~~Research Proposal~~

~~Practice of s~~Spinal anesthesia for cesarean delivery in two~~three~~ teaching hospitals, Addis Ababa, Ethiopia

A Research ~~proposal s~~thesis submitted to the department of Gynecology and Obstetrics for partial fulfillment of Specialty certificate in obstetrics and gynecology.

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~~March~~October, 2014

Addis Ababa, Ethiopia

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Acknowledgement

I would like to thank AAU-Department of Gynecology and Obstetrics for its encouraging support and effort to undertake research, My advisor, Dr Eyasu Mesfin for his unlimited guidance. Finally I appreciate the research team of staff for their motivated action and the respective hospital administrations

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~~Operational~~ List of Abbreviations

APGAR- appearance, pulse rate, gremace, activity, respiration

Bupi- bupivacaine

C/S – cesarean section

GA- general anesthesia

GMH- Gandih Memmorial Hospital

Hypo- hypotension

Lido- lidocaine

Opoid- opioids

PDPH- postdural puncture headache

PSCB- post spinal chronic backache~~PSCB postspinal chronic backache~~

SA- spinal anesthesia

~~SPH Saint Paul Hospital~~

TASH- Tikur Anbessa Specialized Hospital

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Abstract (summary)

The invention of anesthsia has radicalize the quality of surgery. Cesarean section, which is the leading major surgery, can be done by general or regional (spinal and epidural) anesthesia. For Spinal anesthesia, administration of anesthetic drugs in the sub-arachnoid space at L_2-L_4, anesthetist commonly use bupivacaine and lidocaine. This procedure is associated with complications like hypotension, high spinal block, intravenous cannulation, post dural puncture headache,

The main objective of this research is to assess the practice of spinal anesthesia and to determine the association between the anesthetic drug used and its complications, maternal satisfaction and outcome, neonatal outcome in ~~SPH,~~ GMH and TASH

Institution based on descriptive cross-sectional study will be conducted by taking a sample size of 38~~0~~4. Data will be collected using structured questionnaires by well trained health profesionnals and data entry and analysis will be done with SPSS virsion 21 and each variable will be entered to bivariate analysis

The study will be conducted from April 1- June 1/2014GC.

The estimated budget for the research is 23,168~~12,000~~ Eth Birr

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Introduction

1.

1.1.Back ground

Caesarean section refers to the procedure where a baby is delivered through an incision on the abdominal wall (laparotomy) and uterine~~r~~ wall (hysterotomy) of the mother. It is often life-saving and aims to preserve the health of the mother and her baby. It has played a major role in lowering both maternal and perinatal morbidity and mortality rates during the past century. There has been an increasing trend in the caesarean section rate in the last two decades not just in developed countries but also in developing countries. Contributing to its more frequent use is its increased safety, which is largely a result of better surgical technique, improved anesthesia, effective antibiotics, and availability of blood transfusions.

Although the operation has become very safe over the years, it is still associated with greater maternal mortality and morbidity (~~a~~1,2, ~~b~~). The risk of maternal death with caesarean section is four times than that associated with all types of vaginal birth, which is 1 per 10,000 births (~~a~~1). It is also known that there is a greater risk of neonatal respiratory distress with caesarean section than vaginal delivery, regardless of gestational age (~~a~~1). The type of anaesthesia used and the care with which it is administered is an important determinant of the outcome of caesarean section (~~a~~1, ~~c~~3).

~~a~~ ~~EnkinM, KeirseMJNC,Neilson J,CrowtherC,Duley L,HodnettE, et al. *A guide to effective care in pregnancy and childbirth*. 3rd Edition. New York: Oxford University Press, 2000.~~

~~b~~ ~~Hall M, Bewley S. Maternal mortality and mode of delivery. *Lancet* 1999;**319**:776.~~

~~c~~C ~~Andersen HF, Auster GH, Marx GF, Merkatz IR. Neonatal status in relation to incision intervals, obstetric factors, and anesthesia at cesarean delivery. *American Journal of Perinatology* 1987;**4**:279–83.~~

Either regional (epidural or spinal) or general anesthesia is an acceptable approach to providing anesthesia for cesarean delivery (~~d~~4). The type of anaesthesia chosen for caesarean section is dependent on numerous factors such as the urgency and indication of the operation, maternal

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preference as well as coexisting medical problems. Both regional and general anaesthesia for caesarean section have their advantages and disadvantages (e5) Spielman 1985). However, the use of general anesthesia has fallen dramatically in the past few decades and now accounts for only about 5 percent of cesarean deliveries in the United States and United Kingdom (f6).

d Afolabi BB, Lesi FE. Regional versus general anaesthesia for caesarean section. Cochrane Database Syst Rev 2012; 10:CD004350.

e Spielman FJ, Corke BC. Advantages and disadvantages of regional anesthesia for cesarean section. A review. *Journal of Reproductive Medicine* 1985;**30**:832–40.

f Djabatey EA, Barclay PM. Difficult and failed intubation in 3430 obstetric general anaesthetics. Anaesthesia 2009; 64:1168.

General anaesthesia refers to the loss of ability to perceive pain associated with loss of consciousness produced by intravenous or inhalation anaesthetic agents. There are many indications for general anaesthesia, some of which are failed regional anaesthesia, conditions where regional anaesthesia is contraindicated, maternal request and life-threatening foetal compromise. It is a more quickly administered procedure and is often preferred in cases where speed is important (1a).The risks however include the aspiration of stomach contents, awareness of the surgical procedure (due to inadequate anaesthesia), failed intubations, and respiratory problems for both mother and baby (a1).

Regional anaesthesia, on the other hand, refers to the use of local anaesthetic solutions to produce circumscribed areas of loss of sensation. The types of regional anaesthesia used for caesarean section (that is, spinal (subarachnoid) and epidural (extradural) anaesthesia) involve the infiltration of a local anaesthetic agent, usually bupivacaine, into the surroundings of the spinal cord through the lower back of the woman. The advantages of regional anaesthesia include the reduction of the incidence of general anaesthetic complications and that of early bonding between the mother and the newborn, since the mother is awake during the procedure (a1). Potential adverse effects common to both spinal and epidural anaesthetic techniques include: failure to provide adequate anaesthesia, maternal hypotension, post dural puncture headache (PDPH), itching and transient backache over the injection site.

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Spinal anesthesia has been used since 1898GC (by August Bier) and is becoming more and more common. There are two techniques of administering spinal anesthesia these are single shot technique and continuous technique. The later decreased popularity due to complications like neurologic complications, technical difficulty, increased failure rate and high rate of post dural puncture headache events. (~~2~~7)

1.2. Statement of the problem

There are lots of obstetric~~s~~ complications which needs cesarean section for proper management. It would have been unthinkable with out anesthesia and we would have had encountered devastating fetomaternal outcome including loss of life. The type of anaesthesia used and the care with which it is administered is an important determinant of the outcome of caesarean section (~~a~~1,~~c~~3). Although either regional or general anaesthesia can be used for caesarean section, regional anaesthesia is the preferred option when balancing risks and benefits to the mother and her fetus.

There are obvious advantages of regional anaesthesia, including avoiding the problem of a difficult airway, simplicity of technique, avoidance of multiple drugs required for general anaesthesia as well as allowing the parturient to be awake to witness the delivery of her baby thus enabling her to participate and enjoy the birthing experience. As a result, there has been a move towards more caesarean sections being performed under regional anaesthesia compared to general anaesthesia (8~~g~~,9)~~,[5]~~) The proportion of caesarean sections performed under regional anaesthesia has increased greatly over the last two decades, and this has avoided the problem of difficult airway during anaesthesia (8~~g~~,10~~h~~). The Royal College of Anaesthetists in the United Kingdom has proposed that more than 95% of elective caesarean deliveries and more than 85% of emergency caesarean deliveries should be performed using regional anaesthetic techniques (11~~i~~).

~~g. Bucklin BA, Hawkins JL, Anderson JR, Ullrich FA. Obstetric Anesthesia Workforce Survey. Twenty-year update. Anesthesiology. 2005;103:645–53. [PubMed: 16129992]~~

~~h. Sia ATH, Fun WL, Tan TU. The ongoing challenges of regional and general anaesthesia. Best prac Res Clin Obstetrics Gyn. 2009;24:303–12.~~

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~~iI, Russell IF. Raising the standard: a compendium of audit recipes. 2006. Technique of anaesthesia for caesarean sections; pp. 166–7.~~

~~There has been an increasing trend in the caesarean section rate in the last two decades not just in developed countries but also in developing countries. Currently in USA, anesthesia related maternal mortality has decreased to seventh on the list of cause of maternal mortality ie 1 3 maternal mortality per million maternities (1). This decrement has been attributed to increased use of neuraxial anesthesia for cesarean delivery, improved safety of neuraxial techniques and algorithms and airway devices to improve safety of general anesthesia. Despite this still the rate of maternal mortality is 10 fold higher with cesarean section when compared with vaginal delivery.~~

~~Anesthesist, in our set up, uses general anesthesia with thiopental or ketamine for induction and halothane for maintainance of anesthesia; there is lack of nitrous oxide, a routine inhalational anesthesia in the west. It is also increasingly becoming common to administer spinal anesthesia, our consern, with bupivacaine or lidocaine.~~

~~Spinal anesthesia has been used since 1898GC(by August Bier) and is becoming more and more common.there are two technique of administering spinal anesthesia these are single shot technique and continuous technique. The later decreased popularity due to complications like neurologic complications, technical difficulty, increased failure rate and high rate of post dural puncture headache events. (2)~~

In the sub-saharan Africa, 80 -90% of the Cesarean sections are performed under spinal anesthesia (123). The effect of spinal anesthesia could be augumented by adding opioids or epinephrine. The ideal anesthesia should be the one with fast onset and prolonged duration of action, no fetal or maternal side effect or complication. Spinal anaesthesia is advantageous for its ability of ~~coadminister~~co-administer analgesics such as opioids. In addition pregnancy events makes intubation difficult due to airway edema and breast enlargment. Th~~es~~is makes maternal mortality to be 16 times before 1990 and 3 times after 1990 higher when GA is given than regional anesthesia. So the former is becoming a routine practice in our set up. But there are Certain conditions contraindicate spinal anesthesia procedures. These include patient refusal,

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infection at the needle insertion site, significant coagulopathy, hypovolemic shock, increased intracranial pressure from mass lesion and inadequate provider expertise

~~Studies shows that spinal anesthesia exerts its mechanism of action by binding Na channel, by binding phospholipids on the cell membrane which causes conformational change Mayer Overton theory,and by binding on Ca receptors.~~

To have adequate duration of anesthetics effect and to decrease anesthetics side effect there is a minimum standard dose of Lignocaine, Levobupivacaine and Lidocaine this is called Minimum Local Anesthetics Concentration (MLAC) this dose could be further decreased by adding Opioids or Epinephrine. But in our set up it is not seen such combination of medication. The main reason is lack of high quality opioids like fentanyl, sulfentanil and experiance.

So in Ethiopia, where maternal mortality is high, it is important to see the quality of spinal anesthesia to increase its utility in a national level.

1.3. Litrature Reviews

Nowadays cesarean section accounts for 32% of delivery in USA.(123), 25.2% in Singapore(134), According to WHO's 2009 survey, the rate of caesarean section in Africa was 8.8%, which ranges from 1.1% in Angola to 18% in democratic republic of Congo.(145). ~~(5).~~ In Addis Ababa TASH, 30.5% of all deliveries(156), 28%% in Gondar.(167)

There has been a move towards more caesarean section being performed under regional anaesthesia compared to general anaesthesia worldwide. Compared to epidural anaesthesia, placement of a spinal anesthetic is technically easier than an epidural blockade. It is more rapid in onset and more reliable in providing surgical anesthesia from the mid-thoracic level to the sacrum with a failure rate of ~~,~~1%.(178) Spinal anaesthesia is associated with reduced maternal mortality, the need for fewer drugs and lower dose, more direct experience of childbirth, faster neonatal-maternal bonding, and excellent postoperative pain control through the use of neuraxial opioid.(189). A recent review examining anesthesia-related maternal deaths from 1991 to 2002 noted maternal mortality rates for general anesthesia were 16.8 per million in 1991–96

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decreasing to 6.5 per million in 1997–2002, and regional anesthesia mortality rates remained lower at 2.5 and 3.8 per million, respectively .(1910).

The type of anesthesia chosen for cesarean section is dependant on numerous factors like urgency of operation, indication for C/S, maternal preference and coexisting medical disorders. In the United States GA accounts for less than 5%of elective C/S. According to the Royal College of Anaesthetists in UK, regional anesthesia, which have low side effect, accounts for 95%of elective C/S and 85%of emergency cesarean deliveries. In a recent survey of hospitals In the south-west Thames region of the UK, where a total of 37,000 births a year, the rate of regional anaesthesia for elective caesarean section was 94.9%, with spinal anaesthesia being used in 86.6%of these cases; for emergency caesarean section, the regional anaesthesia rate was 86.7%with spinal anaesthesia being used in 44.1%of cases.(2011). Due to lack of epidural set and trained personell we practice general or spinal anesthesia for cesarean section.

Study done by ACOG showed that hypotension despite prehydration found to be 25-67%(2112). Another research done by US Academic center shows that hypotension due to sympathetic blockage to be 24%.(2213).Institution based study done at University of Gondar showed that from 97 patients operated under spinal anesthesia, 8 patients (8.3%) developed hypotension after spinal block and were given adrenaline 10 µgmIV. .(167xxxUoG) But this should be differentiated from supine hypotension (defined as decrement of MAP by more than 15mmHg and increment of maternal HR by more than 20BPM)..(2314) The research also shows that the incidence of postdural puncture headache(PDPH) is 1.5-3% and another study from UK shows the incidence to be 1%(2415). The apparent high risk of PDPH led to the development of microcatheters; but these catheters were unfortunately associated with kinking, breakage and cauda equina syndrome.(2516) So FDA in United States banned use of catheters finer than 24 Guage. but in our set up it looks much higher than this, may be due to multiple puncture, wider and non-pensil-point needle. Large scale study done by Bloom and colligues(2004) from Maternal Fetal Medicine Unit Network shows that 1.7% of failed regional block which require GA and shift to GA for specific single shot spinal anesthesia is 1.2-1.4%.(2617), and 0.05% risk of high spinal block.(2718). Another multicenter prospective study in USA of over 34600 mothers undergoing cesarean section with neuraxial technique between 1999 and 2002 noted high spinal block in 23 cases (0,07%) and no case of meningitis, nueraxial abscess, or

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hematoma.(28~~19~~); but a retrospective Swedish study shows the rate of serious neurologic damage(neuraxial hematoma, or abscess, cord damage) due to obstetrics spinal procedure to be 1:25,000.(29~~20~~)

~~Significance of the study~~

~~This study is going to be undertaken in governmental hospitals where most of cesarean section is being done. So it will yield data on its prevalence, attitude of mothers towards spinal anesthesia, and magnitude of its complications in our set up. This will modify our preparation and degree of counselling before the operation.~~

1.4. Rationale of the study

Prevalence of regional anesthesia use during cesarean appears to be very low in our country compared to the practice in many countries and international recommendations. In addition there is no adequate information on the quality of regional anesthesia use in our setup. The purpose of this study is to assess the prevalence and quality of spinal anesthesia use, attitude of mothers towards spinal anesthesia, and magnitude of its complications in our set up.

The results of this study may benefit women at risk of delivering by C/S and involved health professionals. And, the study is anticipated to come up with baseline data for future studies with larger sample size & national studies.

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Objectives

2.

General objective- To assess the practice and outcome of spinal anesthesia use for cesarean delivery in twothree teaching hospitals.

2.1.

2.2. Specific objective-

- To determine the prevalence of spinal anesthesia use for cesarean delivery
- To describe complications with the use of spinal anesthesia
- To describe obstetric outcome with the use of spinal anesthesia
- To verify the attitude of mothers towards the choise of anesthesia.
- To assess the preoperation and counselling of mother for selection of anesthesia.

3. Methodology

3.1. Study design – dA institution based prospective descriptive cross sectional study. to be done by using self administered questionnaires.

3.2. Study area – The study will be conducted in 23 teaching hospitals in Addis Ababa, the capital city of Ethiopia; namely TikurAnbesa Hospital, aSt Paul's Hospital and Gandhi Memorial Hospital. These hospitals are affiliated to the Department of Gynecology and Obstetrics, School of Medicine, AAU. A total of about the study is going to be conducted in Addis Ababa specifically Tikur Anabessa Specialized Hospital, Gandih Memmorial Hospital and Saint Paul Hospital. These hospitals are found in Addis Ababa, the capital city of Ethiopia, and yearly visited by about 812,000 mothers deliver every year in the hospitals for delovery service of whichwith about a quarter will them1 ending up with cesarian section.

3.3. Study period:-

The study will be conducted from April 1- June 1/2014 GC.

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3.4. Source population: -. All mothers who deliver in the twothree teaching hospitals during the study period.

3.5. Study population- All are mothers who undergone cesarean section with spinal anesthesia in a specified period of time(in months)during the study period who fulfilled the inclusion and exclusion criteria.

3.6. Eligibility:

3.6.1. **Inclusion criteria**

-mothers who undergone deliver by C/S with SA

-

term pregnancy

accept informed concent

-

3.6.2. **Exclusion criteria**

--Mothers who refuse to participate in the study

--Estimated blood loss abave 1000ml - C/S done on association with PIH and APH,

estimated blood loss (EBL) abave 1000ml,

combined spinal-epidural anesthesia

mothers with severe and complicated medical disorder

3.7. Sample size – 384 mothers who undergone cesarean section with spinal anesthesia will be included in the study. Cases will be selected by simple random sampling technique in the study period.The sample size was calculated using the Gonder study prevalence of spinal anesthesia during cesarean delivery of 34 **%.** A single population proportion formula with level of significance being 5%, **Z=** confidence level at 95% (standard value

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of 1.96) and absolute precision or margin of error at 5% (α= 0.05) was used to calculate the sample size as follows:-

$$\text{Sample size} = \frac{Z_{1-\alpha/2}^2 p(1-p)}{d^2}$$

Z= standard normal variate (1.96)

P=expected proportion in population (34%)

d= absolute error or precision (5%)

n= $(1.96)^2$ x 0.34 x 0.66

$(0.05)^2$

= 345

If contingency of 10% added to sample size

n= 380

3.8. Data collection- ~~d~~Data will be collected by two~~three~~ trained health professionals using a pre tested questionaires which contains:- ~~demography, maternal attitude for anesthesa, the type of anesthesia drug used and its effect, neonatal and maternal complications, year and month of data collection, signature of data collector.~~

- Socio-demographic data,
- Clinical data, and
- Obstetric outcome data.

The data collectors will be supervised by the principal researcher.

3.9. Data compilation and analysis

The data will be cleaned and checked for completeness. It will be co~~n~~mpilled and analyzed using SPSS version 21. Descriptive statistics will be used to analyze the data. Percentage, mean, median, standard deviation and range will be used to describe the findings. Tables and different graphs will be used to assist data presentation.

Additionally association between variables will be determined with Chi-square. P value of < 0.05 will be taken as statistically significant. The probability of dependant variables against independant variables will be analyzed with logstic regression. Then the final report will be presented to AAU department of Obstetrics and Gynecology as a fulfillment for postgraduation study.

Independant variables-

- ~~age,~~
- parity
- indication for C/S
- bupivacaine, lidocaine
- baricity of SA
- year of experiance of anesthetist,
-
- guage of spinal needle
-

Dependant variables ~~- hypotension,~~

- hypotension,
- post dural puncture headache,
- post spinal chronic backache,
- high spinal block,

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- neonatal APGAR score,
- shift to GA after spinal,
- maternal death

~~1.~~4. Ethical consideration-

Ethical clearance will be obtained from the Research & Publication Committee (RPC) of the Department of Gynecology and Obstetrics, School of Medicine, Addis Ababa University. Permission will be obtained from medical director of each hospital to conduct the research. Verbal informed consent will be obtained from each study participant and its confidentiality will be maintained. Names or any other personal identifiers of study participants will not be recorded.

5. Limitations of the study

The study population is not representative of the population of the country. Thus outcomes of the study won't be generalizable to the general set up.

~~ethical clearance will be taken from the respective hospitals. Verbal concent will be taken from the mothers and its confidentiality will be maintained. Laison Office Phone will be used to communicate mothers for more information. Encountered patients complaint will be adressed.~~

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6. Operational definitions

Spinal anesthesia- local anesthesia that will be administered into sub arachnoid space for operation purpose

Opioids- medications which have analgesic effect by their own receptors

Hypotension- drop of systolic blood pressure <90mmHg or by 20mmHg.during operation

Post dural puncture headache- headache which gets worse during sitting and standing position and gets relieved with supine position in the 1-4 post operation days,

Post spinal chronic back ache- backache that persists for 6 weeks after operation which was not there before,

Shift to GA- when GA is given after successful spinal anesthesia within 30min during C/S

Spinal needle- special needle to do lumbar pincture to administer spinal anesthesia

High spinal block- during operation, if there is bradycardia(PR<60'), or bradypenia(RR<12'), need of intubation despite good anesthetic effect

Preload infusion ~~**Rehydration**~~- infusion of 500-1000ml crystalloids before the operation

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7. Result

Sociodemographic characterstics

During the study period (3/8/2006EC-4/10/2006EC) there were a total of 1713 deliveries, with 1176 deliveries at GMH and 537 deliveries at BLH. The overall C/S rate was 32.5% (557/1713) while the C/S rates at GMH and BLH were 32.9% (387/1176) and 31.7% (170/537) respectively. Since C/S by spinal anesthesia at GMH is 3X that of TASH, 285 cases from GMH and 95 cases from TASH selected by systematic random sampling technique. The age of the study participants ranges from 18 to 42 years with a mean and mode age of 28 years. Most of the participants, 244 (64.2%), were in the age group 25-34. Maternal parity condition was determined and 182(48%) & 133(35%) of the mothers are para l and para ll respectively while only 5 (1.4%) were para V or more. Majority of the participants were married, Orthodox christian by religion, Amhara by ethinicity and completed primary school or above by education with frequncy of 363 (95%), 353 (93%), 205 (54%) and 246 (64.8%) respectively. Only 5% of the mothers have monthly incomne of <600 birr, and 23% have income >4000 birr. (See table -1 below)

Table 1: Socio-demographic characterstics

VARIABLE	FREQUENCY	PERCENTAGE
Age in years		
15-19	21	5.5
20-24	67	17.6
25-29	155	40.8
30-34	89	23.4
>34	48	12.6
Parity		
Para I	182	47.9

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Para II-IV	193	50.8
Para >IV	5	1.4
Religion		
Orthodox	284	74.7
Muslim	59	15.5
Protestant	36	9.5
Others	1	0.3
Ethinicity		
Amhara	205	53.9
Oromo	72	18.9
Guragae and Silti	77	20.3
Tigre	16	4.3
Others	10	2.6
Residence		
Addis Ababa	353	92.9
Out of Addis Ababa	27	7.1
Education		
Tertiary	84	22.1
High School	123	32.4
Primary Education	123	32.4

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Able to Read and Write	11	2.9
Unable to Read and Write	39	10.3
Marital status		
Married	363	95.5
Not Married Partner	12	3.8
Divorced	3	0.8
Pregnancy due to Rape	2	0.5
ANC status		
Yes	374	98.4
No	6	1.6

Maternal and Neonatal characterstics

During the study period, in GMH of 387 C/S 341 (88%) done with Spinal Anesthesia. In TAH from 170 C/S 106 (62%) done with spinal anesthesia. This make the rate of spinal anesthesia to be 80%. Most of C/S 254 (66.8%) done at term but 47(12.4%) are in postterm, 26(6.8%) are preterm. About 14% of the mother dont remember their LMP. From all cesarean sections 313 (82.4%) are emergency the rest 67(17.6%) done on elective basis. The top most common indications being NRFHRP and previous C/S scar with X-factor each accounting 29%, followed by CPD 42 (11.1%), malpresentation 32 (8.4%), twin pregnancy with X factor 30 (7.9%), non reassuring biophysical profile 29 (7.6%). (See figure -1 below)

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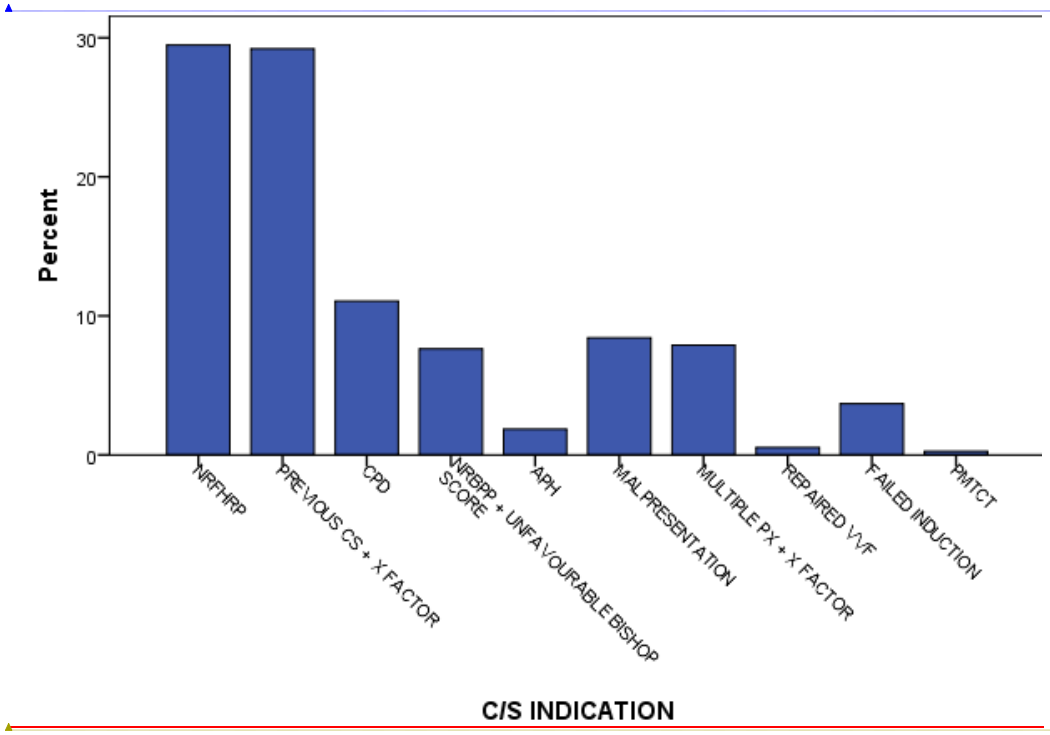

Figure -1: Distributive frequency of C/S indication at GMH and TASH from 3/8/06 EC to 4/10/06EC

Majority of the cesarean deliveries, 237(62%), were done by Year 2 residents while only 9 (2.4%) of the C/S were done by senior Obstetricians. (See table -2 below)

Table 2: Operator Status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YEAR 2 RESIDENT	237	62.4	62.4	62.4
	YEAR 3 RESIDENT	113	29.7	29.7	92.1
	YEAR 4 RESIDENT	21	5.5	5.5	97.6
	CONSULTANT	9	2.4	2.4	100.0
	Total	380	100.0	100.0	

Only two mothers were given SA in left lateral position, Incision to delivery interval of almost half of the mothers (48%) is 5min. Only 28(7.4%) of the mothers deliver within 2min and the longest interval being 16minutes. 95% of the new borns are delivered with APGAR score of 7

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and abave. About 19% of newborns were admitted to NICU. Of 380 mothers, 241(192 from emergency and 49 from elective C/S group) were preloaded with crystalloids, but we found that as high as 241 (63.4%) are hypotensive i.e 65% from preloaded group and 61% from not preloaded group.

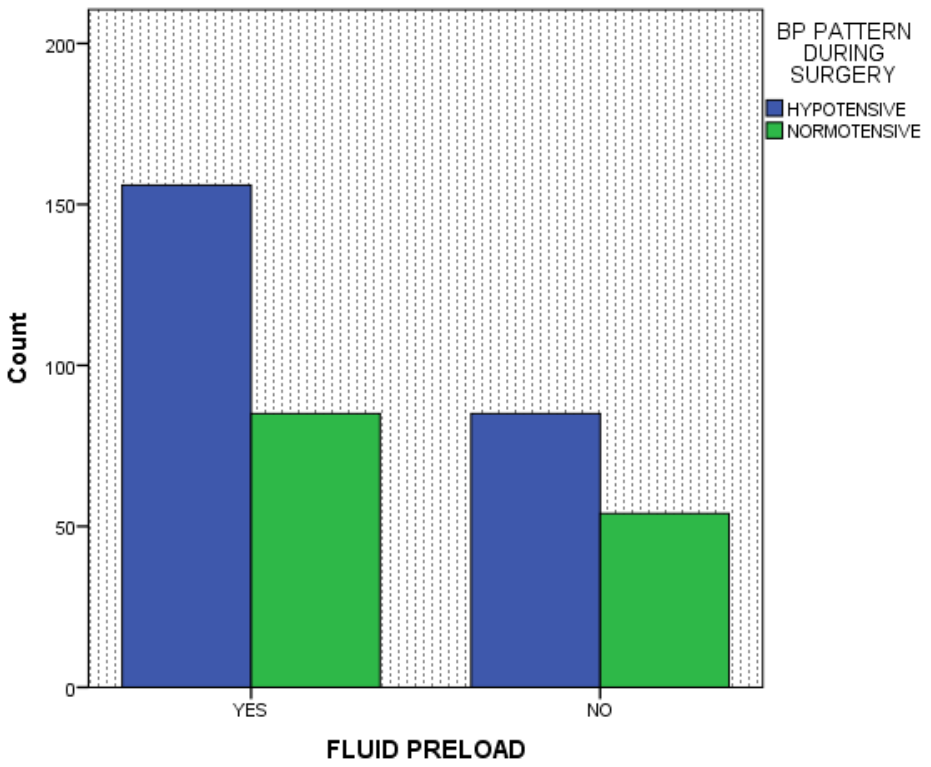

Fig 2 relation between fluid preload and hypotension

The most common SA administered is Lidocaine 296 (78%) and the rest is Bupivacaine. But there is no mother who has been given SA with Epinephrine or with Opioids. Majority (66.5%) of the SA were administered by anesthetists with work experiance of 4 years and less. The PDPH after cesarean section with SA was found to be 34.2%; from this 110(84.6%) were managed while the rest 20(15.3%) of the PDPH were not managed at the time of data collection. Vomiting was experianced in 28.7% of the mothers during and immediately after the surgery. From all of our study participants, 13(3.4%) mothers were given GA 30 min after SA initiated, from this

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1.which ones were preloaded (elective Vs emergency)?
2.how much fluid loaded/
3.the duration of fluid loading? especially in emergency C/S? mainly NRFHRP?
4.SA administration-incision interval?
5.DDI in emergency C/S, especially NRFHR?

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7(1.8%) required intubation. Only 24 (6.3%) of the mothers were counselled on the choise of anesthesia, the majority 356 (93.7%) were not counselled, just given information about what is going to be done. After the operation 90.3% of the mothers are happy with the mode of anesthesia administration and its benefits. They also prefer SA in the future if they are in need of operation but 37(9.7%) of the mother are not happy with the effect of SA. After 6 weeks of operation 326 mothers (the rest 54 mothers are not reachable with phone) were communicated with phone, from whom 40(10.5%) complain of persistent or recurrent back pain which was not there before SA injection.

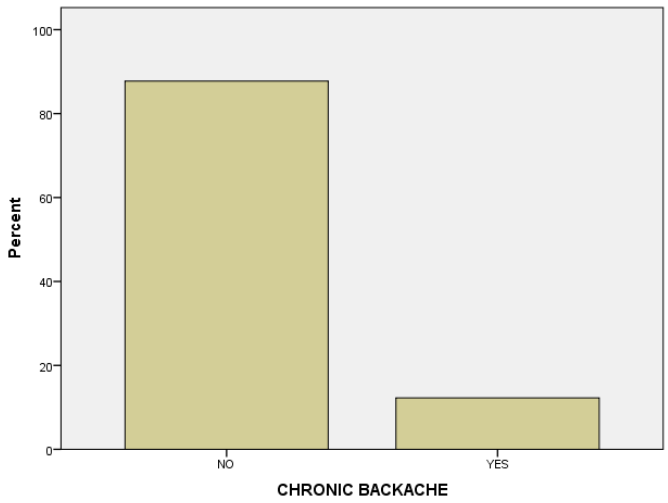

Figure 3: Bargraph showing incidence of chronic backache 6weeks after C/S

With bivariate analysis the study shows that lidocaine is 2.3X higher in causing hypotension than bupivacaine which is statistically significant with P value= 0,001 2.33(95%CI 1.4-3.8). Fluid preload doesnt make any statistically significant difference on the incidence of hypotension. And there is no statistically significant difference on the choise of SA for other complications like PDPH, chronic back ache, need for GA

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Table 4 relation between SA type and hypotension

SPINAL ANESTHESIA TYPE * BP PATTERN DURING SURGERY Crosstabulation

			BP PATTERN DURING SURGERY		
			HYPOTENSIVE	NORMOTENSIVE	Total
SPINAL ANESTHESIA TYPE	3ML BUPIVACAINE .5%	Count	40	44	84
		% within SPINAL ANESTHESIA TYPE	47.6%	52.4%	100.0%
	2ML LIDOCAINE 5%	Count	201	95	296
		% within SPINAL ANESTHESIA TYPE	67.9%	32.1%	100.0%
Total		Count	241	139	380
		% within SPINAL ANESTHESIA TYPE	63.4%	36.6%	100.0%

It is also found that when experiance of anesthetist increase, the incidence of hypotension during surgery decreases. This is also statistically significant with P value 0.00, 0.002 ~~OR 3.8, 3 , 3~~ as we go upward successively

Table 5: Bivariate analysis of experiance of anesthetist and incidence of hypotension

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	EXPERIENC			26.188	5	.000			
	EXPERIENC(1)	-1.351	.368	13.441	1	.000	.259	.126	.533
	EXPERIENC(2)	-1.355	.342	15.727	1	.000	.258	.132	.504
	EXPERIENC(3)	-1.122	.355	10.012	1	.002	.326	.163	.653
	EXPERIENC(4)	-1.098	.355	9.542	1	.002	.334	.166	.670
	EXPERIENC(5)	-.326	.386	.712	1	.399	.722	.339	1.538
	Constant	.274	.215	1.626	1	.202	1.316		

a. Variable(s) entered on step 1: EXPERIENC.

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Table 6: showing relation of Anesthetist experience and hypotension trend

ANESTHETIST EXPERIENCE * BP PATTERN DURING SURGERY Crosstabulation

			BP PATTERN DURING SURGERY		
			HYPOTENSIVE	NORMOTENSIVE	Total
ANESTHETIST EXPERIENCE	1 year	Count	44	15	59
		% within ANESTHETIST EXPERIENCE	74.6%	25.4%	100.0%
	2 years	Count	56	19	75
		% within ANESTHETIST EXPERIENCE	74.7%	25.3%	100.0%
	3 years	Count	42	18	60
		% within ANESTHETIST EXPERIENCE	70.0%	30.0%	100.0%
	4 years	Count	41	18	59
		% within ANESTHETIST EXPERIENCE	69.5%	30.5%	100.0%
	5 years	Count	20	19	39
		% within ANESTHETIST EXPERIENCE	51.3%	48.7%	100.0%
	>5 years	Count	38	50	88
		% within ANESTHETIST EXPERIENCE	43.2%	56.8%	100.0%
Total		Count	241	139	380
		% within ANESTHETIST EXPERIENCE	63.4%	36.6%	100.0%

The research also showed that vomiting during and immediately after operation more common with lidocaine than bupivacaine. This is also statistically significant with P value 0.029 OR 1.9(95%CI 1.1-3.5)

Table 7: Spinal anesthesia type

SPINAL ANESTHESIA TYPE * VOMITING DURING CS Crosstabulation

			VOMITING DURING CS		
			YES	NO	Total
SPINAL ANESTHESIA TYPE	3ML BUPIVACAINE .5%	Count	16	68	84
		% within SPINAL ANESTHESIA TYPE	19.0%	81.0%	100.0%
	2ML LIDOCAINE 5%	Count	93	203	296
		% within SPINAL ANESTHESIA TYPE	31.4%	68.6%	100.0%
Total		Count	109	271	380
		% within SPINAL ANESTHESIA TYPE	28.7%	71.3%	100.0%

It has been found that low APGAR score in preterm is 12%, postterm 6.4% and at term 2.4%. this is also ststistically significant with P value of 0.03. But there is no association between APGAR score and incision to delivery interval.

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Table 8: Gestational age on C/S day,

GESTATIONAL AGE ON CESAREAN SECTION DAY * APGAR SCORE 1MIN Crosstabulation

			APGAR SCORE 1MIN		
			1-6	7 AND ABAVE	Total
GESTATIONAL AGE ON CESAREAN SECTION DAY	PRETERM	Count	3	22	25
		% within GESTATIONAL AGE ON CESAREAN SECTION DAY	12.0%	88.0%	100.0%
	TERM	Count	6	246	252
		% within GESTATIONAL AGE ON CESAREAN SECTION DAY	2.4%	97.6%	100.0%
	POSTTERM	Count	3	44	47
		% within GESTATIONAL AGE ON CESAREAN SECTION DAY	6.4%	93.6%	100.0%
Total		Count	12	312	324
		% within GESTATIONAL AGE ON CESAREAN SECTION DAY	3.7%	96.3%	100.0%

We have assessed the association between chronic backache and the type of C/S based on urgency. We found that the rate of chronic backache is high when the C/S is elective than emergency. This is statistically significant with P vaiue 0.04 OR2(95%CI 1.01-4.5)

Table 9: C/S type Vs chronic back ache

C/S TYPE * CHRONIC BACKACHE Crosstabulation

			CHRONIC BACKACHE		
			YES	NO	Total
C/S TYPE	EMERGENCY	Count	28	238	266
		% within C/S TYPE	10.5%	89.5%	100.0%
	ELECTIVE	Count	12	48	60
		% within C/S TYPE	20.0%	80.0%	100.0%
Total		Count	40	286	326
		% within C/S TYPE	12.3%	87.7%	100.0%

The association between mothers' attitude and PDPH was assessed and there is statistically significant association with P value 0.004

Table 10: PDPH

PDPH * LIKE SA NOW Crosstabulation

			LIKE SA NOW		Total
			YES	NO	
PDPH	YES	Count	109	21	130
		% within PDPH	83.8%	16.2%	100.0%
	NO	Count	234	16	250
		% within PDPH	93.6%	6.4%	100.0%
Total		Count	343	37	380

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% within PDPH	90.3%	9.7%	100.0%

8. Discussion

In our study C/S accounts for 32% of all deliveries. This finding is similar to that of USA which is also 32%(3), and in Gondar=28%(7). The rate of SA for C/S is 80% ie 88% in GMH and 62% in TASH. The difference between the two hospital may be due to higher comorbid cases in TASH which need GA from the beginning. But in general the total rate of SA in our set up is a bit lower than the recommendation by RCOG(11) and it is similar with the study by WHO for sub sahara countries which is 80-90%(3).

Elective C/S is found to be 2 times higher than the elective C/S in Gondar which is 8%(7). This may be due to few number of beds in the maternity ward. The two top most common indication for C/S are NRFHR pattern and previous C/S scar. This is also similar with that of USA, bur in Gondar it is NRFHR pattern and malposition. This may be due to Gondar University Hospital is the only referral hospital for more than 50 health centers so CPD cases are going to be referred only to this hospital .

Research showed that administering SA on left lateral has multiple fetomaternal advantage, but it is not being exercised. This is due to lack of awareness and experiance. Incision to delivery interval has shown inverse association with APGAR score in study done in Gondar(7), and by ACOG(12). But our research doesn't show such association. Despite preload, hypotension was found in 61% of the mothers. ACOG reported 45%(12), and US Academic Center reported 24%(13). In Gondar it is picked in 8.3%(7) and was given Adrenalin. This may be due to difference in the definition of hypotension. Hypotension is more associated with lidocaine rather than bupivacaine. This finding is statistically significant with P value 0.001.

The incidence of PDPH from study done in Gondar is 1.5-3%(7) and another study from UK is 1%(15), but our study shows that it is 34.2% which is significantly higher than the other studies. This may be explained by that most lumbar puncture are done by anesthesia students who puncture subarachnooid space multiple times with 21 and 22guage needle.There is no other variable like PDPH which significantly affects mothers' attitude towards spinal anesthesia now and for the future, i.e if the mother has PDPH, she hates SA, P value 0.004

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From all participants 1.8% required GA with intubation. But the documentation doesn't show whether it is due to SA failure or high spinal block. Similar finding was seen from Maternal Fetal Medicine Unit Network which shows SA failure rate of 1.7%(17). The study also revealed that Chronic back ache was seen in about 10% of the mothers which is more associated with elective C/S than emergency C/S.

9. Conclusion and Recommendation

Cesarean section with SA is significantly higher than with GA (80% V 20%). This is a good trend and need to be augumented with the addition of opioids and epinephrine.

The study showed that the incidence of PDPH is very high. There fore we have to be vigilant in diagnosing mothers with PDPH, and manage it accordingly. Since maternal attitude towards spinal anesthesia is significantly affected by presence of PDPH, lumbar puncture by experianced hand will increases SA utility.

Intraoperative hypotension is also very high. Despite this figure vasoconstrictor medications like Ephedrine, Phenylephrine were not available. There fore pharmacy should make available these important medications. SA administration while the mother is leftlateral position has fetomaternal advantage over sitting position, so we need comparative study on this line. In addition the anesthesia unit need to review the quality and practice of their fluid preloading which is an important preventive intervention.

About 2% of the mothers were intubated. This is not clear whether it is from failed SA or high spinal block. So documentation should be improved. Chronic backache is as high as 10%. This finding is also high in those from elective C/S. This needs further study.

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Annex -1: Budget ~~Ethical consideration~~

~~ethical clearance will be taken from the respective hospitals. Verbal concent will be taken from the mothers and its confidentiality will be maintained. Laison Office Phone will be used to communicate mothers for more information. Encountered patients complaint will be adressed.~~

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Work Plan

Table 1 the following table depicts the work plan of the research that classifies the activity to be done, responsible person and the time frame for each activity.

Seri no.	Activity to be done	Responsible person/s	schedule	remark
1	Communicating with hospital administration for permission	investigators	April 1	
2	Training of data collectors	Principal investigators	April 5	
3	Data collection	investigators	April 6 May 20	
4	Data cleaning, entry and compiling	investigators	May21 24	
5	Data analysis	investigators	May 25 28	
6	Write up	investigators	May29 June 3	
7	Submission of final report	investigators	June 5	

Table 2 table showing financial cost of the research

S No	Item required	Unit	Amount required	Unit price (br)	Whole price (ETH Birr)
1	paper	packet	3	100	300
2	pen	each	3	6	18
3	pencil	each	3	2	6
4	Pensil sharper	each	6	2	12
4	binder	each	4	30	120
5	erasor	each	6	2	12

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6	staples	packet	10	20	200
7	Transportation	total	120	10	1200
8	Phone card	total	1500	1500	1500
8	Paper duplication	total	800	1	800
9	Personel cost	each	3804	2520	19,0007,680
Total					23,16812,000

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Annex -2: References

1. 2US Food and Drug Administration: FDA Safety Alert: Cauda Equina Syndrome Associated with the Use of Small bore Catheters in Continuous Spinal. 1992 [PubMed]
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Questionnaire on spinal anesthesia to aessssess neonatal and maternal outcome

General questions

1.Code number_____

2.Date of interview __/__/__

3.interviewer's name_____

4.Result of data collection

4.1 complete

4.2 incomplete

4.3 others

5. Checked by investigator Signature_____

Date __/__/__

Interviewer	Introduce yourself to the client

Hello, My name is ..... We are conducting a study to asseess and improve the quality of spinal anesthesia for those who have undergone cesarean section As part of this, I would like to ask you some questions about the services you have received and any complaint in relation to the operation. There is no risk if you agree to participate in the interview. All the information that you give to me will be kept confidential; your name will not be used and you will not be identified in any way. This interview should take approximately 20 min to complete. Your participation is absolutely voluntary and there is no penalty for refusing to take part. You are free to ask any questions; you may refuse to take part in the interview; you may refuse to answer any question in the interview; and you may stop the interview at any point.

Do you have any questions for me at this time about this survey?

Yes_____ No___

Do you agree to participate in this interview? Yes_____ No_

IF NO, THANK THE PARTICIPANT AND CLOSE THE INTERVIEW.

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Interviewer's signature _____ Date __/__/__

	PART 1 socio-demographic characterstics		Skip
1.0	Phone number	.....	
1.1	How old are you	.....years	
1.2	Parity	~~1.para 1~~ ~~2.multiparous~~ .....~~3.no response~~	
1.3	What is your religion	1.orthodox 2.catholic 3.muslim 4.protestant 5.others(specify)	
1.4	What ethnic group do you belong to	1.amhara 2.oromo 3.gurage	

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		4.tigre 5.other(specify)	
1.5	Residence	1. in Addis Ababa~~rural~~ 2. ~~urba~~~~on~~ut of Addis Ababa	
1.6~~5~~	What is the highest educational level you completed?	1.Tertiary education 2.High school 3.Primary education 4.Able to read and Write 5.Unable to read & Write 6.No response	
1.7~~6~~	What is your current marital relationship status?	1.married 2.not married partner 3.divorsed 4.pregnancy due to rape 5.no response	
1.8~~7~~	What is your total monthly income?	1.Your own income---------- Eth.Birr 2.Husband's income---------- Eth.Birr 3.Other income sources..... Eth.Birr 4.No income ---------- 5.Doesn't know her own income 6.Doesn't know her partner income	

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Part two- ~~Clinical factors~~clinical data			
2.0	ANC follow up atleast once	1.yes 2.no	
2.1	GA on the day of C/S	1. weeks 2. Unknown	
2.2	Type of C/S	1. emergency 2. elective	
2.3	Indication for C/S	.....	
2.4~~3~~1	Operator status	1.year 1 resident 2.year 2 resident 3.year 3 resident 4.year 4 resident 5. by senior	
2.5~~4~~2	Position of the mother during administration of spinal anesthesia	1 sitting position 2 left lateral position 3 right lateral position 4 no responce	
2.6~~5~~3	Time interval between administration of SA~~spinal anesthesia~~ to ~~insensina~~incistion	.....minutes	
~~2.14~~	~~Type of C/S~~	~~1 emergency~~ ~~2 elective~~	
~~2.25~~	~~Indication for cesarean section~~		

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2.76	Was the mother preloaded with crystalloids ~~rehydrated~~ before SA administeration	1 yes 2 no 3 not documented	
2.87	The lowest BP during C/S	1 sBP<90mmHg or drop by >20mmHg 2 sBP>90mmHg or drop by <20mmHg 3 not documented	
2.98	Medications like phenylephrine, ephedrine ready?	1 yes 2 no 3 no response	
3.02.9	Experiance of anesthetist on SA	~~1 >2 years~~ ~~2 < 2 years~~ .....years~~3 no response~~	
3.10	The type of SA drug used	1.....ml Bupivacaine.....% 2.....ml Lidocaine.....% 3 Bupivacaine with opoid 4 Lidocaine with opoid 5 specify.....	
3.21	Baricity of spinal anesthesia	1 hypobaric 2 isobaric 3 hyperbaric 4 not documented	
3.32	Guage of spinal needle used for SA administeration	.....guage	

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~~3.3~~	~~The position of the mother during administration of SA~~	~~1 sitting~~ ~~2 left lateral~~ ~~3 right lateral~~ ~~4 no response~~	
3.~~4~~4	Do you have PDPH ?	1 yes 2 no 3 no response	
3.4.1	If your answer for question number is “yes”, how was it managed?	1 to assume supine position 2 with analgesics 3 with ice pack 4 with supine position and analgesics 5 with epidural blood patch 6 not managed 7 any other	
3.5	Was there a need to add GA within 30 minutes during operation?	1 yes 2 no 3 not documented	
3.6	Does she need intubation and ventilation for SA complication	1 yes 2 no 3 not documented	
3.7	Were you counselled about options of anesthesia	1 yes 2 no 3 no response	
3.8	Have you had nausea and vomiting during operation	1 yes 2 no 3 no response	

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3.9	Do you like the mode of anesthesia (SA) you have been given	1 yes 2 no 3 no response	
4.0	Do you want to be given SA if you are going to deliver by C/S in future	1 yes 2 no 3 no response	
4.1 (After 6 weeks of operation)	Do you have persistent or intermitent backache after the operation?	1 yes 2 no 3 no response	
4.2	State any other complication associated with SA use during the six weeks period	_____ _____ _____	
Part three Neonate condition			
4.3~~4.2~~	Neonatal weight	1 <2500 gm 2 2500-3999 gm 3 > or = 4000gm 4 not documented	
4.4~~3~~	1st minute Neonatal APGAR score	1. 0 ~~1~~2. 1-~~<~~ 7 ~~2~~3 >or = 7	
4.5~~4~~	Was the neonate admitted to NICU	1.yes 2.no 3.not known	
4.6~~5~~	Condition of the neonate at discharge	1. Alive	

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		2. Dead	

~~3,7~~
~~Were you counselled about options of anesthesia~~
~~1 yes~~
~~2 no~~
~~3 no response~~
~~3.8~~
~~Have you had nausea and vomiting during operation~~
~~1 yes~~
~~2 no~~
~~3 no response~~
~~3.9~~
~~Do you like the mode of anesthesia(SA) you have been given~~
~~1 yes~~
~~2 no~~
~~3 no response~~
~~4.0~~
~~Do you want to be given SA if you are going to deliver by C/S in future~~
~~1 yes~~
~~2 no~~
~~3 no response~~
~~4.1(After 6 weeks of operation)~~
~~Do you have persistent or intermitent backache after the operation?~~
~~1 yes~~
~~2 no~~
~~3 no response~~
~~**Part three Neonate condition**~~
~~4.2~~
~~Neonatal weight~~
~~1 <2500 gm~~
~~2 2500-3999 gm~~
~~3 > or = 4000gm~~
~~4 not documented~~
~~4.3~~
~~1st minute Neonatal APGAR score~~

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1 <7
2 >or = 7
4.4
Was the neonate admitted to NICU
1.yes
2.no
3.not known

Results

Sociodemographic characterstics

During the study period (3/8/2006EC-4/10/2006EC) there were a total of 1713 deliveries, with 1176 deliveries at GMH and 537 deliveries at BLH. The overall C/S rate was 32.5% (557/1713) while the C/S rates at GMH and BLH were 32.9% (387/1176) and 31.7% (170/537) respectively. Since C/S by spinal anesthesia at GMH is 3X that of TASH, 285 cases from GMH and 95 cases from TASH selected by systematic random sampling technique. The age of the study participants ranges from 18 to 42 years with a mean and mode age of 28 years. Most of the participants, 244 (64.2%), were in the age group 25-34. Maternal parity condition was determined and 182(48%) & 133(35%) of the mothers are para I and para II respectively while only 5 (1.4%) were para V or more. Majority of the participants were married, Orthodox christian by religion, Amhara by ethinicity and completed primary school or above by education with frequncy of 363 (95%), 353 (93%), 205 (54%) and 246 (64.8%) respectively. Only 5% of the mothers have monthly income of <600 birr, and 23% have income >4000 birr. (See table- 1 below)

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Table 1: Socio-demographic characterstics

VARIABLE	FREQUENCY	PERCENTAGE
Age in years		
15-19	21	5.5
20-24	67	17.6
25-29	155	40.8
30-34	89	23.4
>34	48	12.6
Parity		
Para I	182	47.9
Para II-IV	193	50.8
Para >IV	5	1.4
Religion		
Orthodox	284	74.7
Muslim	59	15.5
Protestant	36	9.5
Others	1	0.3
Ethinicity		
Amhara	205	53.9
Oromo	72	18.9
Guragae and Silti	77	20.3
Tigre	16	4.3
Others	10	2.6
Residence		
Addis Ababa	353	92.9
Out of Addis Ababa	27	7.1
Education		
Tertiary	84	22.1
High School	123	32.4
Primary Education	123	32.4
Able to Read and Write	11	2.9
Unable to Read and Write	39	10.3
Marital status		

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Married	363	95.5
Not Married Partner	12	3.8
Divorced	3	0.8
Pregnancy due to Rape	2	0.5
ANC status		
Yes	374	98.4
No	6	1.6

Maternal and Neonatal characterstics

During the study period, in GMH of 387 C/S 341 (88%) done with Spinal Anesthesia. In TAH from 170 C/S 106 (62%) done with spinal anesthesia. This make the rate of spinal anesthesia to be 80%. Most of C/S 254 (66.8%) done at term but 47(12.4%) are in postterm, 26(6.8%) are preterm. About 14% of the mother dont remember their LMP. From all cesarean sections 313 (82.4%) are emergency the rest 67(17.6%) done on elective basis. The top most common indications being NRFHRP and previous C/S scar with X factor each accounting 29%, followed by CPD 42 (11.1%), malpresentation 32 (8.4%), twin pregnancy 30 (7.9%), non reassuring biophysical profile 29 (7.6%). (See figure -1 below)

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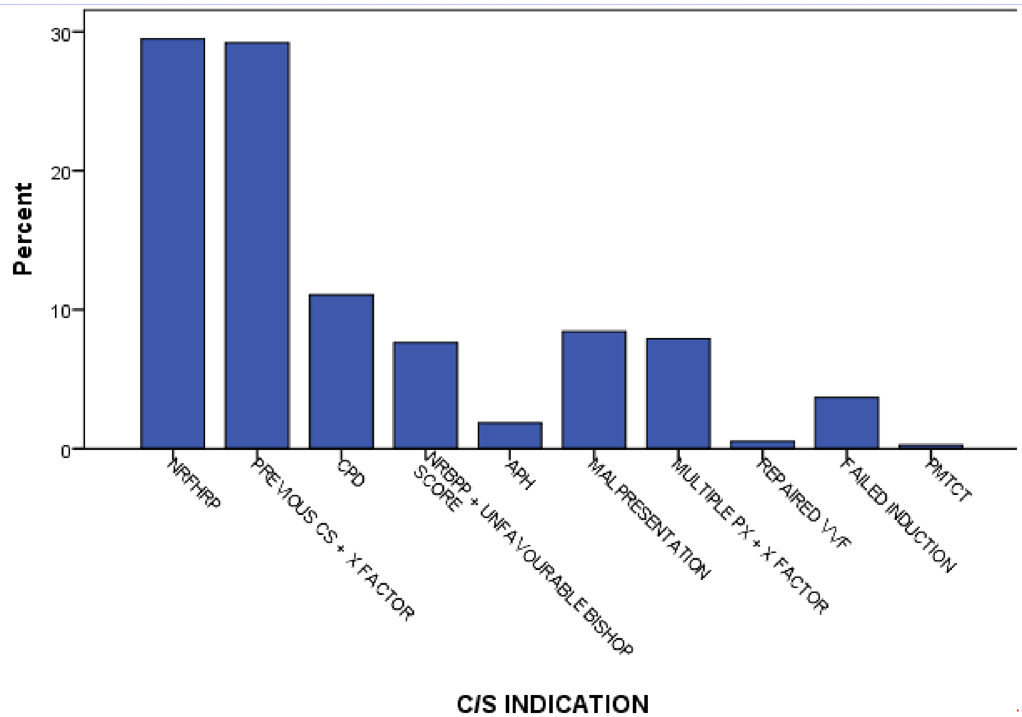

Figure -I: Distributive frequency of C/S indication at GMH and TASH from 3/8/06 EC to 4/10/06EC

Majority of the cesarean deliveries, 237(62%), were done by Year 2 residents while only 9 (2.4%) of the C/S were done by senior Obstetricians. (See table 2 below)

Table 2: Operator Status

		Frequency	Percent	Valid Percent	Cumulative Percent
	YEAR 2 RESIDENT	237	62.4	62.4	62.4
	YEAR 3 RESIDENT	113	29.7	29.7	92.1
Valid	YEAR 4 RESIDENT	21	5.5	5.5	97.6
	CONSULTANT	9	2.4	2.4	100.0
	Total	380	100.0	100.0	

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Only two mothers were given SA in left lateral position. Incision to delivery interval of almost half of the mothers (48%) is 5min. Only 28(7.4%) of the mothers deliver within 2min and the longest interval being 16minutes. 95% of the new borns are delivered with APGAR score of 7 and abave. About 19% of newborns were admitted to NICU. Of 380 mothers, 241(192 from emergency and 49 from elective C/S group) were preloaded with crystalloids, but we found that as high as 241 (63.4%) are hypotensive i.e 65% from preloaded group and 61% from not preloaded group.

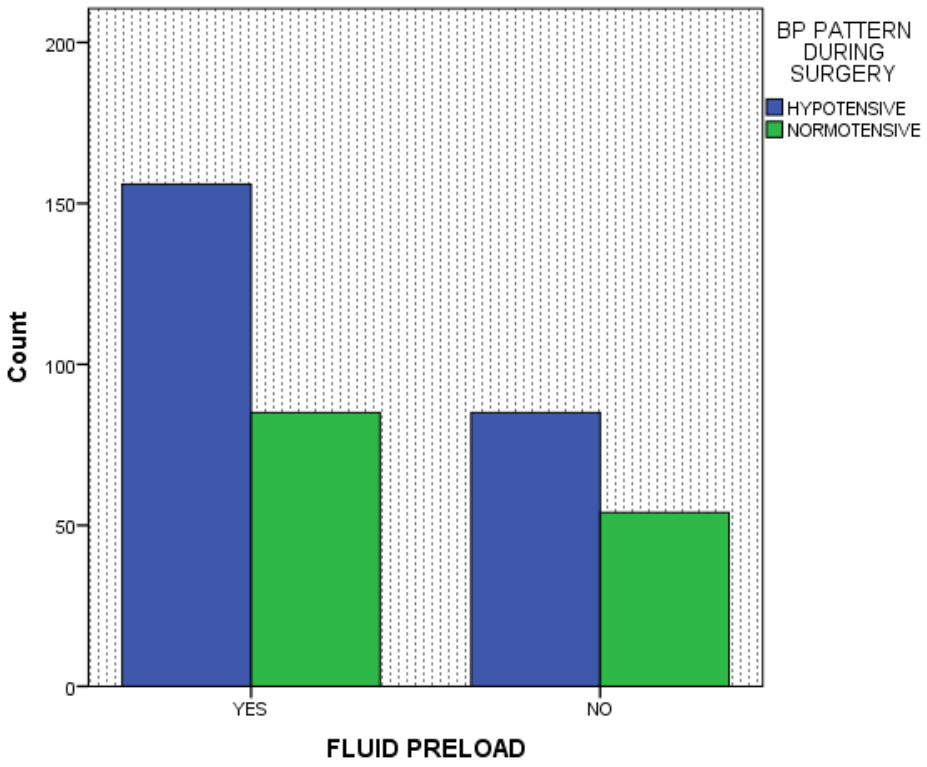

Fig 2 relation between fluid preload and hypotension

The most common SA administered is Lidocaine 296 (78%) and the rest is Bupivacaine. But there is no mother who has been given SA with Epinephrine or with Opioids. Majority (66.5%) of the SA were administered by anesthetists with work experiance of 4 years and less. The PDPH after cesarean section with SA was found to be 34.2%; from this 110(84.6%) were managed while the rest 20(15.3%) of the PDPH were not managed at the time of data collection. Vomiting was experianced in 28.7% of the mothers during and immediately after the surgery. From all of our study participants, 13(3.4%) mothers were given GA 30 min after SA initiated, from this

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7.how much fluid loaded/
8.the duration of fluid loading? especially in emergency C/S? mainly NRFHRP?
9.SA administration-incision interval?
10.DDI in emergency C/S, especially NRFHR?

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7(1.8%) required intubation. Only 24 (6.3%) of the mothers were counselled on the choise of anesthesia, the majority 356 (93.7%) were not counselled, just given information about what is going to be done. After the operation 90.3% of the mothers are happy with the mode of anesthesia administration and its benefits. They also prefer SA in the future if they are in need of operation but 37(9.7%) of the mother are not happy with the effect of SA. After 6 weeks of operation 326 mothers (the rest 54 mothers are not reachable with phone) were communicated with phone, from whom 40(10.5%) complain of persistent or recurrent back pain which was not there before SA injection.

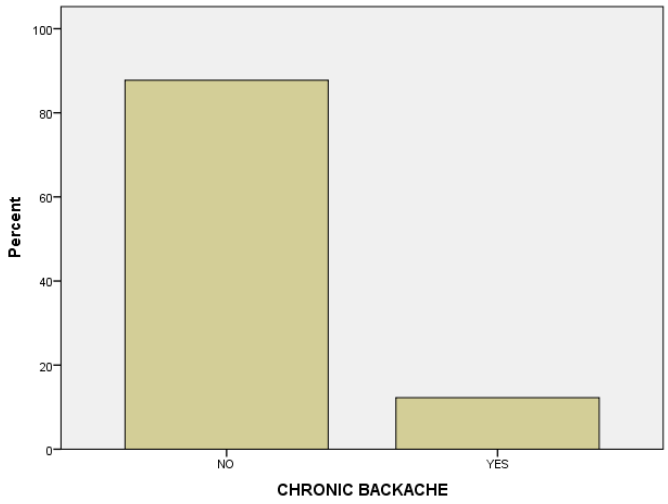

fig 3 bargraph showing incidence of chronic backache 6weeks after C/S

With bivariate analysis the study shows that lidocaine is 2.3X higher in causing hypotension than bupivacaine which is statistically significant with P value= 0.001 2.33(95%CI 1.4 3.8). Fluid preload doesnt make any statistically significant difference on the incidence of hypotension. And there is no statistically significant difference on the choise of SA for other complications like PDPH, chronic back ache, need for GA

Table 4 relation between SA type and hypotension

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SPINAL ANESTHESIA TYPE * BP PATTERN DURING SURGERY Crosstabulation

			BP PATTERN DURING SURGERY		
			HYPOTENSIVE	NORMOTENSIVE	Total
SPINAL ANESTHESIA TYPE	3ML BUPIVACAINE .5%	Count	40	44	84
		% within SPINAL ANESTHESIA TYPE	47.6%	52.4%	100.0%
	2ML LIDOCAINE 5%	Count	201	95	296
		% within SPINAL ANESTHESIA TYPE	67.9%	32.1%	100.0%
Total		Count	241	139	380
		% within SPINAL ANESTHESIA TYPE	63.4%	36.6%	100.0%

~~It is also found that when experiance of anesthetist increase, the incidence of hypotension during surgery decreases. This is also statistically significant with OR 3.8, 3 , 3 as we go upward successively~~

~~Table 5 bivariate analysis of experiance of anesthetist and incidence of hypotension~~

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	EXPERIENC			26.188	5	.000			
	EXPERIENC(1)	-1.351	.368	13.441	1	.000	.259	.126	.533
	EXPERIENC(2)	-1.355	.342	15.727	1	.000	.258	.132	.504
	EXPERIENC(3)	-1.122	.355	10.012	1	.002	.326	.163	.653
	EXPERIENC(4)	-1.098	.355	9.542	1	.002	.334	.166	.670
	EXPERIENC(5)	-.326	.386	.712	1	.399	.722	.339	1.538
	Constant	.274	.215	1.626	1	.202	1.316		

a. Variable(s) entered on step 1: EXPERIENC.

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~~Table 6~~

ANESTHETIST EXPERIENCE * BP PATTERN DURING SURGERY Crosstabulation

			BP PATTERN DURING SURGERY		
			HYPOTENSIVE	NORMOTENSIVE	Total
ANESTHETIST EXPERIENCE	1 year	Count	44	15	59
		% within ANESTHETIST EXPERIENCE	74.6%	25.4%	100.0%
	2 years	Count	56	19	75
		% within ANESTHETIST EXPERIENCE	74.7%	25.3%	100.0%
	3 years	Count	42	18	60
		% within ANESTHETIST EXPERIENCE	70.0%	30.0%	100.0%
	4 years	Count	41	18	59
		% within ANESTHETIST EXPERIENCE	69.5%	30.5%	100.0%
	5 years	Count	20	19	39
		% within ANESTHETIST EXPERIENCE	51.3%	48.7%	100.0%
	>5 years	Count	38	50	88
		% within ANESTHETIST EXPERIENCE	43.2%	56.8%	100.0%
Total		Count	241	139	380
		% within ANESTHETIST EXPERIENCE	63.4%	36.6%	100.0%

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~~The research also showed that vomiting during and immediately after operation more common with lidocaine than bupivacaine. This is also statistically significant with P value 0.029 OR 1.9(95%CI 1.1-3.5)~~

~~Table 7~~

SPINAL ANESTHESIA TYPE * VOMITING DURING CS Crosstabulation

			VOMITING DURING CS		
			YES	NO	Total
SPINAL ANESTHESIA TYPE	3ML BUPIVACAINE .5%	Count	16	68	84
		% within SPINAL ANESTHESIA TYPE	19.0%	81.0%	100.0%
	2ML LIDOCAINE 5%	Count	93	203	296
		% within SPINAL ANESTHESIA TYPE	31.4%	68.6%	100.0%
Total		Count	109	271	380
		% within SPINAL ANESTHESIA TYPE	28.7%	71.3%	100.0%

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~~It has been found that low APGAR score in preterm is 12%, postterm 6.4% and at term 2.4%. this is also ststistically significant with P value of 0.03. But there is no association between APGAR score and incision to delivery interval.~~

~~Table 8~~

GESTATIONAL AGE ON CESAREAN SECTION DAY * APGAR SCORE 1MIN Crosstabulation

			APGAR SCORE 1MIN		
			1-6	7 AND ABAVE	Total
GESTATIONAL AGE ON CESAREAN SECTION DAY	PRETERM	Count	3	22	25
		% within GESTATIONAL AGE ON CESAREAN SECTION DAY	12.0%	88.0%	100.0%
	TERM	Count	6	246	252
		% within GESTATIONAL AGE ON CESAREAN SECTION DAY	2.4%	97.6%	100.0%
	POSTTERM	Count	3	44	47
		% within GESTATIONAL AGE ON CESAREAN SECTION DAY	6.4%	93.6%	100.0%
Total		Count	12	312	324
		% within GESTATIONAL AGE ON CESAREAN SECTION DAY	3.7%	96.3%	100.0%

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~~We have assessed the association between chronic backache and the type of C/S based on urgency. We found that the rate of chronic backache is high when the C/S is elective than emergency. This is statistically significant with P vaiue 0.04 OR2(95%CI 1.01 4.5)~~

~~Table 9~~

C/S TYPE * CHRONIC BACKACHE Crosstabulation

			CHRONIC BACKACHE		Total
			YES	NO	
C/S TYPE	EMERGENCY	Count	28	238	266
		% within C/S TYPE	10.5%	89.5%	100.0%
	ELECTIVE	Count	12	48	60
		% within C/S TYPE	20.0%	80.0%	100.0%
Total		Count	40	286	326
		% within C/S TYPE	12.3%	87.7%	100.0%

The association between mothers' attitude and PDPH was assessed and there is statistically significant association with P value 0.004

Table 10

PDPH * LIKE SA NOW Crosstabulation

			LIKE SA NOW		Total
			YES	NO	
PDPH	YES	Count	109	21	130
		% within PDPH	83.8%	16.2%	100.0%
	NO	Count	234	16	250
		% within PDPH	93.6%	6.4%	100.0%
Total		Count	343	37	380
		% within PDPH	90.3%	9.7%	100.0%

Discussion

In our study C/S accounts for 32% of all deliveries. This finding is similar to that of USA which is also 32%(3), and in Gondar=28%(7). The rate of SA for C/S is 80% ie 88% in GMH and 62% in TASH. The difference between the two hospital may be due to higher comorbid cases in

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~~TASH which need GA from the beginning. But in general the total rate of SA in our set up is a bit lower than the recommendation by RCOG(11) and it is similar with the study by WHO for sub sahara countries which is 80-90%(3).~~

~~Elective C/S is found to be 2 times higher than the elective C/S in Gondar which is 8%(7). This may be due to few number of beds in the maternity ward. The two top most common indication for C/S are NRFHR pattern and previous C/S scar. This is also similar with that of USA, bur in Gondar it is NRFHR pattern and malposition. This may be due to Gondar University Hospital is the only referral hospital for more than 50 health centers so CPD cases are going to be referred only to this hospital .~~

~~Research showed that administering SA on left lateral has multiple fetomaternal advantage, but it is not being exercised. This is due to lack of awareness and experiance. Incision to delivery interval has shown inverse association with APGAR score in study done in Gondar(7), and by ACOG(12). But our research doesnt show such association. Despite preload, hypotension was found in 61% of the mothers. ACOG reported 45%(12), and US Academic Center reported 24%(13). In Gondar it is picked in 8.3%(7) and was given Adrenalin. This may be due to difference in the definition of hypotension. Hypotension is more associated with lidocaine rather than bupivacaine. This finding is statistically significant with P value 0.001.~~

~~The incidence of PDPH from study done in Gondar is 1.5 3%(7) and another study from UK is 1%(15), but our study shows that it is 34.2% which is significantly higher than the other studies. This may be explained by that most lumbar puncture are done by anesthesia students who puncture subarachnooid space multiple times with 21 and 22guage needle.There is no other variable like PDPH which significantly affects mothers' attitude towards spinal anesthesia now and for the future.~~

~~From all participants 1.8% required GA with intubation. But the documentation doesnt show whether it is due to SA failure or high spinal block. Similar finding was seen from Maternal Fetal Medicine Unit Network which shows SA failure rate of 1.7%(17). The study also revealed that Chronic back ache was seen in about 10% of the mothers which is more associated with elective C/S than emergency C/S.~~

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~~Conclusion and Recommendation~~

~~Cesarean section with SA is significantly higher than with GA (80% V 20%). This is a good trend and need to be augumented with the addition of opioids and epinephrine.~~

~~The study showed that the incidence of PDPH is very high. there fore we have to be vigilant in diagnosing mothers with PDPH, and manage it accordingly. Since maternal attitude towards spinal anesthesia is significantly affected by presence of PDPH, lumbar puncture by experianced hand will increases SA utility.~~

~~Intraoperative hypotension is also very high. Despite this figure vasoconstrictor medications like Ephedrine, Phenylephrine were not available. There fore pharmacy should make available these important medications. SA administration while the mother is leftlateral position has fetomaternal advantage over sitting position, so we need comparative study on this line. In addition the anesthesia unit need to review the quality and practice of their fluid preloading which is an important preventive intervention.~~

~~About 2% of the mother are intubated. This is not clear whether it is from failed SA or high spinal block. So documentation should be improved.~~

~~Chronic backache is as high as 10%. This finding is also high in those from elective C/S. This needs further study.~~

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