is highly potent and lipid soluble opoid compared to other [12, 32]. It is common practice to mix fentanyl and hyperbaric bupivacaine in single syringe before intrathecal injection. Neuraxial administration of opioids along with local anaesthetics improves the quality of intra operative analgesia and also provides postoperative pain relief for longer duration [13].

Various factors influence the spread and action of anaesthetic solution like temperature, PH, density, volume of drug, patient position and height of patient, which in turn affects the hemodynamic status of the patient. [12, 18]

1.2 Statement of the problem

Spinal anesthesia has become an increasingly preferable technique for cesarean section in many countries over the last few decades [14]. However, short duration of analgesia, rapid onset of sympathetic block and subsequent hypotension remains a major clinical concern when using the technique. In order to decrease the incidence and severity of hypotension, various attempts have been made to modify the technique and the dose of local anesthetic used [15, 16].

The absence of significant reflex tachycardia after spinal anesthesia despite the presence of hypotension also play important role in development of hypotension [3]. This phenomenon may result from the blockade of cardio accelerator sympathetic fibers at T1 to T4. Additionally, Spinal anesthesia may result in reduced a trial filling and unopposed vagal tone after SA produced a sufficient degree of bradycardia and hypotension, resulting in cardiac arrest [18].

The effect of spinal anesthesia is more exaggerated in obstetric patients compared to other patients coming for non obstetric surgeries. This is due to the hormonal change and mechanical compression of great vessel which decrease venous return and cardiac output which lead to uteroplacental hypoperfusion [6].

Adding adjuvant like fentanyl to intrathecal local anesthetics improves quality and duration of spinal blockade, and prolongs postoperative analgesia, due to this reason now a day it becomes a common practice to mix fentanyl and hyperbaric bupivacaine in single syringe before intrathecal injection but this is assumed to affects the baricity of local anesthetics which in turn affects the quality of block and the hemodynamic parameter of the patients [4, 20]. But still the selection of the mode of administration (sequential or pre mixed) is a matter of debate [12]. The aim of this study is to assess the hemodynamic and analgesic effect of intrathecal fentanyl with hyperbaric bupivacaine injected as the standard pre mixed with one syringe compared to the sequential intrathecal injection with two syringe techniques for patients undergoing elective cesarean section at Empress Zewiditu memorial hospital.

1.3 Significance of the study

Fentanyl has been used as an adjunct to hyper baric bupivacaine for parturients who underwent caesarean section under SA, as it has been shown both to improve the quality of block and reduce the need for intra operative supplementation of opioids. Intrathecal opioids like fenatanyl enhance analgesia from sub therapeutic dose of hyperbaric bupivacaine and achieve successful subarachnoid block. It provide more sensory blockade than sympathetic blockade. So it causes less adverse hemodynamic effects. Intrathecal fentanyl is preferable than other opoids due to its high lipid solubility and faster onset, it does not tend to migrate intrathecally to the 4th ventricle in sufficient concentration to cause delayed respiratory depression.

The addition of fentanyl to hyperbaric bupivacaine alters the density of the mixture and affects the spread of hyperbaric bupivacaine. The mixture of hypobaric fentanyl and hyperbaric bupivacaine sank down and then they crept up together when the patients lay down acting synchronously on the same level. Hyperbaric bupivacaine which was injected separately without mixing is denser than the bupivacaine-fentanyl mixture and sank down and took longer time to rich the final level which delay the onset of sympathetic block and give time for compensatory mechanism to prevent hypotension.

If we inject both drugs separately, it may minimize the effect of the changes in densities and PH of both the drugs. They produce their maximum effect separately to have dense sensory block. Here, this study was undertaken to find out if the effect of fentanyl and hyperbaric bupivacaine can vary by altering their mode of administration.

Some studies have been conducted to compare analgesic and hemodynamic effect of intrathecal fentanyl with hyper baric bupivacaine administered as standard pre mixed versus sequential technique for patients who undergone elective cesarean section under spinal anesthesia. There are still controversies on which methods have good effect on hemodynamic stability and analgesic effect [26, 20, 4]. Since these studies have been conducted on other parts of the world populations, generalization could not be made due to the presence of racial, cultural, genetic and socio demographic difference in the perception of pain [22]. As far as my knowledge goes, there was no previous study done in our country on comparison of intrathecal fentanyl with hyper baric bupivacaine administered as pre mixed versus sequential technique to compare the hemodynamic effect and analgesic efficacy. The result of present study will give a base line for other researchers.

Chapter Two: Literature review

Hemodynamic instability after SA is the most common complication encounter in Perioperative period [28]. Different attempt has been done to improve this complication. From this adding intrathecal adjuvant with local anesthetic is the most common. There are many additives to be used to enhance analgesic quality and duration of Neuraxial blocks, reduce the incidence of hemodynamic instablity such as clonidine, magnesium, ketamine, opioids, vasoconstrictor agents and steroids, and neostigmine [25, 23]. It has been become a common practice to pre mix hyperbaric bupivacaine with opioids. From this fentanyl is the most commonly used due to its highly lipid solubility and faster onset. Due to this, it does not tend to migrate intrathecally to the 4th ventricle in sufficient concentration to cause delayed respiratory depression *[21, 30]*. Giving opoids with hyper baric bupivacaine mixing with one syringe before intrathecal injection affect the density and then distribution of the local anesthetics [29].

Meta -analysis was done in America (2020) by Uppal v et al on efficacy of intrathecal fentanyl with bupivacaine for patients undergoing cesarean section. Seventeen randomized control trial with 1064 participants provided data for the meta-analysis. The result shows that fentanyl added to the bupivacaine reduced the need for intra operative supplemental analgesia (relative risk, 0.18;95% CI, 0.11-0.27;number needed to treat,4)and the incidence of nausea/vomiting(relative risk ,0.41; 95% CI ,0.24-0.70; number needed to treat, 6.5) with longer time to first post operative analgesia request(mean difference, 91 minute;95%CI , 69-113). No difference was observed regarding the need for conversion to general anesthesia (relative risk, 0.67; 95% CI, 0.12-3.57), the onset of sensory block or the duration of motor block. However the addition of fentanyl associated with high incidence of intra operative Pruritus (relative risk, 5.89; 95%CI 2.07-16.79; number needed to harm, 13.5) [31].

A randomized control trial research was done in Singapore (2010) by S. Desai et al to compare hyperbaric bupivacaine with opioids, injected as either a mixture or sequentially, for spinal anaesthesia for caesarean section. Forty-eight women having elective caesarean section under spinal anaesthesia were recruited to this double-blind, randomized trial. Group M (n=24) received 2 ml of 0.5% hyperbaric bupivacaine plus morphine 100 μg plus fentanyl 15 μg, mixed in a syringe prior to administration. Group S (n=24) received 2 ml of 0.5% bupivacaine through one syringe, followed by morphine 100 μg plus fentanyl 15 μg through a separate syringe.

The patients in Group M had higher levels of sensory block to cold than those in Group S (median T2 vs T3)(P=0.003). Five patients in Group M and none in Group S had a block to cold ≥T1 (P=0.02). There was no difference between groups in the incidence of hypotension, need for vasopressor or side-effects [26].

A randomized control trial was done at *Karaikal* India (2016) by DR.V.Suresh Kumar to compare intrathecal fentanyl with hyperbaric bupivacaine administered as a mixture and sequentially in lower abdominal surgery. One hundred patients posted for elective lower abdominal surgeries were randomly selected. One group received 35 micrograms fentanyl and 3 ml of bupivacaine sequentially in two different syringes and the other received in a single syringe. the result showed that there was no significance difference in hemodynamic status change between study and control group. The onset of sensory block in the sequential and premixed group was 3.1±0.45 and 5.2±0.9 min respectively, p=0.007. The onset of motor block on sequential and mixed group was 3.4± 0.5 and 6.75±1.02 min respectively,(p= 0.006). The first rescue analgesic time was 314±11.2 min in sequential group and 301.2± 9.2 min in the pre mixed group, (p <0.001) [21].

A randomized trial was done in India (2014) by Prachee Sachan et al on Efficacy of premixed versus sequential administration of clonidine as an adjuvant to hyperbaric bupivacaine intrathecally in cesarean section which was conducted on ninety full term parturient scheduled for elective cesarean sections were divided into three groups on the basis of technique of intrathecal drug administration. Group M received mixture of 75 µg clonidine and 10 mg HB 0.5%. Group A received 75µg clonidine after administration of 10 mg HB 0.5% through separate syringe. Group B received 75µg clonidine before HB 0.5% (10 mg) through separate syringe. They found that the Time to achieve complete sensory and motor block was less in group A and B in which drugs were given sequentially. Duration of analgesia lasted longer in group B (474.3 ± 20.79 min) and group A (472.50 ± 22.11 min) than in group M (337 ± 18.22 min) with clinically insignificant influence on hemodynamic parameters and sedation [16]

An observational study was done by Dr. Sonali Joshi et al in India (2017) on Two Syringe Technique for Spinal Anesthesia in Cesarean Section to achieve more Satisfactory Block, Less Frequency of Hypotension and Prolong Analgesia, conducted on 60 Parturient scheduled for Elective cesarean section, the study was done between two groups. The first group was given

25ug fentanyl (0.5cc) premixed with 0.5% bupivacaine heavy 10 mg (2cc) in the same syringe (group M). The second Group was given 25ug fentanyl (0.5cc) in one syringe and 0.5% heavy bupivacaine 10 mg (2cc) without barbotage in a second syringe. There was statistically significant observed more incidence of hypotension in group M (43.3%) than group S (23.5%), (P<0.05). The mean atrial blood pressure was significantly decrease in M- group compared to S-group at 4^{th} ,10^{th} and 15^{th} min. Mean time to onset of sensory and motor block was observed early in group M (3.28±0.66 ; 4.2±0.66 respectively) than group S(4±0.43; 4.82±0.42 respectively) ,which was statistically highly significant.(P <0.001). Maximum sensory block level was higher in group M (6.75±0.98) than group S (6.13±0.51), which was statistically highly significant (p < 0.05). There was no significant difference of time to maximum sensory and motor block observed between group (P >0.05). Mean time to regression of sensory and motor block was observed early in group M (219±16.04; 188±15.6 respectively) than group S (253±17.04; 223±17.04 respectively), which was statistically highly significant (P<0.001). Mean time to 1st rescue analgesia was required early in group M (226±29.9) than group S (243±39.28), which was statistically highly significant (P<0.001) [20].

A randomized and single blinded study was conducted (2016) India by Dr.Noopur et al in the department of Anaesthesiology, Bharathi Vidyapeeth Deemed University, Pune. A total 60 patients were equally divided in to sequential group and premixed group. The hemodynamic changes, onset of sensory and motor block, side effects and regression of the motor and sensory block and duration of first rescue analgesia were studied between the sequential group and premixed group. There was no significant difference in the blood pressure during the intra operative period. There was significant difference between the mean, systolic and diastolic blood pressures of study and control groups at 1 min, 2 min, 3 min and 4 min after induction of anesthesia. The mean (± SD) onset of sensory block in the study group was (2.7 +/-0.53) min and (5.03 ± 1.07) min in the control group which was statistically significant. There was a statistically significant difference between the (mean ± SD) time for onset of motor block in study group and control group. The time of rescue analgesia was at (189± 37.1) min in the study group and at (102.5 ± 32.0) min in the control group which was statistically significant [12].

Randomized control trial was done by Amr Aly Ismail Keera et al in Egypt (2018) to compare the outcome of spinal injection of hyperbaric bupivacaine and fentanyl separately to standard

injection of mixed fentanyl with hyperbaric bupivacaine. 124 parturient scheduled for elective cesarean section were randomly allocated into two groups, each 62 parturient: Group M received spinal anesthesia using 10 mg bupivacaine 0.5% premixed with 25 micro gram fentanyl in the same syringe and Group S received 25 microgram fentanyl in one syringe and 10 mg bupivacaine 0.5% without barbotage in a second syringe. The result showed that time till theonset of sensory block was non- significantly (Z = 1.157, P > 0.05) shorter in Group S compared to Group M. Mean level of maximal sensory block was non-significantly (Z = 9.321, P > 0.05) higher in Group S compared to Group M. Time till onset and recovery of motor block and Bromage grades were non significantly different between both groups. The frequency of hypotension was significantly lower in Group S compared to Group M (P < 0.05) [4].

Chapter Three: Objective

3.1 General objective

To assess hemodynamic and analgesic effect of pre mixed versus sequential administration of intrathecal fentanyl with hyper baric bupivacaine for patients who underwent elective cesarean section under spinal anesthesia at Empress Zewiditu memorial hospital, from January 01 to March 30, 2020 G.C

3.2 Specific objective

To compare change in the mean atrial blood pressure between the two group

To compare change in mean heart rate between the two group

To compare the first rescue analgesic request time between the two groups

To compare post operative pain VAS score between the two group

Hypothesis

HO1: there is no stastically significant difference in mean atrial blood pressure between the two groups.

HA1: there is stastically significant difference in mean atrial blood pressure between the two groups.

HO2: there is no stastically significant difference in mean heart rate between the two groups.

HA2: there is stastically significant difference in mean heart rate between the two groups.

HO3: there is no stastically significant difference in first rescue analgesic request time between the two groups.

HA3: there is stastically significant difference in first rescue analgesic request time between the two groups.

HO4: there is no stastically significant difference in post operative pain VAS score between the two groups.

HA4: there is stastically significant difference in post operative pain VAS score between groups.

Chapter Four: Methodology

4.1 Study Area

The study was conducted at Empress Zewiditu Memorial hospital which is located in capital city of Ethiopia, Addis Ababa. It is located in Kirkos sub city woreda 08. This hospital was built, owned and operated by the Seventh- day Adventist church but was nationalized during derge regime in 1976. The Hospital is operated by the ministry of health; it has a total of 128 beds out of these 46 beds is for obstetrics, gynecologic and postnatal ward.

4.2 Study Design and period

An institutional based prospective cohort study was conducted from January 01/2020----March 30/2020 G.C.

4.3 Population

4.3.1 Source of population

All mothers who underwent elective cesarean section under spinal anesthesia at Empress Zewiditu memorial hospital.

4.3.2 Study population

All patients who underwent elective cesarean section under spinal anesthesia, during the study period.

4.4 Study variables

4.4.1 Dependent variables

Change in peri operative Mean atrial blood pressure

Change in Peri operative mean heart rate

Post operative pain VAS score

First rescue analgesic request time

4.4.2. Independent variables

Socio-demographic variables (Age, weight, height and BMI), parity, position, blood loss, amount of intra operative fluid intake, duration of surgery, base line MAP and HR.

4.5 Operational definition

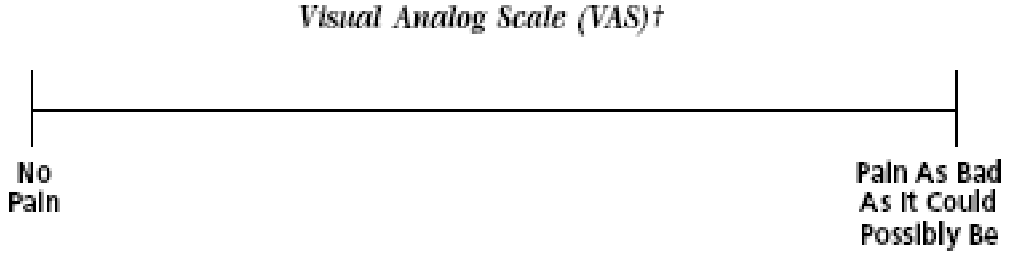
Hypotension: Defined as a Systolic blood pressure of below 90mmHg or MAP less than 70mmHg on one or more observation [32].

Bradycardia: Defined as a heart rate less than 60 beats/minutes on one or more observation [33].

Respiratory depression: Defined as a respiratory rate less than 10 breaths per minute or oxygen saturation less than 90% was consider [32].

Peruritis: Defined as any scratch or itching complained by the patient.

VAS: visual analogue scale which is a method of pain assessment determined by the patient making a mark (/) of their pain intensity on a line which is 10cm long (34).



0cm = no pain 4- 6cm = moderate pain

1-3cm = mild pain 7-10cm = sever pain

Figure 1 : VAS instrument adopted from the National Initiative on Pain Control™ (NIPC™)

Nausea: subjectively unpleasant sensation associated with awareness tee urge to vomit.

Total analgesia consumption: the total amount of analgesic the patient given with in 24 hr after SA.

Onset of sensory block: time elapsed from the end of study solution administration to absence of pinprick sensation at T10 dermatome.

Time to first analgesic request: is a time in minute measured from the end of spinal anesthesia procedure to time where patient request analgesics.

ASA 2: pregnant mother without any co- existing illness comes for cesarean section.

Modified Bromage scale: 0: No motor block, 1: Unable to raise an extended leg (able to flex the knee), 2: Unable to flex the knee (able to move the foot only), 3: Unable to flex the ankle (unable to move the foot or knee) [35].

4.6 Eligibility criteria

4.6.1 Inclusion criteria

American society of anesthesiology grade 2

Age between 18 up to 35 year

Height between 145&175cm

Body mass index (BMI) between 18.5 and 30kg/m^2

4.6.2 Exclusion criteria

Patients with known history of adverse response to fentanyl or bupivacaine

Multiple pregnancy and macrosomia

Complete or partial failed spinal

Patients taking other than 10 mg bupivacaine and 25 µg fentanyl

Patients taking isobaric bupivacaine for spinal

Patients having regional nerve block other than SA

Preeclampsia

4.7 Sample size and Sampling method

4.7.1 Sample size determination

According to results from recent study in India [20], the mean first rescue analgesic request time was 226±29.9 min when the hyper baric bupivacaine and fentanyl administered as pre mixed and

243±39.9, When the hyper baric bupivacaine and fentanyl administered sequentially, which means μ1= 226, σ1 =29.9, μ2=243, σ2=39.28, with α error of 0.05, and power of 80%. When these values are incorporated into the formula;

$$N1= \frac{(\sigma_1^2 + \sigma_2^2)(z_{\alpha/2} + z_{\beta})^2}{(\mu_1 - \mu_2)2}$$ substituting the values into the formula;

$$N1= \frac{(29.9)^2 + (39.28)^2 (1.96+0.84)^2}{(243-226)^2} = 30.46$$, approximately n= 30

The ratio of the group is 1:1, then n2= 30

When 10 % of contingency is included for dropouts, total sample of 66 patients or 33 patients per group was required.

4.7.2. Sampling methods

Study participants were selected using systematic random sampling technique. According to the reviewed data, average number of elective cesarean sections under spinal anesthesia with fentanyl additives for the last three month in this hospital were (N=135), since the sample size was (n=66), sampling interval was calculated as K^{th}=N/n= 135/66=2.05. Using the daily schedule as a sampling frame, the first patient was selected with lottery method and then every 2^{nd} patient was included until the required number obtained in both groups. Parturient who had received spinal anesthesia using 10 mg hyperbaric bupivacaine 0.5% premixed with 25 μg fentanyl in the same syringe was group as -M and parturient who had received 10 mg hyperbaric bupivacaine followed by 25 μg fentanyl without barbotage was grouped as S- group.

Patient enrollment

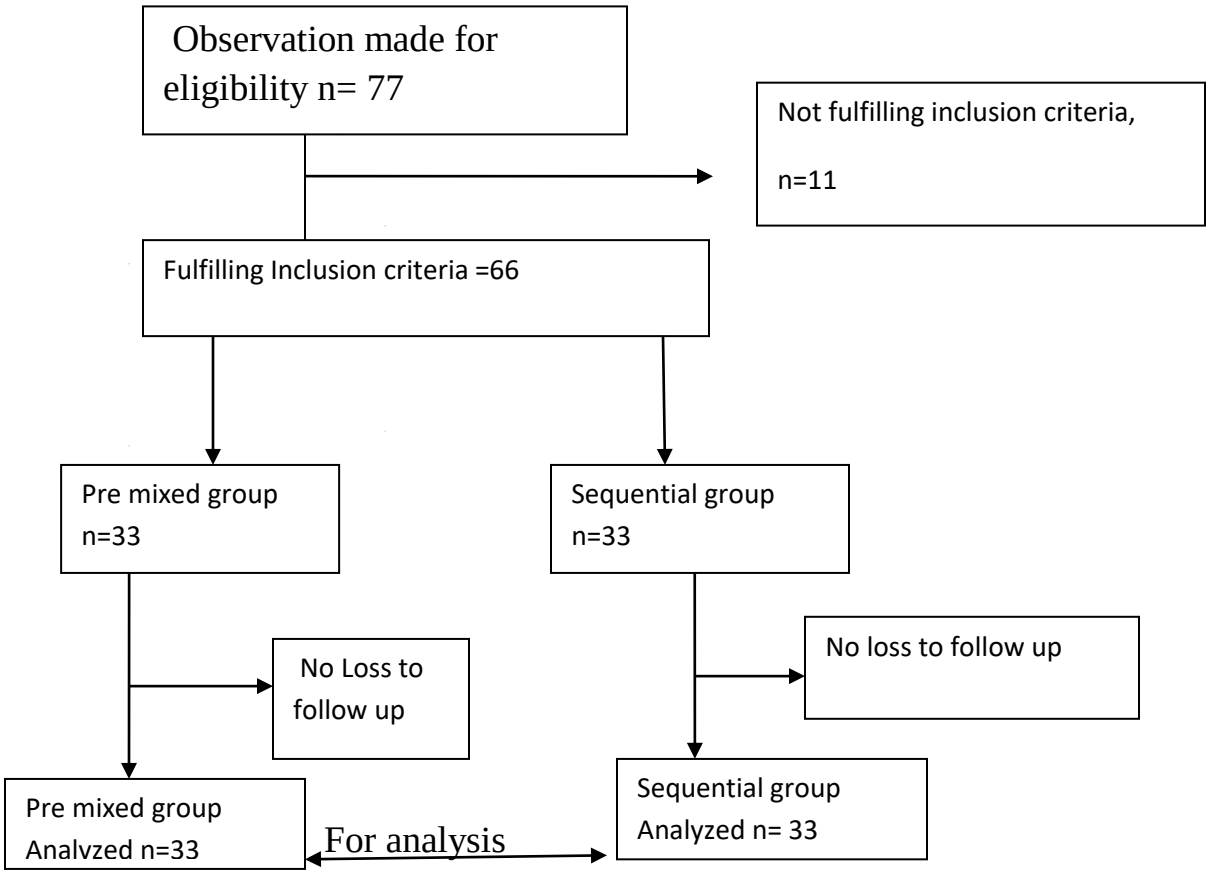


Figure 2: schematic presentation patient enrollment in the study

4.7.3 Data collection method

The pre tested questionnaire which was written in English containing consent form, demographic data, base line vital sign and other variables was used to collect the data. The assigned data collectors were two Bsc anesthetists and one Msc anesthetist for supervision. After the patient has been re assured about the procedure verbal as well as written consent was taken from each parturient. Plasil pre medication 10 mg IV and Pre loading all parturients with 1000 ml normal saline was given to all participants by the responsible staff member. Brief explanation was given for the participant by the data collector on how to use VAS tool to expressing their pain severity post operatively. All medications were prepared before insertion of the spinal needle and standard monitoring was applied. Demographic data including age, height, weight and base line hemodynamic variables were determined preoperatively. After the site has cleaned with antiseptic the spinal anesthesia was given by the responsible anesthetist in sitting position either

sequentially or pre mixed technique. Then the parturient was asked to lie down supine position immediately after SA has given. The data collector record the pulse and mean arterial blood pressure at 2min, 5min, 10min,15 min, 30min, 45min and 1hr and then every 1 hr up to 4 hr perioperatively. The results on a paper labeled with the patient's file number. IV fluid co loading was given during and continued after spinal anesthesia application.

The onset of sensory block and maximum level of sensory block was assessed by pinching with toothed pick up and recorded. Motor blockade of the lower limbs was tested and scored according to the modified Bromage scale [35].

Time of onset of motor blockade, time lapsed from start of spinal anesthesia till Bromage grade 0 changed to grade I and duration of motor blockade, the time elapsed since start of motor block till complete recovery of muscle strength was determined.

Pain was assessed by visual analogue scale postoperatively at 30 min, 1 hr, 2 hr, 3 hr, 4 hr, 5 hr, 6 hr, 12 hr and 24hr.

Rescue analgesia was given to the patient when VAS≥ 3cm by the responsible staff. The time from onset of sensory block to the first analgesic request was documented. Any complication associated with spinal anesthesia was managed accordingly with responsible staff member.

4.9 Data quality control and assurance

To assure quality of data, training on the objectives, relevance of the study and brief orientations on the assessment tools was given for data collectors and supervisors. In addition to this, pre test of the data collection tool (questionnaire) was done by taking 5% of the total sample size at Empress Zewditu memorial hospital 2 week before the start of main study, which are not included in the main study. Data was checked for completeness, accuracy and clarity on the day of collection by the principal investigator. Data clean up and cross checking; arranging materials sequentially and keeping in a safe and secure place was done before analysis.

4.10 Data analysis and interpretation

Data was checked manually for completeness and was cleaned and entered into SPSS Version 22 for analysis. A Shapiro Wilk test was used to test for distributions of data while homogeneity of

variance between the groups was assessed using Levene's test. The data was normally distributed and homogenous with exception of postoperative pain severity, post operative analgesia consumption, level and onset of sensory block. Data was statistically described in terms of mean±SD for independent t test result, median (IQR) for man Whitney U test result and frequencies for chi square test result. Comparison of normally distributed numerical variables between study groups was done using unpaired student t- test, and comparisons of non-normally distributed data was done by Mann-Whitney U test. Chi square test was employed to compare for categorical variables and p value <0.05 was considered as statistically significant.

4.11 Ethical consideration

Ethical clearance was obtained from the department ethical clearance committee before the start of the study. Official support letter was written to Hospitals and Addis Ababa Health Bureau and permission for data collection was taken from the responsible authorities. The purpose and the importance of the study were explained, verbal as well as written informed consent was obtained from each participant. Confidentiality was maintained at all levels of the study by avoiding identifiers and using codes to identify patients. The participant's involvement in the study was on a voluntary basis, participants who are not willing to participate in the study and those who wish to quit their participation at any stage was informed and allowed to do so without any restrictions.

4.12 Dissemination of study result

Copies of the research will be disseminated to college of health science, school of medicine/department of anesthesia, Addis Ababa University student research office, Ethiopian Association of Anesthetists, Ethiopian ministry of health. Finally it will be send to different reputable national and international journals for publication.

Chapter Five: Result

5.1. Demographic and Perioperative characteristics of the study participants

A total of 66 patients (33 pregnant mothers in each group) were finally involved for analysis of the study based on whether they received spinal anesthesia pre mixed with one syringe technique or sequentially with two separate syringe techniques. There was no statistical significance difference between two groups in demographic data and Perioperative characteristics such as age, BMI, height, weight, parity, estimated blood loss, intraoperative fluid and duration of surgery (see table 1).

Table 1 Demographic data and Perioperative Characteristics of study participants (mean± SD, analyzed by independent sample t test and chi-square test (frequency) for patients undergoing elective cesarean section under spinal anesthesia at Empress Zewditu memorial hospital from January 01/2020 – march 30/2020 G.C.)

variables		M group	S group	Asympt. P value
Age(year)		27±3.969	27.76±4.637	0.629
Weight(k.g)		69.697±5.86	69.758±4.53	0.963
Height(cm)		161±3.26	160.485±4.16	0.492
Parity (%)	< p3	16(48.6 %)	17 (51.4%)	
	≥ p3	15 (48.4%)	18 (51.6%)	0.805
BMI(k.g/m^2)		25.399±1.79	26.104±1.411	0.08
Duration of Surgery (min)		47.36±7.508	46.64±7.937	0.703
Blood loss in ml		343.64±61.483	365.45±41.615	0.096
Intra operative fluid given in ml		1772.73±264.89	1606.06±280.557	0.16

NB: Result presented as Mean ± SD, S- sequential group, M – pre mixed group, BMI= body mass index, p= parity, ml= milliliter and SD-standard deviation: independent t test was used, p value < 0.05 was considered as significant.

5.2 Comparison of Perioperative mean atrial blood pressure at different time interval

An independent sample t test was run to determine if there were difference in mean atrial pressure at different time interval between groups. The result shows that there was a significant difference in peri operative mean atrial blood pressure at 5 min ,10 min and 15 min ($p<0.05$) but there was no significance difference at 30 min, 45 min, 1hr, 2 hr, 3hr, and 4 hr ,($p>0.05$). [see figure 3]

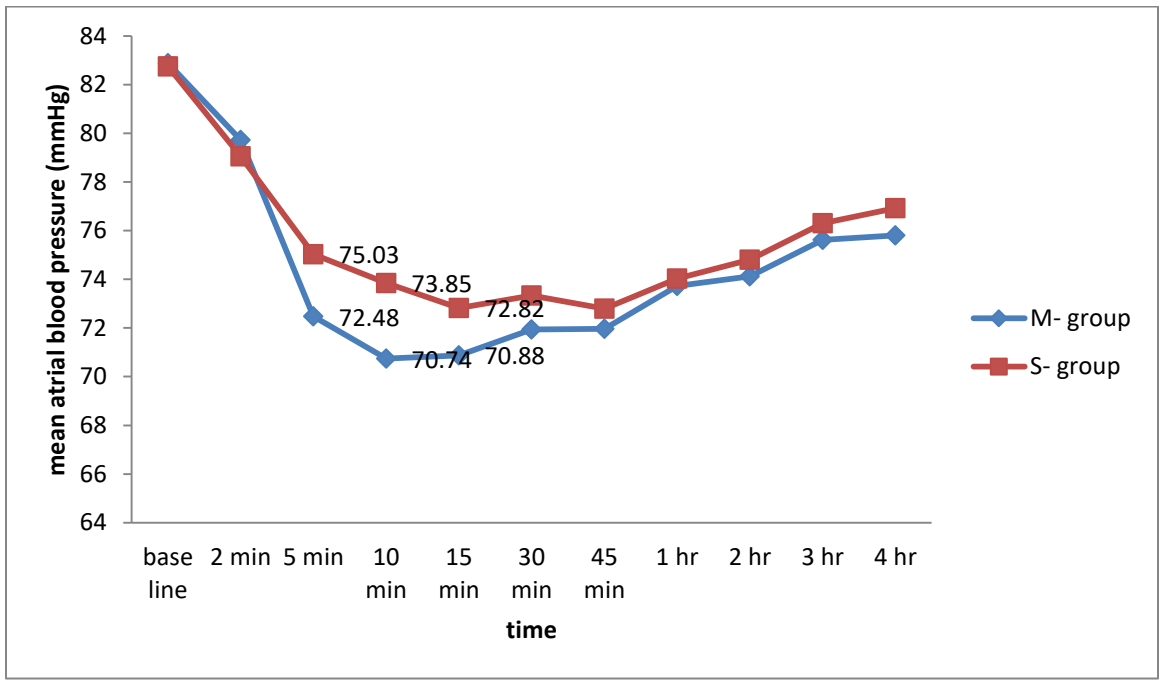


Figure 3 Line graph showing the mean atrial blood pressure at different time interval between M- and S- group undergoing elective cesarean section at Empress Zewiditu memorial hospital from January 01/202 to March 30/2020 G.C.

5.3 Comparison of Perioperative mean heart rate at different time intervals

Independent sample t test was done to compare the Perioperative mean heart rate and there was non- significant difference in peri operative mean heart rate between the two groups at base line, 2 min, 5 min, 10 min, 15 min, 30 min, 45 min, 1 hr, 2 hr, 3hr, and 4 hr, p value (p= 0.694, 0.441, 0.133, 0.136 , 0.359, 0.577 ,0.601, 0.913,0.72, 0.383) respectively. [see figure 4].

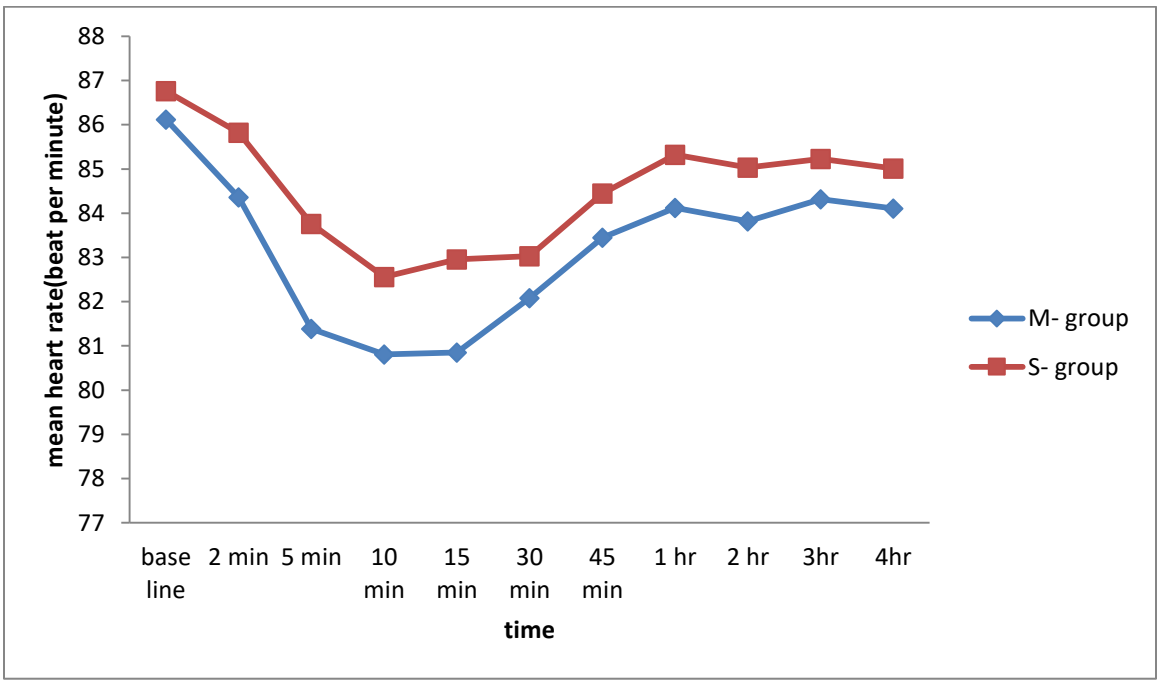


Figure 4: Line graph showing the mean heart rate at different time interval between M- and S- group undergoing elective cesarean section at empress Zewiditu memorial hospital from January 01 to March 30, 2020 G.C.

5.4. Comparison of Postoperative pain severity by VAS Scale

The Mann Whitney U test was used to compare the median post operative pain score between the groups. The result was comparable at 30 min, 1hr, 2 hr, 3 hr, 12 hr and 24 hour. But the median pain score was significantly lower in the S- group than M-group 2.5(2-3) vs 3(2- 3) cm at 4th hr, 5(4.5-5.5) vs 5.5(5-6) cm at 5th hr and 5(4.25-5.5) vs 5.5(4.5-5.75) cm at 6th hr respectively, ($p< 0.05$). [See figure 5].

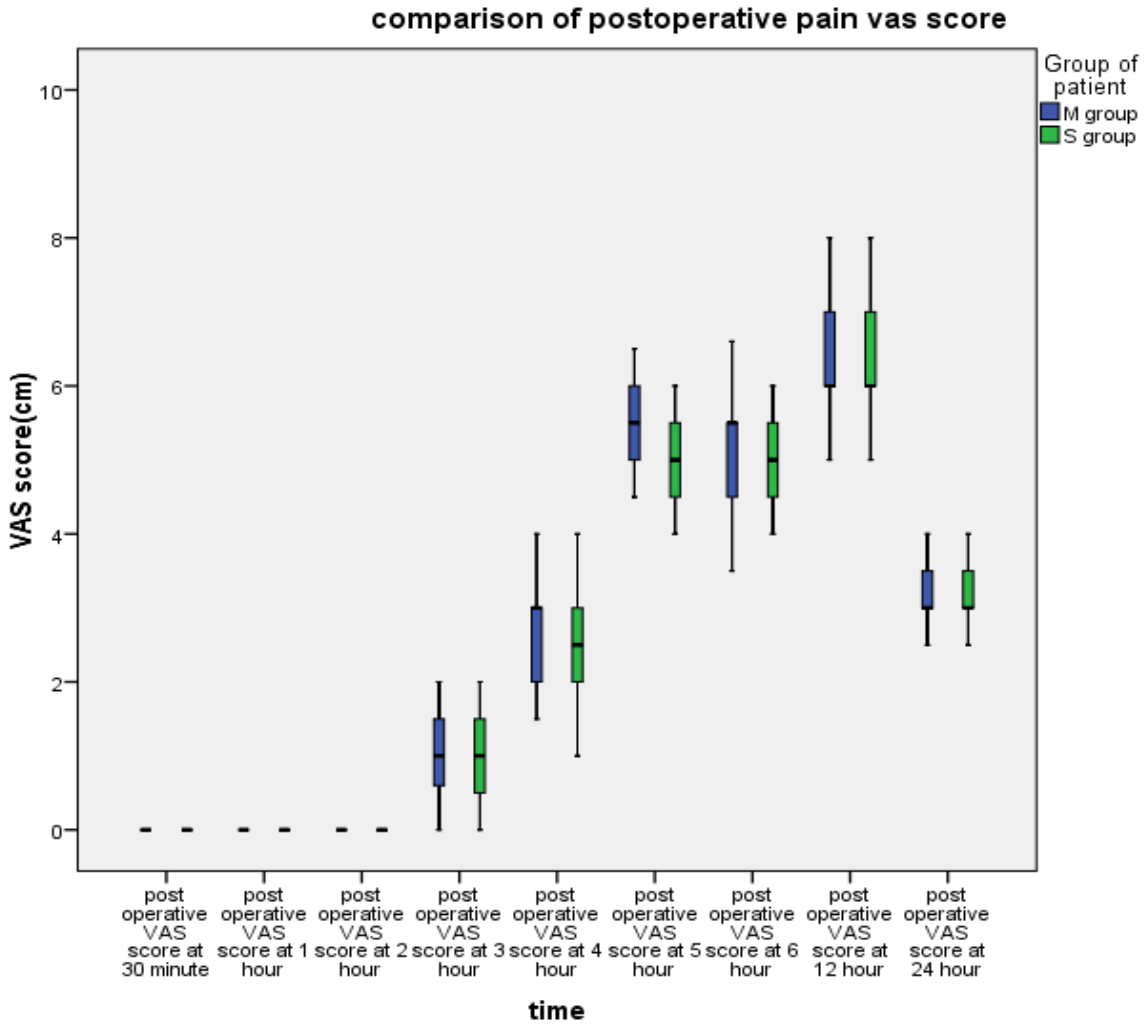


figure 5 :whisker and box plot showing the median and interquartile range of post operative pain VAS score(cm) of patients undergoing elective cesarean section at Empress Zewiditu memorial hospital from January 01 to March 30, 2020 G.C

5.5 comparison of first rescue analgesic request time and post operative consumption of analgesia between groups

An independent sample t test and Mann Whitney U test were run to compare the mean and median time taken for first analgesic request time and post operative analgesic consumption respectively between the two groups and the result showed that there was highly significant difference between the two groups, (see table 2)

Table 2: showing first rescue analgesic request time and consumption of analgesia between M- group and S- group analyzed by an independent sample test and Mann Whitney U test for patients who underwent elective cesarean section at Empress Zewditu memorial hospital from January 01/2020- march 30/2020 G.C.

variable		M- group	S- group	Asymptotic.P value
First rescue analgesic request time		(261.39± 25.378)*	(287.909±15.255)*	< 0.001
Postoperative analgesic consumption	Tramadol (IV)	50(50-75)**	50(50)**	0.047
	Diclofenac(IM)	75(0-75)**	75(0-75)**	0.775

NB: Result presented as *= M ± SD in minutes, ** = median (IQR), IM= intramuscular, IV= intravenous, $p < 0.05$ was considered as stastically significant.

5.6. Characteristics of block

Mann Whitney U test were done to compare the median time taken for the onset of sensory and motor block as well as maximum level of sensory block. But there was no significant difference on maximum level of sensory block between the two groups,($p > 0.05$). The independent t- test was run to compare the mean duration of motor block between groups there was stastically significant difference between the group.(see table 3)

Table 3 comparison of block character between the two group analyzed by independent sample t test and Mann Whitney u test who undergone elective CS under spinal anesthesia at empress Zewiditu memorial hospital from January 01/2020 – March 30 /2020 G.C.

Character	M-group	S- group	Asymptotic P value
Time taken for onset of sensory block	4(4-5)*	4(3-4)*	0.001
Time taken for onset of motor block	5(4.5-6)*	5(4-5)*	0.036
Maximum level of sensory block	T5(T5-T6)*	T6(T5-T7)*	0.06
Duration of motor block	(240.27±14.116)**	(255.64±12.874)**	< 0.001

NB : Values , * : median(IQR) in minute , **: mean± SD in minute ,where, IQR = interquartile range and SD= standard deviation, T= Thoracic dermatome, p value <0.05 was considered as stastically significant.

5.7. Comparisons of Incidence of intraoperative complication between the two groups

Chi square test result shows that the incidence of hypotension between the group was 33.3% in M –group and 21.1% in S- group, (x^2= 4.227, p=0.04). Chi square test result for, nausea, vomiting, shivering and peruritis were comparable between the two groups (p>0.05), but there was no incidence of bradycardia and respiratory depression. (See figure 6)

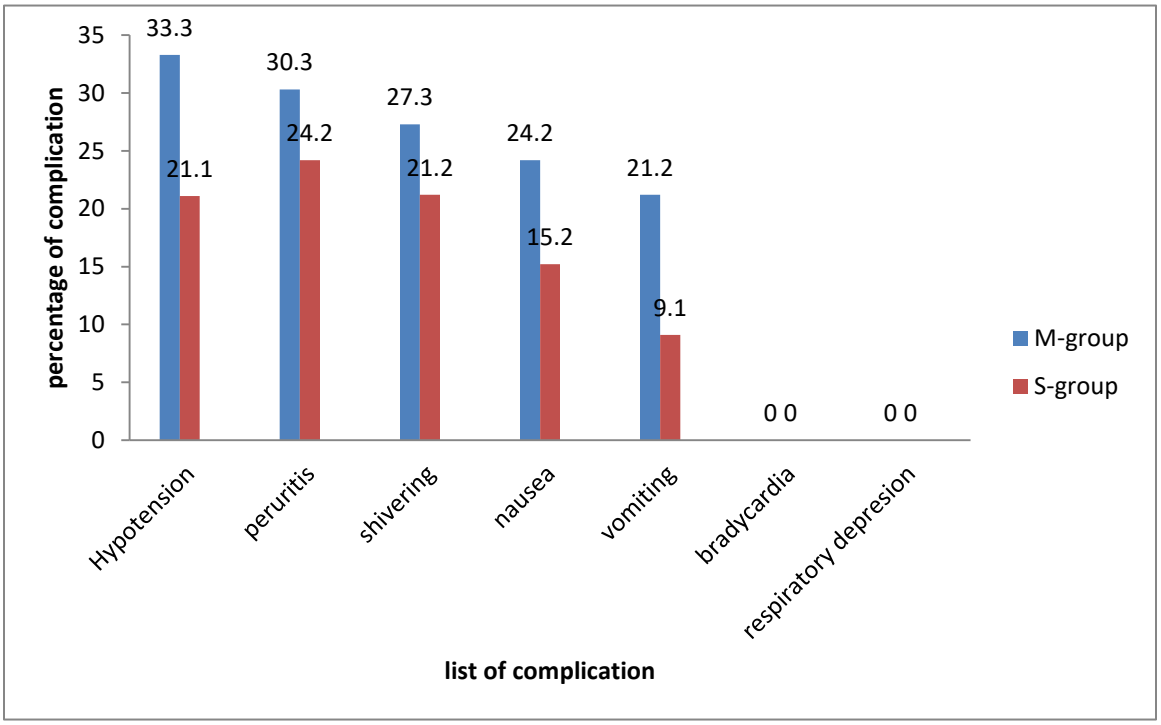


figure 6 :bar graph showing comparisons of incidence of intra operative complication between S-group and M- group of patients undergoing elective cesarean section at empress Zewditu hospital from January 01/2020 to March 30/ 2020 G.C

Chapter six: Discussion

This study was mainly undertaken to find the hemodynamic and analgesic effects after administration of premixed and sequential use of Hyperbaric Bupivacaine and fentanyl of patient undergoing elective cesarean section under spinal anesthesia.

In our study we found that there was highly significant reduction in intra operative mean atrial blood pressure at 5^{th} ,10^{th} and 15^{th} min in the M- group compared to the S- group after intrathecal injection of drug ($p<0.05$). This might be due to high level of symphatectomy happens in the pre mixed group due to altered in density of hyperbaric bupivacaine by the hypobaric fentanyl but in the sequential group which was injected separately without mixing was denser than bupivacaine fentanyl mixture and sank down and took a longer time to reach the final level which delayed the onset of the sympathetic block and gave time for a compensatory mechanism to prevent hypotension. But there was no significant difference between the groups at 30^{th} min, 45^{th} min, 1^{st}, 2^{nd}, 3^{rd}, and 4^{th} hr after administration of drug ($p > 0.005$).

In line with this result an observational study done by Sonali et al in India on 60 parturients schedule for elective cesarean section under spinal anesthesia with 10 mg hyperbaric bupivacaine and 25µg given for pre mixed and sequential group showed that there was significantly decrease mean atrial blood pressure in group M than group -S at 4^{th}, 10^{th} and 15^{th} min after administration of drug ($P <0.05$) [20]. Similar result was reported by a randomized control study done by Amr aly and his colleagues showed that early hypotension occurred in group M as compared to group S and also found that frequency of drop in mean atrial blood pressure in group S was lower as compared to group M,($p<0.05$) [4]. In contrast to our result a randomized control trial study done at Singapore (2010) by Desai et al on 48 parturients who came for elective cesarean section grouped into two group (24) each. Group –M received 2 ml of 0.5% hyperbaric bupivacaine plus morphine 100 µg plus fentanyl 15 µg, mixed in a syringe prior to administration and Group S received 2 ml of 0.5% bupivacaine through one syringe, followed by morphine 100 µg plus fentanyl 15 µg through a separate syringe and they observed that there was no significant hemodynamic change difference between the two groups [26]. The reason for this might be barbotaging (aspirating before injection) during the sequential administration of bupivacaine and fentanyl which will mix up and alter the density of hyperbaric bupivacaine.

The present study demonstrated that there was no stastically significant difference on peri operative mean heart rate at different time interval between S- group and M- group (p>0.05) this might be due to, in both groups the level of sympathetic blockage do not reach to the cardio accelerator nerves(T1-T4). In line with our study a randomized control trial study done by Noopur et al on 60 parturients came for elective cesarean section under spinal anesthesia with fentanyl 25µg and hyperbaric bupivacaine 2ml of 0.5% either sequentially or premixed thechinique., demonstrated that there was no stastically significant difference in mean heart rate at different time interval between the groups, (p>0.05) [12].

In our study mean first rescue analgesic request time had stastically significant difference between the groups; it was 261.39±25.38 min in M –group vs 287.909±15.25 min in S- group (p < 0.001). This difference might be secondary to difference in baricity (S-group > M- group) and fentanyl in the sequential group might have the chance to produce its maximum effect. In line with this result an observational study conducted by Sonali et al in india on 124 parturients undergone elective cesarean section with 10 mg hyperbaric bupivacaine and 25µg fentanyl to both S and M- group, reported that the first analgesic request time was 226±29.9 min on M-group and 268±39.28 min on S- group which was stastically significant,(p<0.001) [20]. Another comparable result was reported from randomized control trial study done by Noopur et al in india on 60 parturients who undergone elective cesarean section under spinal anesthesia with fentanyl and hyperbaric bupivacaine. They observed that the first rescue analgesic request time was (189± 37.1) minutes in the S- group and at (102.5 ± 32.0) minutes in the M- group which was statistically significant.(p= < 0.001) [12]. Relatively the time of first rescue analgesia request time was shorter on both M and S- groups compared to our study; this might be due to difference in presence of racial, cultural, genetic and socio demographic difference in the perception of pain [22].

With regard to our study result the severity of pain VAS scores were comparable at 30 min , 1hr, 2 hr and 3hr between M- and S- group, This might be due to the analgesic effect of spinal anesthesia that continue in both M and S group. But there was stastically significant difference in median VAS score at 4^{th}, 5^{th} and 6^{th} hr post operatively between S-group vs M- group which was 2.5(2-3) vs 3(2- 3) cm , 5(4.5-5.5) vs 5.5(5-6) cm and 5(4.25-5.5) vs 5.5(4.5-5.75) cm , respectively. The reason for this might be separate injection of fentanyl and hyper baric

bupivacaine allows fentanyl to work on its own maximum effect in the spinal cord preventing visceral pain. After 6 hour there was no significant difference in median VAS scores at 12 hr and 24 hr postoperatively this might be due to the duration of intrathecal fentanyl is expected to stay around 6 hr and both groups were treated with analgesic drug. Comparable to our result study done by Sonali et al reported that At 4^{th} and 6^{th} hr interval VAS score was significantly higher in group M compared to group S. Contrary to our study, Sonali et al noted that at 5^{th} hr interval VAS score was significantly lower in group M as compared to group S [20]. This difference might be due to early supplementation of analgesia to group- M due to early pain complaint.

Regarding our study result the median post operative consumption of analgesia there was stastically significant difference on Tramadol consumption which was 50(50-75) in M- group and 50(50) in S- group (p=0.047), but there was no significant difference on consumption of Diclofenac. This difference might be due to prolonged first rescue analgesic request time and improved in quality of block in S-group compared to M- group. But there was no significant difference in Diclofenac consumption (p> 0.05). In similar fashion to our result randomized control trial study done by S. Desai et al in Singapore noted that Mean patient-controlled analgesia morphine consumption across the 24-hour period was significantly greater in group M (13±11 mg) compared with group S (6±7 mg) (*P*=0.015).

In our study the median time for the onset of sensory and motor block was significantly lower in S- group compared to M-group, (p< 0.001). This result is supported by a randomized control study conducted by Noopur his colleagues noted that the onset of sensory block was significantly different between M-group and S- group, (5.03± 1.07 min) vs (2.7± 1.07 min) respectively, (p <0.001) and the onset of motor block was (3.1±0.3 min) in S- group and (7.23±1.07 min) in M-group, (p < 0.001) [12]. In contrast to our study an observational study done by Sonali et al on 124 parturients came for elective cesarean section with group M and group S concluded that Mean time to onset of sensory and motor block was observed early in group M (*3.28±0.66 ;4.2±0.66* respectively*)* than group S(*4±0.43; 4.82±0.42* respectively) ,which was statistically highly significant.(P <0.001) [20].

In our study there was no significant deference on the median of the maximum level of sensory block between M-group and S-group T5 (T5-T6) vs T6 (T5-T7) respectively.(p = 0.06). This

result is in line with a randomized control trial study done by Amr Aly and his colleagues on 124 parturients who undergone elective cesarean section under spinal anesthesia with 2 ml of 0.5% hyperbaric bupivacaine and 25 µg fentanyl grouped into M and S- group. They noted that mean level of maximal sensory block was non-significantly higher in group S (3.65±1.392) as compared to group M (3.4±1.273),(p>0.05) Contrary to our result an observational study conducted by Sonali and his friends on 60 Parturient who undergone cesarean section under spinal anesthesia with 10 mg of hyperbaric bupivacaine and 25µg fentanyl by pre mixed and sequential technique. They observed that Maximum sensory block level was higher in group M(6.75±0.98) than group S (6.13±0.51), which was statistically significant, (p <0.05) [20]. These differences might be related to the speed of intrathecal injection or difference in positioning after spinal anesthesia, which affect level of sensory block.

Regarding the incidence of Perioperative complication, our study showed that hypotension was encountered in 11(33.3%) patients in M- group and 3(21.1%) in S-groups (x^2=4.227, p=0.040) which was stastically significant. The hypotension was treated with IV fluid. None of them needed vaso-active drugs. The reason for this might be the mixture of hypobaric fentanyl and hyperbaric bupivacaine sank down, then they crept up together when the patient lay down acting synchronously on the same level. However, hyperbaric bupivacaine, which was injected separately without mixing, was denser than bupivacaine fentanyl mixture and sank more down and took a longer time to reach the final level which delayed the onset of the sympathetic block and gave time for a compensatory mechanism to prevent hypotension. In line with our result a randomize control trial study done by Amr Aly et al on 60 parturients who undergone elective cesarean section under spinal anesthesia demonstrated that the incidence of hypotension was 32 (51.6%) in Group M and 18(29%) in Group S (x^2 = 6.56, P < 0.05) [4]. Contrary to our finding a randomized and single blinded study was conducted by Noopur et al on 60 parturients who undergone elective cesarean section under spinal anesthesia with 25µg fentanyl and 10 mg hyperbaric bupivacaine with sequential and pre mixed technique, reported that there was no stastically significance difference in the incidence of hypotension between S-group and M-group 7 (23.3%) vs 2 (6.7%) respectively, p > 0.05[12]. This finding might be related to difference in speed of intrathecal injection and positioning after giving SA. There was other Perioperative complication like peruritis, shivering, nausea and vomiting without stastically significant difference between the two groups, (p>0.05). There was no incidence of respiratory depression

and bradycardia. This result was in line with a randomized control trial study done by Amr Aly and his friends in Egypt on elective cesarean section under spinal anesthesia with 10 mg hyperbaric bupivacaine and 25µg fentanyl both to sequential and pre mixed group reported that there was an incidence of Perioperative complication like, nausea; vomiting, shivering and peruritis without significant difference between the groups, ($p > 0.05$). No respiratory depression or any other complications had happened between groups.

6.1 Strength of the study

Participants were homogeneous (elective obstetric patients) which play its own roll to predict the difference in result between groups. The socio demographic variables and Perioperative factors were comparable between groups. There were also adequate sample sizes with the planed, estimated and fixed period of time.

6.2 Limitation of study

It was difficult to control the rate of intrathecal injection which was different from anesthetist to anesthetist and it was difficult to properly blind data collection. During data reviewing, it was possible to tell which subjects were in which group so this could be a source of possible bias. Most of studies used for comparison were randomized control trial.

Chapter seven: conclusion and recommendation

7.1 Conclusion

The result of our study demonstrates that the use of sequential administration of intrathecal fentanyl and hyper baric bupivacaine for patients undergoing elective cesarean section under spinal anesthesia have good hemodynamic stability, improve the quality of anaesthesia and increases the time for first rescue analgesic request time.

7.2 Recommendation

We recommend using sequential administration of fentanyl with hyperbaric bupivacaine to have good hemodynamic stability and quality of analgesia for patients undergoing elective cesarean section. We also recommend randomized control trial to be done to have better control for the peri operative factor affecting the outcome variables.

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Annex one:

Information sheet and consent form

Dear participants

Hello my name is _____ MSC anesthesia student working with Addis Ababa University on study to compare the hemodynamic and analgesic effect sequential versus pre mixed administration of intrathecal fentanyl with hyperbaric bupivacaine for patients undergoing elective cesarean section at Empress Zewiditu memorial hospital, 2012 E.C. You are selected to participate in this study by chance. The study will involve various intimate and private life questions. In order to achieve the objective of the research, we are requesting your participation. There are questions for you to answer and there is no need to put your name on the questionnaire; no individual response will be reported. Your response will be completely confidential. It is your full right to accept or refuse to give answer for questions. However; your honest answer to those questions will help us to assess and understand the effect. So; we are requesting you to give honest response and keep participation. Are you willing to participate?

A/ Yes, signature _____, B/ NO (Thank you very much for your help).

For any farther question, please contact the investigator.

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የመጠይቅ ፈቃድ

የተከበራችሁ የጥናቱ ተሳታፊዎች

እኔ _____ እባላለሁ፡፡፡በአዲስ አበባ ዩኒቨርሲቲ አንስቴዝያ ትምህርት ክፍል የምርምር ቡድን ዉስጥ እየሰራሁ እገኛለሁ፡፡ የዚህ ጥናት ዋና አላማ በ2012ዓ.ምበአድስ አበባ ጤና ቢሮ ስር በሚገኘዉ የ ዘዉድቱ መታሰቢያ ሆስፒታል ከወገብ በታች በሚሰጥ ማደንዘዣ የማዋለጃ ቀዶ ጥገና የሚደረግላቸው ታካሚዎች በቀዶ ህክምና ወቅት እና ከቀዶ ህክምናዉ በኃላ የሚደርስባቸዉን ህመም እና ችግሮች በመገንዘብ የሚደረግ ጥናት ነዉ፡፡በአጋጣሚ እርስዎም በዚህ እንዲሳተፉ ተመርጠዋል፡፡የዚህ ጥናት ጥቅም እርስዎ በሚሰጡት ምላሽ መሰረት መረጃዎችን በማሚላት በሚገኘዉ ዉጤት መሰረት መረጃዎችን በማጠናቀር ውጤቱን እየተሰራበት ካለው ጋር ማገናዘብ እንዲቻል ነዉ፡፡ጥናቱ በትክክል አላማውን እንዲመታ የእሶን ድጋፍ እንጠይቃለን፡፡ የማንኛውም ግለሰብ ስም አይመዘገብም እንዲሁም ሀሳቡ ብቻውን ይፋ እንዲወጣ አይደረግም ሙለ በሙለ በሚስጥር የተጠበቀ ነው፡፡እርስዎ ከጥናቱ የሚያገኙት ጥቅምም ሆነ ጉዳት የለም፡፡ በጥናቱ መሳተፍ አመለሳተፍ የራስዎ መብት ብቻ ነዉ፡፡ ግልፅ የሆነ ምላሽንና ከልብ የመነጨ ተሳትፎዎን እንዲሰጡን በአክብሮት እንጠይቃ□ን፡፡□መሳተፍ ፈቃደኛ ነዎት ? ሀ/ አዎ ፊርማ_____

ለ / አይደለሁም

መሳተፍ ፈቃደኛ ስለሆኑ እናመሰግናለን፡፡

ስልክ ቁጥር: 0923526532 **ኢሜይል:** tilahunanimut58@gmail.com

Annex two:

Questionary

Date ____/___/_

Check list

ADDIS ABABA UNIVERSTY
COLLEGE OF PUBLIC HEALTH AND MEDICAL SCIENCE
SCHOOL OF MEDICINE DEPARTMENT OF ANESTHESIA

Data collection formats to compare hemodynamic and analgesic effect of sequential versus pre mixed administration of intrathecal fentanyl with hyperbaric bupivacaine for patients who undergo elective cesarean section at Empress Zewiditu memorial hospital, Addis Ababa, Ethiopia, 2012 E.C.

Instructions:

A. Fill the blank space provided.

B. Encircle the alternatives when necessary.

Part 1. Section I: Socio-demographic and basic characteristics of the patient.

Medical registration number(MRN)		
Diagnosis		
S.no.	variables	response
101	age	……yr
102	weight	…….kg
103	height	……..cm
104	BMI	……..kg/m^2
105	parity	……

Part 2: data related to base line vital sign and intraoperative hemodynamic parameter

		Time											
s.no.	Vital sign	Base line	2 min	5 min	10 min	15 min	20 min	30 min	45 min	1 hr	2hr	3hr	4hr
201	HR												
204	MAP												

205. Thechiniqe of spinal anesthesia 1. pre mixed with one syringe

2. sequentially with two different syringe

206. Time of onset of sensory and motor block……..am/pm local time,

207.time taken till sensory and motor block…….. &……min respectively

208. Maximum level of sensory block……..

209. Does the client took vasopressor (adrenaline) intra operatively? 1. yes 2. no

2010. Duration of operation……min (from skin incision to skin closure)

2011. total estimated blood loss ……..ml

2012.Total volume of fluid took intra operatively. …….ml

Part 3: Question related on postoperative pain severity assessment by visual analogue scale.

S.no	Time	VAS Score(cm)
301	30 min	
302	1 hr	
303	2hr	
304	3hr	
305	4 hr	
306	5 hr	
307	6hr	
308	12hr	
309	24hr	

3010. time of first analgesic request time…….am/pm local time

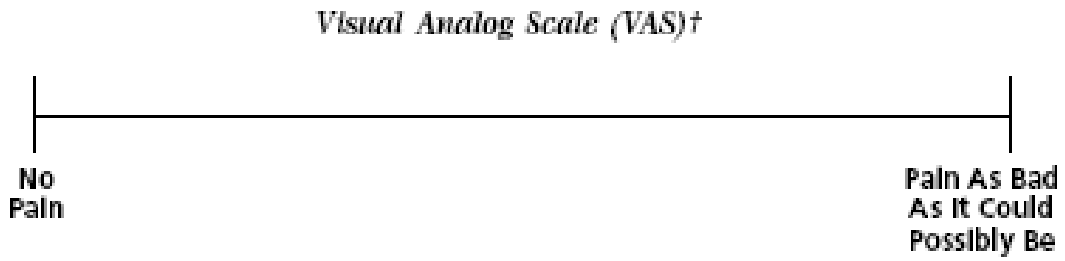
3011. Total time from onset of sensory block to first analgesic request time……..min

3012. time taken till motor block become grade 0……..min

3013. total consumption analgesia(Tramadol)…….mg , Diclofenac…..mg

Annex three:

Pain assessment tool: visual analogue scale (VAS) (0-10cm)



0- no pain 4-6cm=moderate pain

1-3cm= mild pain 7-10= sever pain

This scale will be taken 10 times within the first 24 hours and patients will be asked to mark their pain on the scale and will be recorded at, 30 min , 1 hr , 2 hr, 3 hr, 4 hr, 5hr , 12 hrs , 16hr, 20hr and 24 postoperatively

After training on this tool patients will be asked to mark their pain based on the following:

A. What point would you give your pain on this 0 to 10 scale?

B. When the explanation on the scale will not be clear to the patients further explanation of the assessment scale will be done.

Part 4: Question related on incidence of associated peri operative complications.

S.no.	Associated complication	Response
401	hypotension	A. yes B. no
402	nausea	A. yes B. no
403	vomiting	A. yes B. no
404	shivering	A. yes B. no
405	peruritis	A. yes B. no
406	Respiratory depression	A. yes B. no

Thank you !!!