A STUDY ON THE "MATERNAL AND PERINATAL OUTCOME OF OBSTETRIC ANALGESIA DURING LABOUR"

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For the award of the degree of

M.S. OBSTETRICS AND GYNAECOLOGY
BRANCH - II

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CERTIFICATE

This is to certify that the dissertation entitled **'MATERNAL AND PERINATAL OUTCOME OF OBSTETRIC ANALGESIA DURING LABOUR'** submitted by **DR.SRIDEVI. R** in the Institute of Social Obstetrics, Govt Kasturba Gandhi Hospital (Madras Medical College) Triplicane, Chennai, in partial fulfillment of the university rules and regulations for award of MS degree in Obstetrics and Gynaecology, Branch - II under my guidance and supervision during the academic year 2011-2014.

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I solemnly declare that this dissertation entitled **'MATERNAL AND PERINATAL OUTCOME OF OBSTETRIC ANALGESIA DURING LABOUR'** was done by me at The Institute Of Social Obstetrics, Govt Kasturba Gandhi Hospital, Madras Medical College, Chennai, during 2011 - 2014 under the guidance and supervision of **Prof.Dr.BABY VASUMATHI MD. DGO.** This dissertation is submitted to the Tamil Nadu Dr.M.G.R. Medical University towards the partial fulfillment of requirements for the award of M.S. Degree in Obstetrics and Gynaecology, Branch - II.

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CONTENTS

INTRODUCTION

`The birth of an neonate to the painfree parturient will be the most rewarding moment in Obstetric practice.' The most painfull experience in a woman s life is labour. Quite unbearable is the pain of child birth and its related agony at times is beyond description.'

The mother of yesterday is no more the mother of today". Complex,psycological,physiological interactions are involved in labour. Multiple system like gastrointestinal, cardiovascular, respiratory, genito urinary, neuro endocrine may be affected if pain not adequately controlled, blood flow to the placenta which may be reduced due to pain lead to altered fetal homeostasis. These consequences are avoidable by effective analgesia during labour.

There are several methods that can be employed in labour pain control like intravenous anesthesia' opiod analgesics local anesthetics inhalational anesthetics regional anesthetics, lumbar epidural analgesics The most effective and least depressant treatments for labor pain are the neuraxial techniques allowing for an alert and participating mother [ACOG].

The American College of Obstetricians and Gynecologists [2006] and the American Society of Anesthesiologists issued a joint statement on labour pain that in the absence of medical contraindication ‘ maternal request is sufficient justification for analgesia during labour .’

NEONATAL AND FETAL BENEFIT

In comparison to opiod analgesia neuraxial techniques have good Apgar Score and decreased incidence of metabolic acidosis.

Epidural analgesia is preferred since

1. Neonatal respiratory depression is reduced wherein the intramuscular opioid have been repeated.

2. In the conditions where the fetus is already compromised like pregnancy induced hypertension, intra uterine growth restriction.

3. Improvement in uteroplacental blood flow and opioid effects are limited.

4. To assist the premature, breech or multiple pregnancy with a controlled birth.

BENEFIT IN MOTHER

1. As an adjunct to antihypertensive therapy in severe pre eclampsia.

2. To stabilise blood pressure In cardiac, respiratory, neuromuscular and neurological disease of women may have significant safety benefits with pain control.

3. Women who have significant risk factors like difficult airway management morbid obesity who have significant anesthesia risk related to general anesthesia

CONTRAINDICATIONS

1. Infection at local site or systemic sepsis.

2. There is an increased risk of epidural or spinal haematoma with defective haemostasis e.g. severe Thrombo cytopenia; frankcoagulopathy; disorders of blood factors, Heparin or Aspirin taken recently, the count of platelets and the test related to their function coagulation profile are checked.

3. Severe preeclamptic women with abruption, inherited disorders of bleeding recently taken anticoagulant treatment.

4. Uncorrected hypovolaemia

5. Intracranial tension with mass lesion.

6. If one cannot guarantee an aseptic technique.

7. Refusing or withdrawing of consent of the women

8. Inadequately trained of staff.

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HISTORY

Child birth is considered a painful process and there are associated myths and controversies about pain relief during labour.

People believed the birthing process is painful and interference not needed.

Several methods in the earlier days used to relieve labour pain.

Various non- pharmacological and pharmacological methods in the modern era are being practiced for labour analgesia and the use of labour analgesia had gained its popularity.

For labour analgesia, the most frequently employed pharmacological methods are neuraxial analgesia, systemic opiod analgesia, inhalational analgesia.

Labour analgesia has undergone extensive research in the last four decades to find an ideal labour analgesia safe to both mother and the in utero fetus.

History of development in labour analgesia

Ether in 1847

Chloroform in 1853

Nitrous Oxide in1881

Spinal with Cocaine in 1990

Morphine and Hyoscine in1902

Caudal Epiduralin 1909

Sacral Epidural in 1930

Pethidine in 1940

Continuous Caudal Epidural in 1943

Continuous Lumber Epidural in 1949

Psycho prophylaxis by Lamaze in 1959

TENS in 1980

The criteria for the Ideal technique of labour analgesia

Any drug or technique used in labour analgesia should be simple, safe and must have high technical success rate. It should be acceptable to mother and allow her active participation in the labour process. These drugs and or techniques should provide complete analgesia throughout

the painful period of labour and must be devoid of any harmful effect on mother and labour process. Complete fetal homeostasis should be maintained without any depressant effect on fetus.

Physiology of Labor Pain

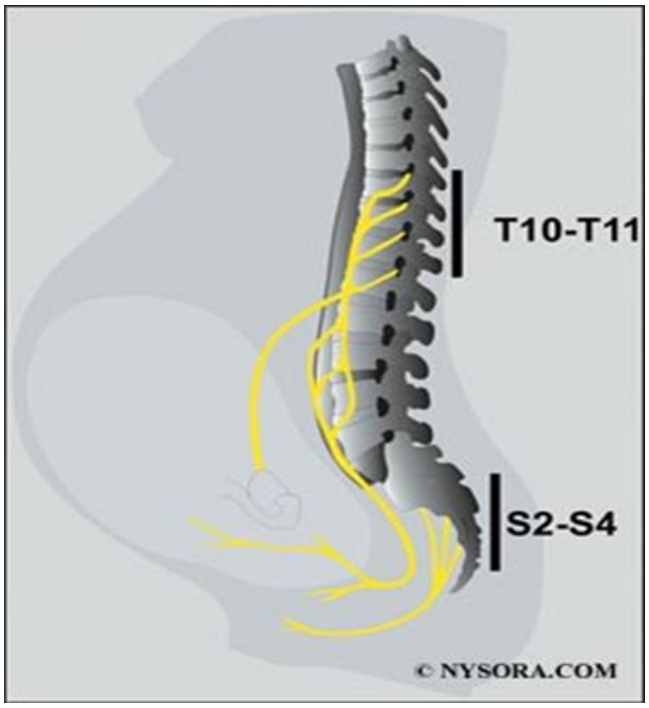
During the first stage of labour, pain impulses arise primarily from the uterus. Uterine contractions may result in myometrial ischemia, which ultimately causes the release of bradykinin, histamine, and serotonin. In addition, stretching and distention of the lower uterine segment and cervix may stimulate mechanoreceptors. These noxious impulses transmitted via A delta and C fibres follow the sensory nerve fibers that accompany sympathetic nerve endings; they travel through the paracervical region and the hypogastric plexus to enter the lumbar sympathetic chain.

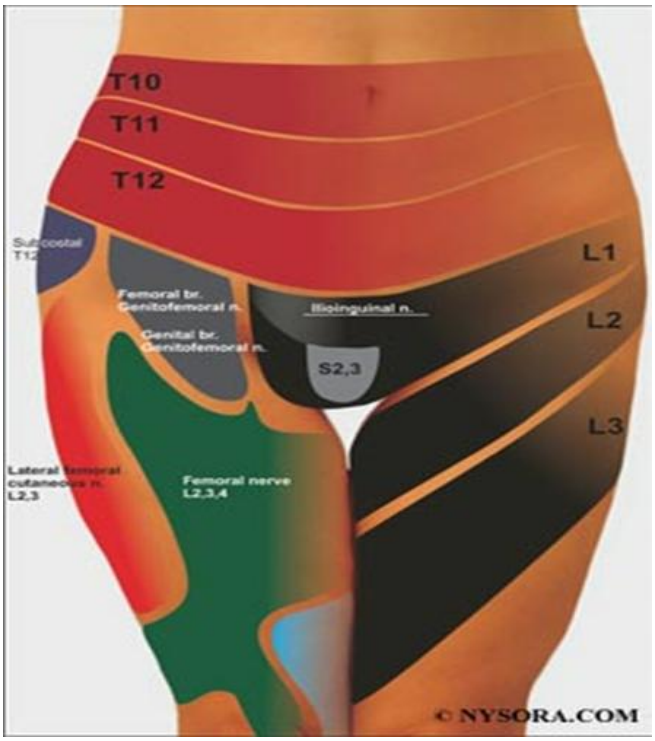
Central connections to the spinal cord is via the dorsal root ganglion and lateral division of posterior roots.These stimuli enter the spinal cord at the T10, T11, T12, and L1 spinal segments.

Pain is referred to the area of skin supplied by these nerves.

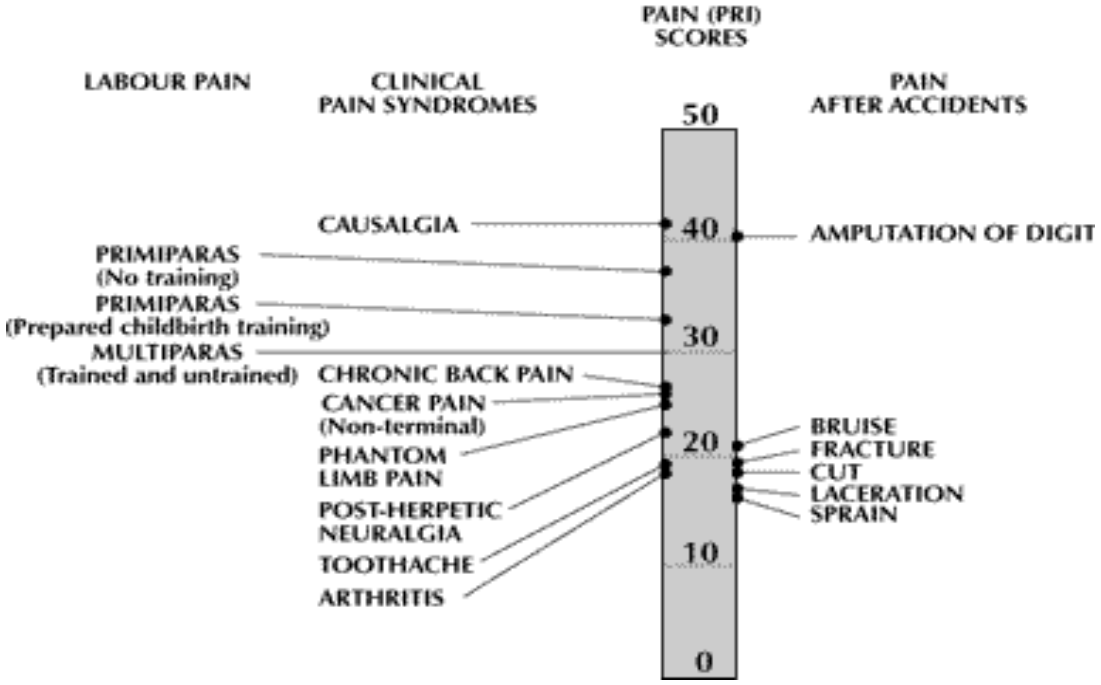
Parturients describe this pain as dull in nature(visceral) and often poorly localized in the lower abdomen, loin and lumbosacral region.

With onset of the second stage of labour and stretching of the perineum, somatic afferent nerve fibers transmit impulses through the pudendal to the spinal cord at the S2, S3, and S4 levels :





Pain scores using the McGill Pain Questionnaire comparison



Mechanism of Labor Pain

Uterine Contractions → Myometrial Ischemia → Releasa of mediators (e.g Bradykinis, Serotnin)

Pain Pathway in first stage

Uterus & Cervix → Sympathetic fibres → Paracervical region → Hypograstic plexus → Lumber sympathetic chain → Spinal Cord (T10-L1)

Stretching of LUS & Cervix → Stimulation of mechanoreceptors

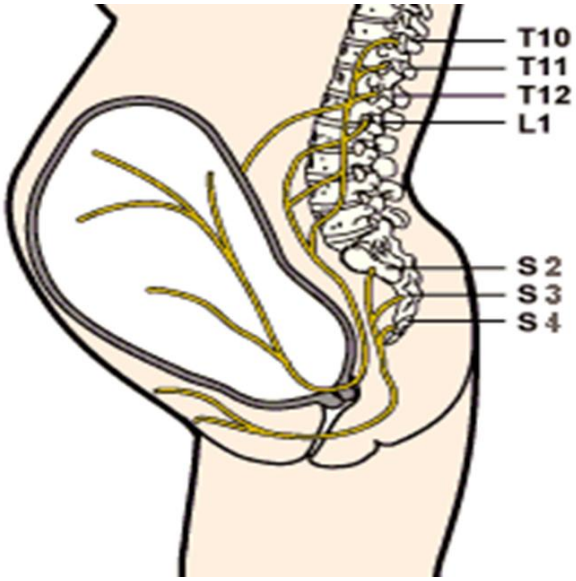
Mechanism of Labor Pain in Second Stage

Activation of the same afferents Adelta and C fibres activated during the first stage of labour plus afferents that innervate the vaginal surface of the cervix, the vagina, and the perineum. Afferents course through the pudendal nerve with DRG at S 2-S4, and they are somatic in nature. Hence analgesia should cover dermatomes L2to S5.

First stage pain is visceral best relieved by narcotics and second stage pain is Somatic nature best relieved by local anesthetics.

Hence neuraxial technique using Local anesthetic with narcotic in low doses most versatile techniques of pain relief.

PAIN PATHWAYS DURING LABOUR PAIN IN LABOUR



Site of Origin	Cause	Pathway	Site of Pain
Uterus and cervix	Contraction and distension of uterus and dilatation of cervix	Afférent T10 – L1 Post. Rami T10 – L1	Upper abdomen to groin, mid back and inner upper thighs (referred pain)
Peri-uterine tissue (mainly posterior)	Pressure often associated with occipito posterior position and flat sacrum	Lumbo sacral plexus L5- S1	Mid and lower back and back of thighs (referred pain)
Lower birth canal	Distension of vagina and perineum in second stage	Somatic roots S2- S4	Vulva, Vagina and Perineum
Bladder	Over distension	Sympathetic T11-L2 Parasympathetic S2-S4	Usually suprapubic
Myometrium and uterine visceral peritonium	Abruption Scar dehiscence	T10-L1	Referred Pain to site of pathology

EFFECTS OF LABOR PAIN ON MOTHER

Obstetric Course

- Neural stimulation through pain pathways results in the release of substances that either drive (oxytocin) or brake (epinephrine) uterine activity and cervical dilation; effect of analgesia on the course of labor can vary between individuals.

Cardiac and Respiratory Effects

- The intermittent pain of uterine contractions also stimulates respiration and results in periods of intermittent hyperventilation. In the absence of supplemental oxygen administration, compensatory periods of hypoventilation between contractions result in transient periods of maternal hypoxemia and, in some cases, feta hypoxemia.

PSYCHOLOGICAL EFFECTS

Small proportion of women can be psychologically harmed by either providing or withholding analgesia

Both individual and environmental influences upon this meaning.

Effects of labor pain on fetus

Labor pain affects multiple systems that determine utero-placental perfusion:

(1) uterine contraction frequency and intensity, by the effect of pain on the release of oxytocin and epinephrine;

(2) uterine artery vasoconstriction, by the effect of pain on the release of norepinephrine and epinephrine; and

(3) maternal oxyhemoglobin desaturation, which may result from intermittent hyperventilation followed by hypoventilation.

TECHNIQUES OF LABOUR PAIN RELIEF

Non pharmacological

1. Psycho prophylaxis
2. Hypnosis
3. TENS
4. Acupuncture and Acupressure
5. Hydro therapy
6. Miscellaneous
7. Yoga Music therapy
8. Breathing exercise

Pharmacological

1. Inhalation analgesia N2O:O2, Ether, trilene Halogenated compounds like Enflurane, isoflurane, sevoflurane.
2. Parenteral analgesia Opioids: pethidine, pentazocine, fentanyl, Remifentanil, sufentanil, meperidine, butorphanol and

nalbuphine. Non-opioid: tramadol Sedative & tranquiliser: diazepam, midazolam Ketamine.

3. Regional analgesia Lumbar epidural Caudal epidural Spinal analgesia Combined spinal-epidural Walking epidural Patient controlled epidural analgesia

4. Paracervical block

Hydrotherapy involve a simple shower or tub bath, or it include the use of a whirlpool or large tub specially equipped for pregnant patients. Benefits of hydrotherapy includes reduced pain & anxiety, decreased BP & increased efficiency of uterine relaxation.

AIMS AND OBJECTIVES

The study aim is to analyse the maternal and perinatal outcome of obstetric analgesia during labour. The study also compares with outcomes of those who did not receive analgesia. The study was conducted at Institute of Social obstetrics and government Kasturba Gandhi hospital Chennai from the period of November 2012 to November 2013.

OBJECTIVES

To study the effects of obstetric [epidural] analgesia in the following aspects :

1. Effectiveness of pain relief in terms of maternal comfort satisfaction.
2. Duration of labour its influence on all three stages and the initiation of analgesia to delivery interval.
3. Mode of delivery –spontaneous vaginal instrumental and LSCS.
4. Maternal complications like hypotension, pyrexia, backache, headache, bladder dysfunction and third stage complication like retained placenta, PPH, urinary retention.
5. Neonatal outcome in the form of Apgar scores intrapartum post partum and early neonatal complications and birth weight.

REVIEW OF LITERATURE

The term Natural Childbirth coined by Grantly Dick Read in 1933 who believed child birth was painless and no intervention needed if women prepared.

Fernard Lamaze French obstetrician adapted the Russian Pavlovian methods in 1950 focussed on teaching mother conditioned reflexes to overcome pain and fear of child birth which included breathing exercises relaxation techniques and human support.

Religious taboos resulted in centuries of denial of pain relief. Fifteen century midwives were burned at the stake for offering pain relief in labour.

The modern era of obstetric analgesia began in 1847 when James Young Simpson a Scottish obstetrician administered ether to a women with rickety pelvis in labour.

Charles Dmeigs Philadelphia obstetrician believed Labour pain has a purpose uterine pain inseparable from contractions and any drug abolishes pain will alter contractions.

John Snow [1853) administered chloroform to Britain Queen Victoria during birth of eight and ninth child.

Pain in labour is a complex subjective interaction of physiological psychological and socio cultural factors on women individual interpretation of labour stimuli [Donald et al 2002].

Melzack [1984] used a questionnaire to assess the intensity and emotional impact of pain [McGill pain rating index]. In nulliparous labour pain rated as digit amputation [without anesthesia].

Penny and O Hara [2002] systematically reviewed non pharmacological methods of pain relief as inexpensive quality may be poor and no scientific validity.

Henneborm and Cogan [1975] noted continuous labour support decreased maternal anxiety and medication requirements.

Kennel and colleaques [1991] showed lower level of caesarean section in women who had emotional support through labour.

Minnich et al [2004] showed touch and massage transmits sense of security and wellbeing.

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Melzack et al 1991 Bloom et al 1998 studied various postures on pain perception and outcome of labour vertical position to horizontal position.

Bloom and colleaques [1998] found walking did not have effect on labour.

A review by Downswell and colleques [2009] there is little difference in pain ratings between TENS[trans cutaneous electric nerve stimulation] TENS decreased pain and no evidence that TENS had impact on intervention and outcomes of labour.

Belfrage et al 1981 studied infants born within the period of maximum fetal uptake of pethidine [ie 2-3 hrs after maternal administration] had increased risk of respiratory depression.

Sosa and co workers [2004] in a randomised controlled trial concluded pethidine not to be given in parturients with cervical dystocia.

Chest nut et al[2009]: Fentanyl highly lipid soluble opiod has analgesic potency 100 times of morphine and 800 times of pethidine. It has rapid onset, short duration of action, no major metabolities, no effect on Apgar scores or neurobehavioral scores at 2and 24 hrs.

Douma et al [2009] studied the efficacy of patient controlled pethidine fentanyl remifentanyl for labour analgesia Remifentanyl PCA provided better analgesia than the rest.

Rosen et al [2002] reviewed Entonox a mixture of 50% oxygen and 50% nitrous oxide for labour not potent analgesic but not interfere with uterine activity and neonatal Apgar.

Hart et al [2003] currently advocates a low dose mixture of local anesthetics with lipophilic narcotic.

Bupivacaine economical and effective as newer agents [Atienzaret al 2008].

Leighton and Halpern [2002] that epidural not increase caesarean rates.

Liu and Sia [2004] low concentration of bupivacaine unlikely to increase caesarean rates.

Liberman and O Donaghue [2002]had evidence to conclude epidural associated with lower spontaneous delivery higher instrumental vaginal and longer labour prolonged second stage but does not affect neonatal outcome in nulliparous.

Liu and sia [2004] and Anim-Somuah [2005]found epidural increases instrumental delivery but not caesarean and not associated with low Apgar at 5 min and not affect lactation [Cochrane Database systematic review 2005].

Torvaldsen et al [2004] concluded larger studies required to determine discontinuing epidural late in labour decreases instrumental delivery.

People [pushing Early or Pushing Late with Epidural] trial Fraser et al 2000 showed delayed pushing for maximum 2 hrs compared with immediate pushing at full dilatation in nullipara with epidural analgesia showed significant reduction in incidence of difficult births [22.5% to 17.8%].

Hansen et al [2002] found no difference in outcomes in multiparous who waited for one hour before pushing.

Buxton et al [1988] Robert et al 2003]showed policy of delayed rather early pushing for women with epidural analgesia reduced operative intervention at the expense of increased second stage duration.

Maltau and Anderson 1975 Schnider et al 1983 Desai et al 2006 studied that epidural analgesia may accelerate an already prolonged and

exhausting labour and reduce caesarean for failure to progress. Effective analgesia reduces inhibitory effect of endogenous catacholamines on uterine contractility attenuates acidosis and permits to tolerate oxytocin augmentation.

PEOPLE trial [Franser e all 2000] nullipara with analgesia waiting up to 2 hrs before pushing results in reduction in median duration of active pushing [from 110 min to 68 min].

Simpson and James [2005] and Hansen et al [2002]reported fewer incidence for fetal heart rate decelerations in primi and multi who waited befare pushing.

Franser et al [2000] showed lower umbilical cord PH in infants of delayed pushing group.

Menticoglou et al [1995] studied 93 % of nullipara with epidural analgesia delivered in 4 hrs of full diatation 7% second stage more than 4 hrs less than one third had spontaneous vaginal delivery .No change in neonatal outcome.

Cheng et al 2004 2007 reported when second stage longer than 4 hrs studied increase in maternal morbidity like post partum haemorrhage third and fourth degree lacerations, operative vaginal birth and caesarean.

Sleep [1990] adverse outcome of prolonged second stage may be due to underlying causative factor and not on absolute duration.

Bates et al [1985] labour epidural analgesia had more descent disorders and high operative vaginal than who not received which may be due to interference to beardown reflex and inability to push.

Halpern et al [1998] did a metaanalysis of 2400 women assigned epidural analgesia or parenteral analgesia that epidural prolonged active phase by 42 min and second stage by 14 min.

Thorp et al 1993 showed significant caesarean rate increase whereas Sharma et al 2002 showed no differences.

Yuong strom et al 1996 used low dose anesthetics like bupivacaine with opioidagonist fentanyl with minimal motor block and preservation of urge to push.

Kilpatrick and laros [1989] found 95 th percentiles for second stage in nullipara with analgesia 185 min and without 132 min and in multipara 61 and 85 min Anim- Somuah and colleaques [2005] reviewed Cochrane database showed incidence of long term back ache similar between women receiving labour analgesia and who did not.

COMET group study has demonstrated reduced instrumental vaginal delivery with the 'mobile' epidurals with the low dose neuraxial techniques with an opiod as adjuvants will reduce pain transmission in an additive or synergistic fashion will effectively provide analgesia with proven safety and efficacy and without much unwanted side effects.

Epidurally administered clonidine and neostigmine that are promising more recently.

MATERIALS AND METHODS

This study was carried out in 70 women who were admitted with labour pain for safe confinement in the department of Obstetrics and gynecology at **Institute of Social Obstetrics and Government Kasturba Gandhi Hospital, Chennai** during the period October 2012 to November 2013.

Study Design : Descriptive case study

Institutional ETHICAL COMMITTEE Clearance obtained

Methodology

70 Pregnant women who received epidural analgesia in labour were enrolled in this study. The patients with similar profile as study group were enrolled as control groups.

Inclusion criteria

1. Women with gestational age more than 37 weeks maturity confirmed by Ultra sound in established labour with regular uterine contractions (3 -4 in 10 minutes lasting 45 seconds) with cervical effacemet more than 50 % and dilatation > 3 cms with cephalic presentation.

2. Age > 18 years < 35 years.

3. Height >145 – 160 cms.

4. Weight 50 -65 Kgs.

5. No fetal distress.

Exclusion criteria

1. Patient refusal

2. Known case of allergic reaction to local anesthetics

3. Women with cephalo pelvic disproportion and contracted pelvis and Malpresentation

4. Coagulation problems and thrombocytopenia

5. Aspirin within 3 days Platelets less than 80000

6. Severe Preeclampsia-abruption HELP Syndrome

7. Placenta previa with hemodynamic instability

8. Severe Anemia

Preparation

- The patient requests epidural analgesia for pain relief (or for relief of anticipated pain, planned induction of labor).

- Preanesthetic evaluation, which includes an assessment of the patient's medical obstetric and anesthetic history.

- The risks of epidural analgesia are discussed with the patient, and written informed consent is obtained.

- And the procedure explained, all relevant obstetric issues are understood (e.g., gestational age, intrauterine growth restriction, fetal presentation, risk of obstetric hemorrhage, previous cesarean delivery).

- An assessment of fetal well-being is performed .

Maternal blood pressure monitoring from initiation of epidural every 5 min for first 20 to 30 min and after every dose.

NICE guidelines recommend the continuous electronic fetal monitoring during establishment of epidural analgesia.

Resuscitation Drugs

- Thiopental
- Succinylcholine
- Ephedrine
- Atropine
- Epinephrine
- Phenylephrine
- Calcium chloride
- Sodium bicarbonate
- Naloxone

EQUIPMENT

- Oxygen supply
- Self-inflating bag and mask for positive-pressure ventilation
- Masks
- Oral and nasal airways
- Laryngoscopes

Parameters observed

Baseline maternal respiratory rate pulse rate blood pressure saturation

Baseline visual analogue scale score

Base line fetal heart rate

Onset of pain relief

Degree of analgesia

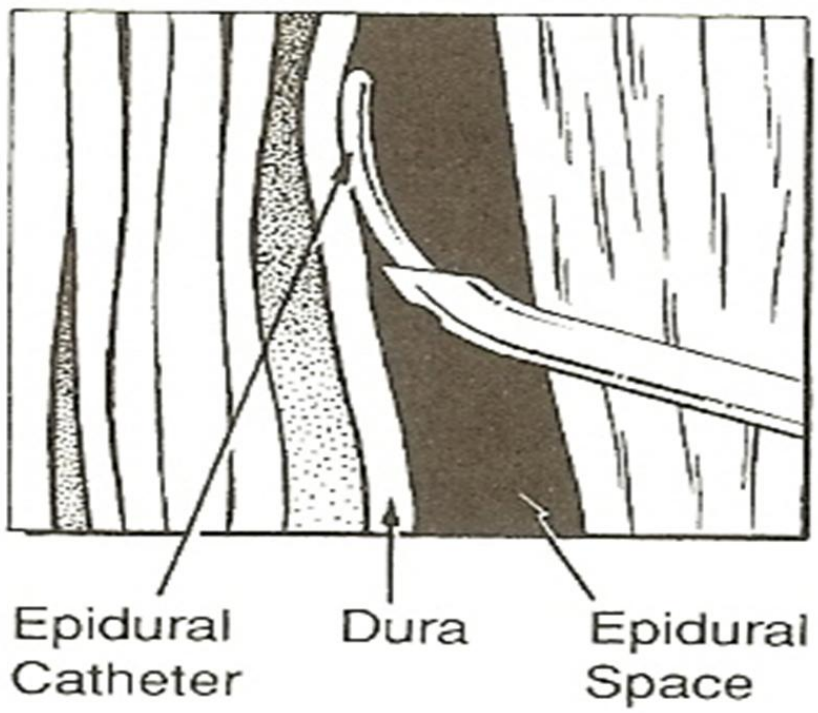
Intensity of pain at 5 10 15 30 60 min after analgesia and every 30 min

Intensity of uterine contractions

Rate of cervical dilatation

Partogram to monitor progress of labour

DRUG USED LOW DOSE BUPIVACAINE 0.0625% WITH OPIOD FENTANYL 25 MCG



Local anaesthetic agents and Drug Concentration	Initial dose	Top up dose
Lignocaine 0.5%	10 ml	3-5 ml
Bupivacaine 0.125%	10 ml	6-12 ml–hr infusion
Ropivacaine 0.2%	10 ml	8ml-hr infusion
Levobupivacaine 0.125%	10 ml	6-12 ml-hr infusion

VARIOUS EPIDURAL DRUG REGIMES

Drug Intermittent injection Continuous infusion.

Bupivacaine 5-10 mL of a 0.125%-0.375% solution every 60-120 min 0.0625%-0.25% solution given at a rate of 8-15 mL/hr.

Ropivacaine 5-10 mL of a 0.125%-0.25% solution every 60-120 min 0.125%-0.25% solution given at a rate of 6-12 mL/hr.

Lidocaine 5-10 mL of a 0.75%-1.5% solution every 60-90 min.

0.5%-1.0% solution given at a rate of 8-15 mL/hr.

Epidural analgesia initiated by **anesthetist.**

Patient shifted to operation theatre.

Anesthesia machine checked emergency airway equipment verified.

Intravenous access with 18 guage established.

Prolaoded with 10 ml/kg lactated ringers given.

Monitor maternal blood pressure every 5 min of bolus of local anesthetic.

Continuous fetal heart rate monitoring and continuous verbal communication.

Equipment needed 17 guage tuohy needle and 19 guage epidural catheter.

Patient in left lateral or sitting position strict asepsis followed.

Skin infiltration with 2% lignocaine1.5 ml tuohy needle entered via l2-l3 interspinous space epidural space identified by loss of resistance to air technique kept 3 cm inside .catheter firmly secured to back.

A test dose of 3 ml of 1.5 % lignocaine with 1 in 200000 epinephrine injected after aspiration and after a contraction to minimise confusion of tachycardia due to pain aith tachycardia due to intravenous injection of test dose.

Test dose negative 5 ml of .0625% bupivacaine injected to reach a cephalad sensory level of T10.

After 15 min block assessed by loss of sensation to cold or pinprick.Replace catheter in inadequate or asymmetrical block.

After observation of 30 min patient shifted to labour ward in left lateral position to avoid aorta caval compression.

Maternal recorded every 5 min and the fetal heart rate is monitored continuously.

The level of analgesia assessed hourly.

Drug given on patient first request and only by anesthetist.

Parameters observed.

Onset of sensory loss.

Level of sensory loss.

Any motor block.

Uterine contractions rate of cervical dilatation.

Duration of labour all three stages.

Mode of delivery.

Fetal outcome

Fetal heart rate

Apgar score ot1 and 5 min

Patient comfort

Analgesia for the first stage of labor is achieved when T10-Ll dermatomes are blocked with a low concentrations of local anesthetic, in combination with a lipid-soluble opioid.

In the second stage of labor and delivery, the block should be extended to include the pudendal segments, S2-4 to combat pain due to vaginal distension and perineal pressure.

Complications

- Hypotension (Incidence 17-20%)
- Inadequate Analgesia (0.5-1.5%)
- Intravascular Injection of Local Anesthetic
- Unintentional Dural Puncture (1-7.6%)
- Unexpected High Block
- Subdural injection of a local anesthetic (0.82%)
- Extensive motor blockade

WHY LABOUR ANALGESIA?

The labour pain during contraction produces a generalised neuroendocrinal stress response and a widespread physiological effects in the first stage of labour like the increased oxygen consumption, hyperventilation and the respiratory alkalosis; increased cardiac output, systemic peripheral resistance and blood pressure; gastric emptying may be delayed, impaired uterine contractility and diminished uterine perfusion and metabolic acidaemia.

Other factors (such as anxiety, starvation and physical exertion) are also responsible for some of these effects, pain appears to be the most potent of them and effective epidural analgesia has the ability to obtunds these effects. The increase in oxygen consumption and minute ventilation that are primarily due to pain.

Epidural analgesia decreases the work of breathing and the oxygen consumption in both the first and second stages of labour. Instead of stopping these processes from happening, measures to be taken to minimize the pain.

PAIN THEORIES

Specificity Theory Rene Descartes, a French philosopher and mathematician proposed a theory in the late 16th century found the severity and intensity of pain felt was directly related to the severity and intensity of the injury. For example, pricking the finger with a needle or a pin produces minimal pain, while cutting the hand with a knife provides more intense and severe pain. This theory is often considered one of the "original" pain theories and is commonly accepted by most. This theory is generally accurate when related to many injuries and the pain related to these injuries. This theory can be related to birth, however, is less commonly related to birth than the Gate Control Theory and the Fear Tension Pain Cycle Theory.

Gate Control Theory The nerve fibers transmitting labour pain sensations are unmyelinated and carry nerve impulses more slowly than the nerve fibers that carry sensations of light pressure, soft touch and vibration. Transmitting pleasurable impulses (like as light, soft touch), will reach the brain first, and that can cause modulation, or interference with, the pain sensations.

Merkel's disks are nerve endings the sensations of which very quickly transmitted to the brain. They are mostly located in the palms, the

soles of the feet, and the lips. Thus, having partners to hold a parturient hand, rub her feet, which can all help interrupt the pain sensations. Parturients can also grip the rails of the bed, or stand up inorder to activate some of these sensors.

Meissner's corpuscles that are found in the fingertips, and sensations from which of them are transmitted quickly.In general, sensory input has the ability to distract us from pain perception.Therefore, any sensory input the women finds pleasant and relaxing can help her massaging , light touch, music, a focal point to look at, aroma therapy, so on.

Ronald Melzack and Patrick Wall in 1960 recognized the importance of the mind in relation to the perception of pain. This pain theory is based on the fact that the experiencing pain relies on the complicated interactions that exists between the central nervous system and the peripheral nervous system. The signals thereafter travel through the peripheral nerves to the brain., Melzack and Patrick labeled as "**nerve gates,**" that which before reaching the brain open or close due to various circumstances. Therefore the "nerve gates" are open at the time when the pain signals are sent, the signals can easily pass onto the brain, and the pain is then felt intensely.

Thereafter when the "nerve gates" are closed, the signals have more difficulty passing through and pain felt is either incredibly lessened, or eliminated. Certain factors that help to open or close the "nerve gates." Factors that which open the "nerve gates," allowing pain signals to travel more freely and easily, thus intensifying pain include;

Cognitive factors Being preoccupied and concerned with the pain can open the gates making it easier for these signals to travel, thus worsening pain. Having high levels of anxiety over the pain opens the "nerve gates,

Sensory factors, such as being under the influence of drugs or alcohol, as well as poor physical condition and lack of mobility may open the "nerve gates" allowing pain signals to travel more freely.

Emotional factors can impact the "nerve gates" just as much, if not more than cognitive and sensory factors. Individuals suffering from depression, or anxiety are more likely to have open "nerve gates." If the individual is incredibly fearful, and feels helpless when it comes to the pain, the gates are much more likely to remain open, making the pain felt more intense. There are factors that may help to close the "nerve gates" often reducing the intensity of the pain experienced, or eliminating the pain felt entirely. These factors include**;**

Cognitive Factors An individual who remains positive about their ability to cope with pain, or uses other methods to distract themselves from the severity of the pain may be able to effectively close the "nerve gates," reducing the amount of pain experienced. Avoiding being under the influence of drugs and alcohol, and using relaxation techniques such as breathing patterns, meditations and visualizations may help effectively close the "nerve gates," lessening the amount of pain experienced.

Emotional Factors An individual who maintains a positive attitude and understands that pain is not always a bad thing, and maintains a certain degree of control over themselves and their situation is often able to effectively close the "nerve gates," reducing the intensity of pain experienced.

Fear Tension Pain Cycle Theory

Dr. Dick in 1930 proposed the Fear Tension Pain Cycle theory in the in laboring women. Dick- Read believed that labor was not specifically painful, but associated by the fear the women experienced during labor . , when a woman felt fearful during labour, would trigger the "fight or flight" response, releasing stress hormones (catecholamines: epinephrine, etc.) that places them in a hyper-aroused state making them hypersensitive to pain was the observation by him. Catecholamines

increase our heart rate, and blood pressure, slow down digestion, and shunting blood supply away from internal organs and toward skin and skeletal muscles Muscular tension due to fear that increases our experience of pain for which relaxation techniques can help to reduce the muscle tension. The concept of the fear-tension-pain triangle is that: when fear increases that causes, tension to increase and pain increases.

Neuromatrix theory provides a framework which tells why selected nonpharmacologic methods of pain relief can be quite effective for the relief of pain for the laboring woman. The theory was developed by Ronald Melzack and represents an expansion beyond his original"gate theory"of pain, first proposed in 1965 with P. D. Wall.

Uterine blood flow and labour

Uterine blood flow at term is 700 to 900 ml/min. During pregnancy uterine blood flow is dependent on uterine artery perfusion pressure.

Factors that decrease uterine artery perfusion pressure or increase uterine artery vascular resistance leads to decreased uteroplacental blood flow.

Uterine blood flow is directly related to perfusion pressure and inversely related to uterine vascular resistance.

Perfusion pressure decreases due to Aortocaval compression and supine hypotension. Syndrome, maternal haemorrhage and hypovolemia,high epidural block with resultant hypotension.

Increases in vascular resistance are due to Venacaval compression Uterine contractions, performing valsalva while pushing, Oxytocin like drugs induced uterine hypotonus. Labour pain causes increased catecholamine release thereby resulting in increased maternal cardiac output. Sympathetic blockade by regional analgesics may improve blood flow to placenta but maternal hypotension decreases the uteroplacental perfusion. There is an increased cardiac output from 12% to 34% by the second stage of labour which are attributable to pain and apprehension can be minimised by effective analgesia. Shnider et al found 25% increase in plasma norepinephrine concentration due to acute stress resulting in 50% reduction in uterine blood flow. Lederman et al increased plasma epinephrine concentration due to pain and stress increased the incidence of abnormal fetal heart rate patterns In parturients.

Therefore by decreasing the circulating catecholamines and preventing periods of hyperventilation during contractions may increase

the uterine blood flow. Regional analgesia may decrease the blood flow due to maternal hypotension.

LABOUR ANALGESIA AND OUTCOMES

There was inevitable selection bias, since women with long painful labours, who had increased risk of intervention, request epidural analgesia more likely, and those women who are high risk are actually recommended and encouraged an epidural analgesia.

RCT are considered the gold standard for research, difficulty exists to blind and due to problems with consent recruitment and high crossover rates.

Effect on Cesarean section rate

In several trials in 1990 s women randomly assigned to receive epidural analgesia or parenteral opioids found higher rates of caesarean in epidural groups which was subjected to criticisms.

Segal and colleagues conducted metaanalysis of nine impact studies in which 37 000. Parturients were involved and found no increase in the cesarean rate during epidural analgesia.

Cochrane review [2005] Which involved 20 studies reported Caesarean rates not increased between women who received epidural versus systemic analgesia for labour.

Meta- analysis by **Halpern and Leighton** studies[2005]6701 women were involved and the risk of Caesarean delivery was not different between women who received neuraxial Analgesia and in those who received parenteral opiod. Thorp and colleague who randomized 93 nulliparous women to receive epidural analgesia or systemic analgesia with meperidine, 2% in meperidine group and 25% in epidural group underwent caesarean section group.

TIMINIG OF ANALGESIA

American College of Obstetricians and Gynecologists (ACOG) stated previously epidural analgesia, ‘when feasible, delay until the cervix is dilated to 4–5 cm.

Regarding the association of neuraxial analgesia with the risk of Caesarean delivery a cause and effect question has been raised, to whether neuraxial labour analgesia initiated early is directly responsible for adverse labour outcomes.

Increased risk of Caesarean delivery is due to mere association.

Several Randomized controlled trials were conducted that compared early-labour neuraxial analgesia to systemic opioid analgesia.

Chestnut and colleague conducted two studies nulliparous women were randomised in spontaneous labour or oxytocin augmentation group and found that epidural analgesia initiated early and that initiated when cervical dilation reached 5 cm, no difference in Caesarean delivery rates were found between groups, but the validity of the results were limited since the median cervical dilation was 3.5 cm in spontaneous women and 4.0 cm in women receiving oxytocin augmentation at the time of initiation of analgesic.

ACOG [2006] updated Committee Opinion was published based on these studies **E**ntitled Analgesia and Caesarean Delivery Rates, which stated that: '**maternal request is a sufficient medical indication for pain relief during labour in the absence of medical contraindications'**. The method of pain relief that women can choose during labour should not be influenced by the fear of increased caesarean delivery.

Royal College of Obstetricians and Gynaecologists, the Royal College of Midwives, the Royal College of Anaesthetists, and the Royal College of Paediatrics and Child Health stated a **joint statement in 2007**

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‘**When women chose epidural analgesia for pain relief in labour, they should be able to receive it in a reasonable time. This meant obstetric units must be able to provide regional analgesia on request at all times.’**

Wang and colleagues [2009] involved more than 12 000 nulliparas in 5 years period showed Caesarean delivery rate not increased in parturients in latent phase to receive epidural analgesia as compared with active phase.

According to **COMET trial** spontaneous vaginal delivery rates is influenced by the type of analgesia. No difference in the instrumental vaginal delivery rate were observed before and after the availability of neuraxial analgesia.

Second stage of labour prolongation malposition of fetus and the loss of bearing down reflex and the loss of urge to push are the indications to apply instrument for facilitating delivery. Systematic reviews of randomized controlled trials wherein caesarean delivery rate was the primary outcome neuraxial was compared with systemic opioid analgesia, concluded neuraxial analgesia was associated with an increased risk of instrumental vaginal delivery.

Liberman and O Donaghue [2002] found that in metaanalysis of 17 studies women had higher instrumental delivery and longer labours.

Halpern and Leighton,[2002]the OR was 1.92.] for instrumental vaginal delivery in epidural analgesia group versus systemic opioid analgesia .In meta-analysis reported by **Sharma and colleagues** meta-analysis by Liu and colleagues[2004], instrumental vaginal delivery adjusted OR were 1.8 and 1.63, respectively.

Several confounding factors like the neuraxial analgesia density during the second stage of labour, abdominal wall musculature relaxation secondary to epidural local anaesthetic could result in decreased effectiveness of maternal expulsive efforts.

Ability to coordination of expulsive efforts with uterine contractions can also be hindered by the density of the sensory blockade of the uterus and the birth canal.

Additionally, high concentrations of neuraxial local anaesthetic causes relaxation of the pelvic floor musculature and leads to interference with fetal rotation during descent and Obstetricians are urged to perform instrumental vaginal deliveries in parturients with effective second-stage analgesia than in parturients than those without analgesia**. James and**

colleague and Olofson and colleagues noted that low dose bupivacaine 0. 125% with fentanyl 2 μg/ml− had resulted in lower incidence of instrumental vaginal delivery than women who received 0.25% epidural bupivacaine.

Smedstad and Morison demonstrated 0.25% bupivacaine showed a higher incidence of instrumental vaginal delivery when administered as a continuous epidural infusion as compared with intermittent bolus injections.Study by Wong and colleagues [2006] and the COMET study demonstrated no difference in the instrumental vaginal delivery rate between groups who received ‘low- dose’ bupivacaine/fentanyl by either intermittent bolus or continuous infusion.

Maternal perineal trauma increases with the use of instrumental delivery and the risk of adverse neonatal outcome is increased in, cases of difficult midforceps delivery. It is art and science to minimize the risk of instrumental vaginal delivery while maximizing comfort of the parturient, tailoring to the individual needs.

Effect on the duration of labour and labour augmentation

First stage of labour

This parameter is assessed with conflicting results as a secondary outcome in various studies. Halpern and Leighton in the meta analysis of nine impact studies and Cochrane review [2005] duration of the first stage of labour showed no difference among women receiving epidural labour analgesia and those systemic opioid analgesia or no analgesia, when the parturient complains of rectal pressure, wherein full cervical dilatation is diagnosed is likely to be at a later time in women with effective neuraxial analgesia compared to the women with systemic opioid analgesia. Owing to the presence of effective labour analgesia the duration of first stage of labour may be apparently prolonged. The duration of first stage of labour is significantly influenced by the changes in uterine activity which are increased or decreased by neuraxial analgesia, that may be due to the fluid bolus epidural analgesia. **Fluid bolus** has been also suggested to cause a decrease in concentrations of hormones known to had effect on the augmentation of uterine activity. Behrens and colleagues observed that there is a decrease in the release of prostaglandin F2 alpha in women who received epidural analgesia during the first stage of labour, a hormone known to increase uterine activity.

Rahm and colleagues in a prospective study demonstrated lower plasma oxytocin concentrations 60 min after initiation of epidural analgesia compared with parturients without epidural analgesia.Studies demonstrate an increase in uterine activity due to acute decrease in plasma epinephrine after initiation of neuraxial analgesia. Epinephrine owing to its effects on β-adrenergic receptors causes tocolysis.

Sympatholysis is associated with a rapid decrease in maternal plasma concentrations of epinephrine.This acute decrease in maternal epinephrine concentration with decreased beta adrenergic receptor activation , result in increased uterine activity.

Abráo and colleagues [2009] in a randomised double blinded trial higher incidence of uterine tachysystole and faster onset of pain relief and sympatholysis in the CSE group. More precipitous decrease in maternal epinephrine concentrations, result in uterine tachysystole. Van de Velde and colleagues also demonstrated a higher incidence of uterine hypertonus. The studies that were associated with prolongation of the first stage of labour no increase in adverse neonatal or maternal outcomes owing to increased labour time.

Second stage of labour

There may be an inhibition of urge to push but valsalva maneuvers like maternal expulsive efforts are not impaired unless with high dense blocks. Epidurals might block the afferent limb of the Ferugson reflex but only theoretically. There may be a relaxation of pelvic musculature. Halpern et al meta analysis showed second stage prolonged by 14 min in epidural group and two fold increase in forceps delivery. It is widely agreed that duration of second stage of labour is prolonged by effective neuraxial analgesia. This consensus is supported by the meta- analyses of randomized controlled trials that compared neuraxial with systemic opioid analgesia demonstrated in a women who received neuraxial analgesia the second stage duration was approximately 15 min longer.

The presence or absence of neuraxial analgesia is incorporated by **ACOG** into their definition of **second-stage dystocia**, and states that the provided the progress has been made the need for intervention (instrumental or surgical) should not be mandated solely based on second stage duration. Several studies suggested that provided the fetal status is reassuring and with proper fetal head descent and the mother adequately hydrated and pain controlled a prolonged second stage of labour does not result in adverse maternal or fetal outcomes. Paterson and colleagues

evaluated more than 25000 women there was no clear cut point for the spontaneous delivery expectation in parous women with epidural analgesia in terms of the second stage of labour, women who spontaneously delivered an infant at ≥37 weeks gestation with vertex presentation. There was also no clear-cut point in predicting unsuccessful spontaneous vaginal delivery in nulliparous women, due to the steady rate of birth in this population.

The definition of prolonged second stage in women received regional analgesia has been revised by **the American College of Obstetricians and Gynecologists[2003] ie more than 3 hrs in nullipara and more than 2 hrs in multigravida Provided the fetus and mother are both well** this number is arbitrary. The risk of damage to the neurological structures within the pelvis with longer labours is theoretical, and is difficult to quantify. In a **PEOPLE trial** which is a randomized multi-centre controlled trial, [the Pushing Early or Pushing Late with Epidural (PEOPLE)] in the delayed pushing group, the rate of spontaneous vaginal delivery was higher, duration of pushing shorter, and rate of mid-rotational forceps lower in women as compared with immediate pushing. Meta-analysis study [2004] of nine studies of 72, PEOPLE study included as one 71 concluded that delayed pushing did not decrease the rate of instrumental vaginal delivery (RR 0.92; 95% CI

0.84–1.01) or Caesarean delivery, but the rate of midpelvic rotational forceps delivery was decreased (RR 0.69; 95% CI 0.55–0.87). The delayed pushing group had longer duration of the second stage of labour, but the neonatal outcomes are similar. Until the fetus has descended to a lower fetal station it is preferred to delay pushing inorder to avoid maternal exhaustion. Association between analgesia and operative delivery is explained by the finding that women who requested analgesia were those at increased risk for prolonged labour and operative delivery with more likelihood to experience severe labour pain, compared with women who had rapid and uncomplicated labours. Wuitchik and colleagues observed that operative delivery more in women who experienced severe pain in the latent period. Also the rate of caesarean delivery was almost twice in women who experienced more breakthrough pain during low-dose bupivacaine/fentanyl epidural. Studies suggest that there is a risk of abnormal labour and operative delivery in women who experienced severe pain in latent period.

Effect on the fetus and neonate

Neonatal arterial pH or APGAR scores in babies had no difference who are born to mothers with epidurals . Hill [2003] found no deleterious

effect on fetal heart rate Reynolds et al [1999] showed cord PH better in babies under epidural.

Benefits for the neonate, including a reduction in the incidence of low APGAR scores at 5 min and in the need for naloxone are also shown by studies. Transient alterations in fetal heart rate, particularly bradycardias, are also reported in some studies after initiation of epidural analgesia.

Various explanations including opioid-induced uterine hyperstimulation and placental hypoperfusion (secondary to a fall in maternal blood pressure and rapid onset analgesia with an ensuing rapid fall in maternal epinephrine concentrations has been proposed. Importance of these isolated reports is unclear clinically. However, monitoring of the fetus remains important.

Therefore neuraxial analgesia can be initiated individualising to the expectant needs.

COMPLICATIONS OF REGIONAL ANALGESIA

Hypotension

Blockage of preganglionic autonomic fibres results in vasodilatation reduction in systemic vascular resistance and fall in maternal blood pressure leading to fetal heart rate changes. This can be prevented by preloading with crystalloids and maintaining lateral position.[Danilenko –Dixon et al [1996]. Despite these one third of women still develop hypotension [Sharma et al 1997]

Accidental dural puncture and post dural puncture headache

The incidence is 0.2 to 2 % .this is due to inadvertent advancement of needle beyond epidural space.

Breach in dura resuts in leakage of CSF resulting in low pressure headache'.headache occurs 24 to 48 hrs after postural subsides in lying down and aggravates in upright posture. Severe forms treated with epidural blood patch and milder forms with caffeine and paracetamol.

Backache

Local tendernes 3 to 7 days in 30 % due to technical difficulty may be present due to multiple attempts. Anim-Somuah et al [2005] the

incidence of long term backache is similar in women receiving analgesia and those who did not.

Bladder dysfunction

Bladder distension not recognised resulting in overdistended bladder and postpartum bladder dysfunction especially in prolonged labour. Encouraging to void and cetheterisation can be done.

Maternal pyrexia

The temperature rise is never beyond 1 degree C and rule out underlying cause in temperature beyond that Leighton et al [2002] and Liberman [2002] found an association of epidural analgesia and intrapartum fever. Pyrexia teated with hydration and supportive care. Evaluation for neonatal sepsis not warrented.

Miscellaneous

Shivering pruritis, delayed gastric emptying.

Unintended intravascular local resulting in toxicity and total spinal blockage are rare and avoided by following strict protocols and risk management strategies.

Systemic opioid analgesia

Newborns of mothers who had neuraxial opiods there was no difference in neonatal outcome (as assessed by Apgar scores] and umbilical cord PH measurements.

No difference in long term neonatal outcome.

Opioids block the transmission of pain-related information by binding at presynaptic and postsynaptic receptor sites in the dorsal horn of the spinal cord (i.e., Rexed laminae I, II, and V), and in the brainstem nuclei, periventricular gray matter, medial thalamus. They are associated less adverse effects than systemic use Opioid and a LA are given epidurally, they interact synergistically to provide effective pain relief.

OPIOIDS USED TO PROVIDE EPIDURAL ANALGESIA DURING LABOR

Drugs	Dose	Onset (Minutes)	Duration (hours)
Morphine	3–5 mg	30–60	4–12
Pethidine	25–50 mg	5–10	2–4
Butarophanol	2–4 mg	10–15	6–12
Fentanyl	50–100 µg	5–10	1–2
Sufentanil	5–10 µg	5–10	1–3

Complications of Neuraxial Opioid

Pruritus

Neurotoxicity

Sensory Changes

Hypotension

Nausea and Vomiting

Respiratory Depression

Delayed Gastric Emptying

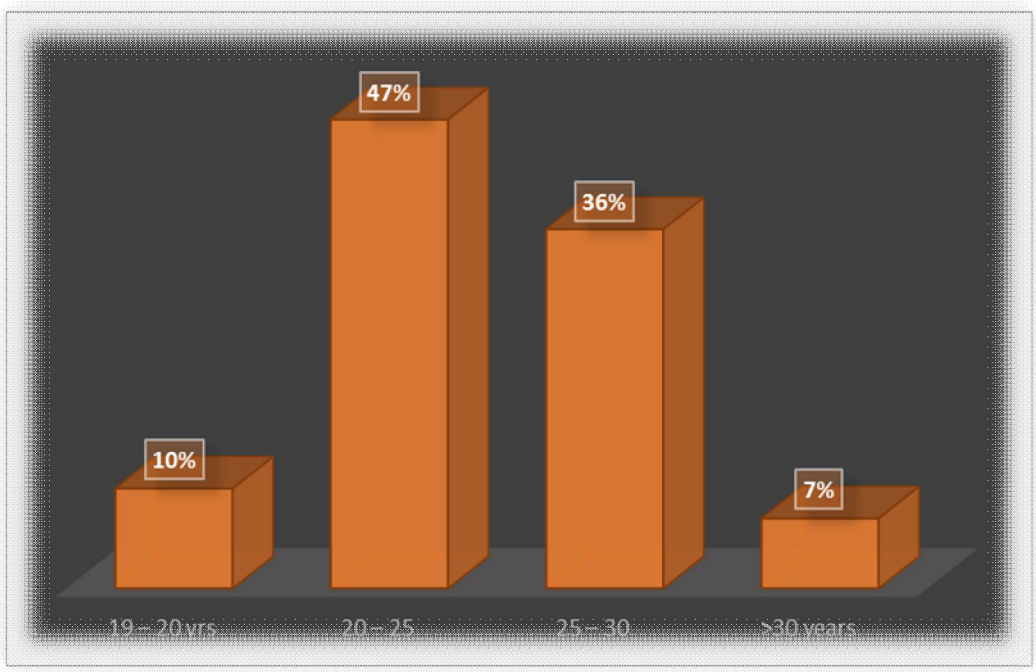
Opioid Direct fetal effects may include intrapartum effects on the FHR as well as possible respiratory depression after delivery.

Indirect fetal effects include fetal bradycardia.

AGE OF PATIENT

Age Group (Years)	Study Group No. of Patients	%
19 – 20 yrs	7	10%
20 – 25	33	47%
25 – 30	25	36%
>30 years	5	7%
Total	70	100%

AGE OF PATIENT

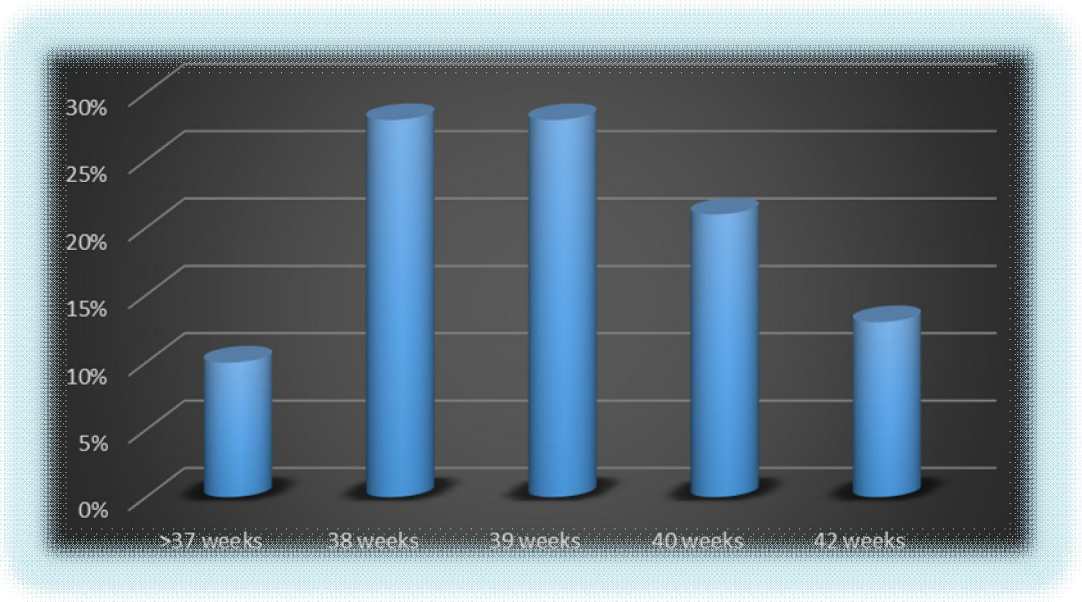


In my analysis 10% of patients in age group of 19 to 20 yrs and majority of 47% of patients in 20to 25 yrs and 36% in 25 to 30 yrs and only 7% in 30 yrs.

GESTATIONAL AGE

Gestational Age	No. of Patients	%
>37 weeks	7	10%
38 weeks	20	28%
39 weeks	20	28%
40 weeks	15	21%
42 weeks	9	13%
Total	70	100%

GESTIONAL AGE

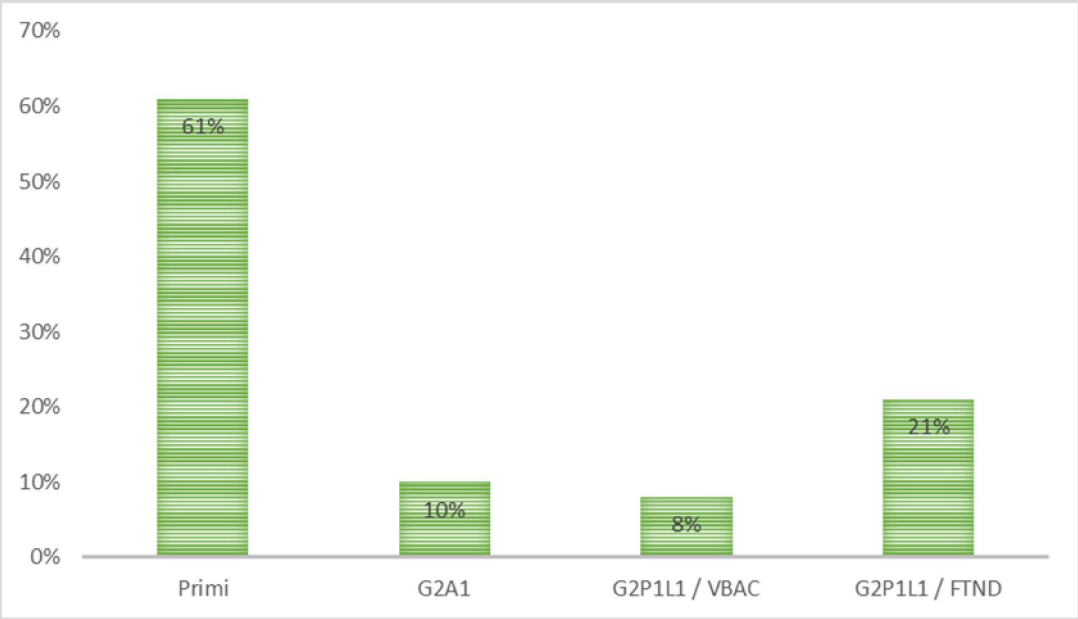


In my study majority of my patients in 38 and 39 weeks of gestation 21% in 40 weeks gestation and 13% in 42 weeks gestation.

PARITY

Parity	No. of Patients	%
Primi	43	61%
G_2A_1	7	10%
$G_2P_1L_1$ / VBAC	5	8%
$G_2P_1L_1$ / FTND	15	21%
Total	70	100%

PARITY



In my study primigravida constitutes 61% and second gravida with previous normal delivery 21% and 8% of those with previous cesarean section.

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HEIGHT

Height	No. of Patients	%
145 – 150	13	18%
150 – 155	37	54%
156 – 160	20	28%
Total	70	100%

WEIGHT

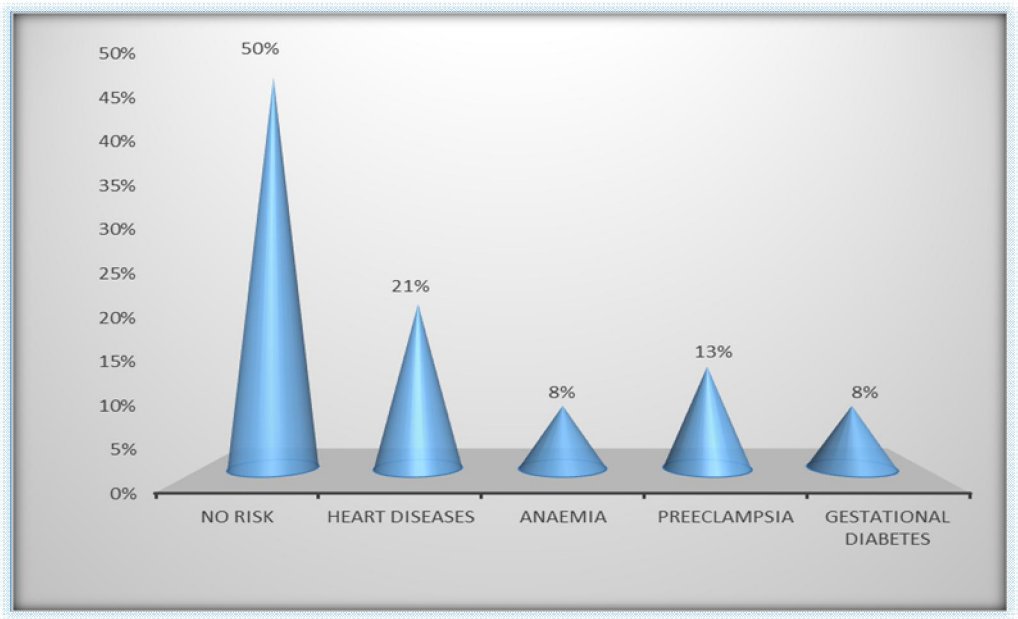
Weight	No. of Patients	%
50 – 55 kg	23	34%
55 – 60	27	38%
60 – 65	20	28%
Total	70	100%

In my analysis around 54% of patients were of height more than 150 cm and regarding weight 38% of them were 55 to 60 kg.

SELECTION OF CASES

Cases	No. of Patients	%
No Risk	35	50%
Heart Diseases	15	21%
Anaemia	5	8%
Preeclampsia	10	13%
Gestational Diabetes	5	8%
Total	70	100%

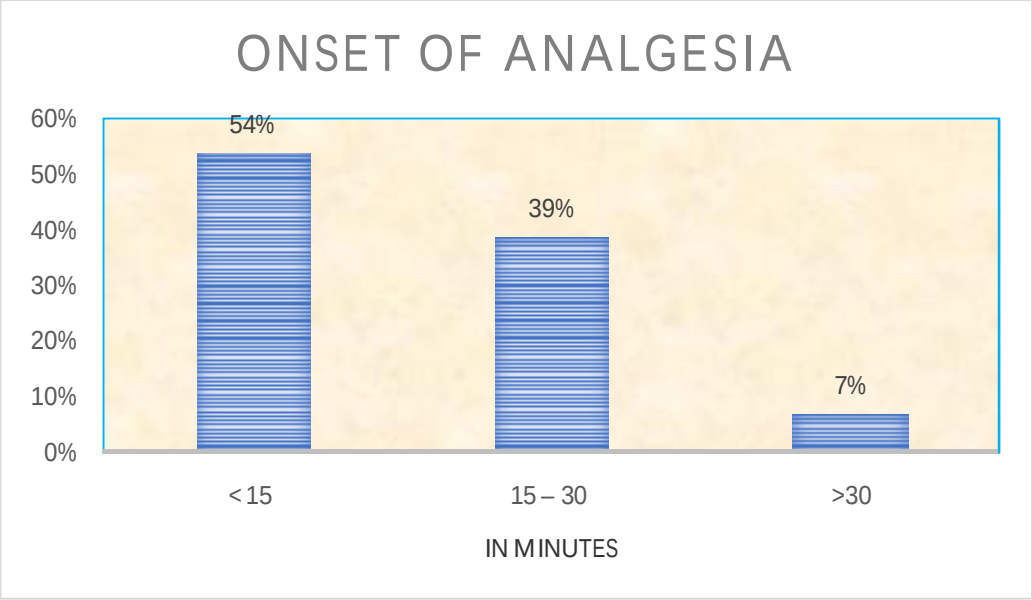
SELECTION OF CASES



In my analysis about 50% of patients had no risk factors and 21% of them were those with heart disease 13% were preeclampsia patients and 8% gestational diabetes and 8% anemic patients.

ONSET OF ANALGESIA

Time in minutes	No. of Patients	%
< 15	37	54%
15 – 30	50	39%
>30	3	7%
Total	70	100%



The onset of analgesia 54% of patients had immediate pain relief within 15 minutes of initiation of main dose and 39% in 15 to 30 min and 7% in 30 minutes hence majority of them had early pain relief.

INITIATION OF ANALGESIC TO DELIVERY INTERVAL

Time in Hrs	No. of Patients	%
2 to 3 hrs	8	11%
4 to 6 hrs	15	21%
6 to 8 hrs	17	24%
8 to 10 hrs	30	44
Total	70	100%

RATE OF CERVICAL DILATATION

Rate / hr.	No. of Patients	%
1 cm / hr	30	39%
0.5 cm / hr	10	12%
2 cm / hr	30	39%
Total	70	100%

In my analysis about 44%of patients delivered in 8 to 10 hrs of initiation of first main dose of analgesic and 24% delivered in 6 to 8 hours 21% in4 to 6 hrs and 11 % delivered in 2 to 3 hrs with two dose of analgesic.

Regarding cervical dilatation equal number 39% had a rate of 1cm /hr and 2cm /hr and 12% had 0.5 cm/hr rate of cervical dilatation.

STAGE – I : DURATION OF LABOUR

I stage in hrs.	No. of Patients	%
4 – 6 hr	3	7%
6 – 8 hr	9	12%
8 – 10	31	43%
10 – 12	27	38%
Total	70	100%

In my analysis 43% of patients had first stage of labour of 8 to 10 hrs 38% had 10 to 12 hrs of first stage of labour.

STAGE – II : DURATION OF LABOUR

II stage in mins.	No. of Patients	%
30 to 60 mins	4	8%
60 to 90 mins.	18	24%
90 to 120 mins.	15	21%
> 120 mins.	33	47%
Total	70	100%

47% of patients had second stage labour beyond 120 min 24% of them had 60 to 90min and 21% had between 90 to 120 min.

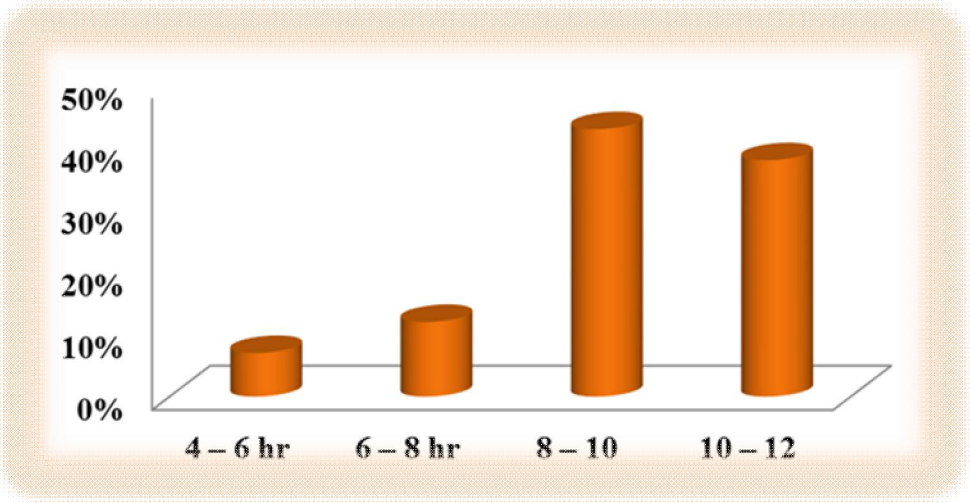
STAGE - III

DURATION OF LABOUR

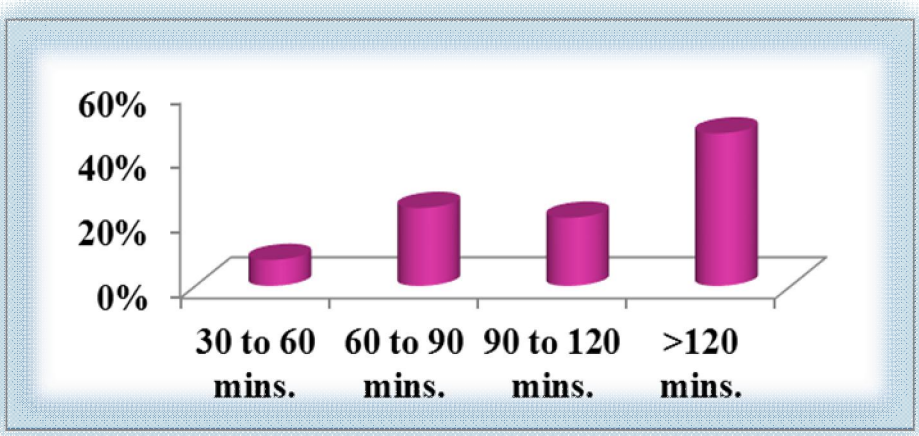
III stage in mins	No. of Patients	%
< 30 min	35	50%
Equal to 30 min	20	28%
> 30 min	15	22%
Total	70	100%

The duration of third stage of labour was less than 30 min in 50% 15 patients had longer than 30 min of which 1 patient had retained placenta necessitating manual removal and 6 patient had atonic PPH

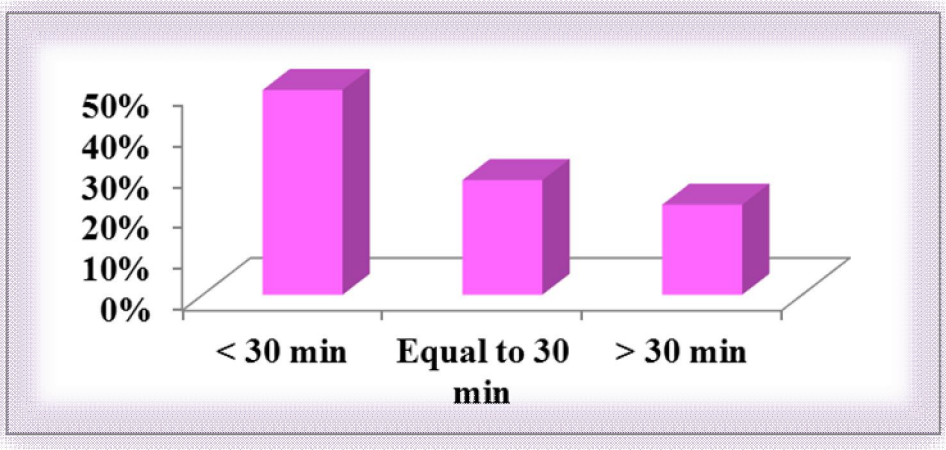
DURATION OF LABOUR - I STAGE



DURATION OF LABOUR – II STAGE



DURATION OF LABOUR - III STAGE

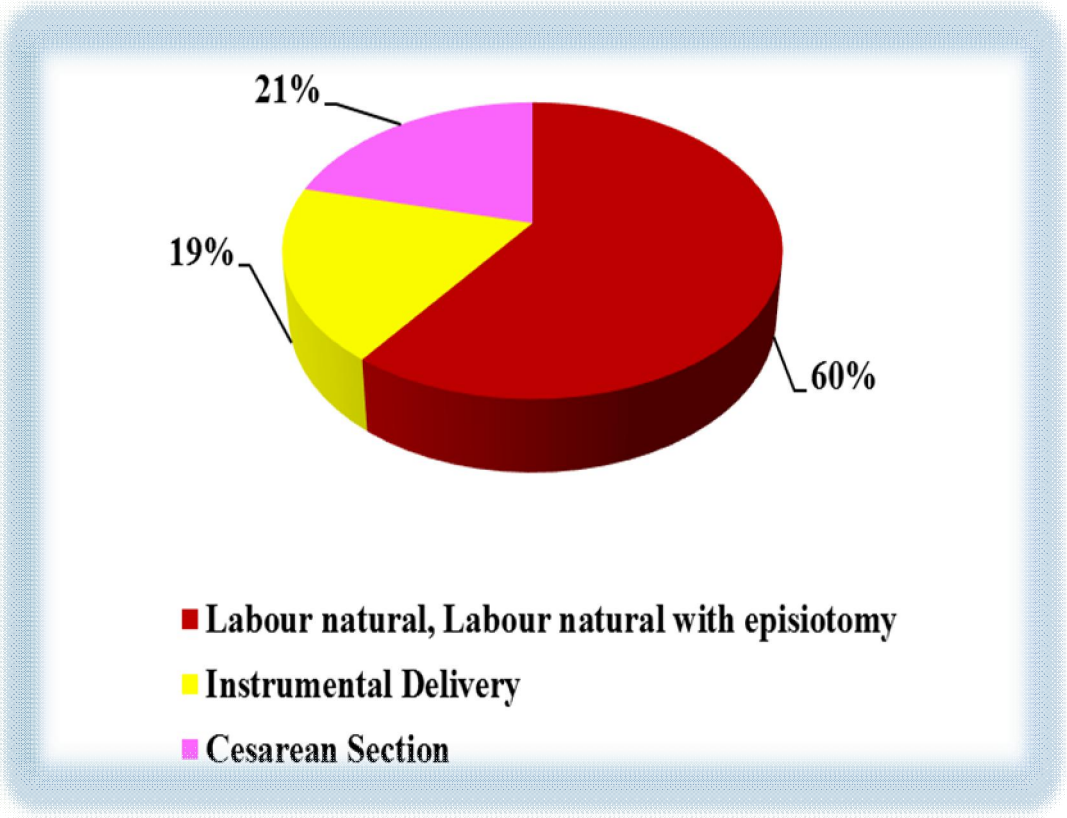


MODE OF DELIVERY

Delivery	No. of Patients	%
Labour natural	10	14%
Labour natural with Episiotomy	33	47%
Instrumental LMC Forceps Outlet Forceps Vaccum	 4 8 2	18.6%
Cesarean Section	15	21%
Total	70	100%

In my analysis 61% of the study group delivered labour natural aroud 19% had instrumental delivery and 21% had cesarean delivery and 15% of control group had instrumental delivery and 24% had and the rest labour naturale which were similar in both groups.

MODE OF DELIVERY



INDICATION FOR CESAREAN

Indication	No. of Patients
Failure to progress	5
Failed induction	4
Fetal Distress	3
CPD	3
Total	15

The indication for cesarean was failure to progress in 5 patient failed induction in 4 patients fetal distress in 3 patients and cephalopelvic disproportion in 3 patients.

THIRD STAGE COMPLICATIONS

Complications	No. of Patients
Retain Placenta	1
Atonic PPH	6
Traumatic PPH	2
Total	9

Regarding third stage complication 1 patient had retained placenta which was removed manually and 6 patients who had prolonged third stage had atonic PPH medically managed and 2 patient had traumatic PPH who underwent exploration and repair.

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INDICATION FOR FORCEPS

Forceps	No. of Patients
Failure of maternal expulsive efforts	8
Indicated forceps	5
Fetal Distress	2
Total	15

The indications for forceps were 8 patients had failure of maternal expulsive efforts 5 of them had indicated forceps delivery for heart disease complicating and 2 had fetal distress and underwent forceps delivery.

MATERNAL COMPLICATIONS

Intrapatrum	No. of patients	Postpartum	No. of patients
Inadequate Analgesia	5	Urinary retention	2
Dural puncture	1	Respiratory depression	Nil
Venous puncture	1	Backache	2
Pruritis	Nil	Headache	3
Nausea & Vomiting	2	Neurological deficits	Nil
Rigor	4		
Hypotension	4		

Regarding complications 5 patient complaint of inadequate analgesia 1 of each patient had inadvertent dural and venous puncture and 2 patient had nausea and vomiting 4 patient had rigor 4 patient had hypotension 2 each had urinary retention and backache and 3 had headache and none of them had neurological deficits.These complications were minimal and easily managed symptomatically without much difficulty.These complications were comparable to the controls.

FETAL OUTCOME

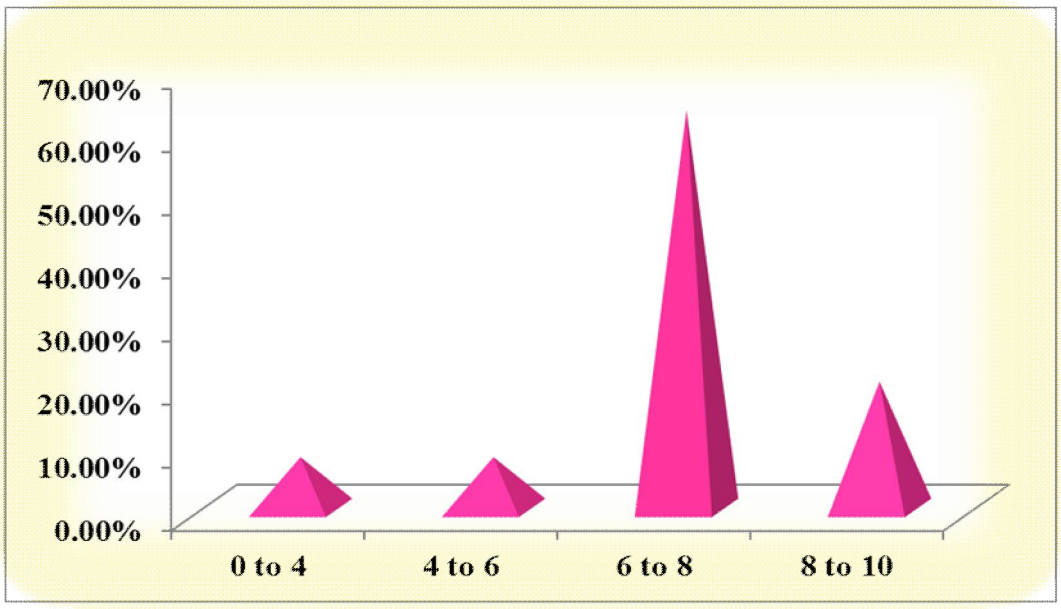
Outcome	Intrapartum	Postpartum	Early neonatal	%
Normal alive		56		80%
Asphyxiated and revived		10		14%
Asphyxiated not revived (Death)			2	3%
HIE			2	3%
Fetal distress	3			4%
Hyperbilirubinemia and revived			5	7%

In my study about 80% of babies were normal alive 14% of them asphyxiated but revived 2 babies died in early neonatal period who were asphyxiated but could not be revived.2 of them developed HIE in the early neonatal period 3 babies had fetal distress diagnosed intrapartum and 5 developed hyperbilirubinemia in early neonatal period and revived .

APGAR 1 MIN

Score	No. of babies	%
0 to 4	6	8.5%
4 to 6	6	8.5%
6 to 8	44	63%
8 to 10	14	20%
Total	70	100%

APGAR (1 MIN.)

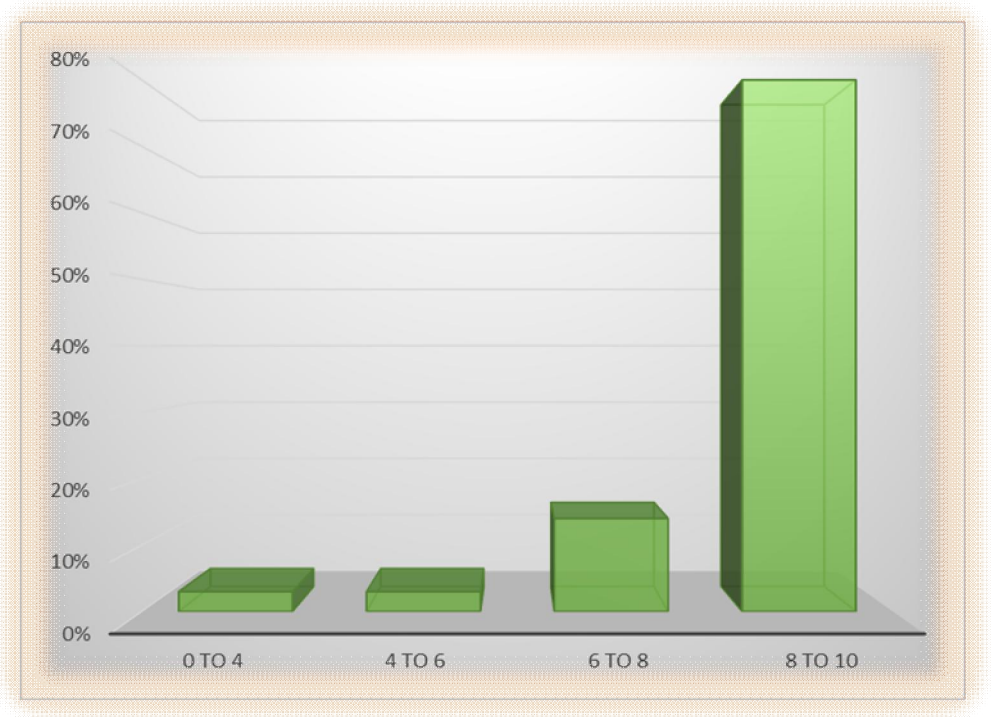


APGAR (5 MIN.)

Score	No. of babies	%
0 to 4	2	3%
4 to 6	2	3%
6 to 8	10	14%
8 to 10	56	80%
Total	70	100%

About 80% had Apgar score of 8 to 10 and 14% had score of 6 to 8 and only 3% had low scores.

APGAR (5 MIN.)

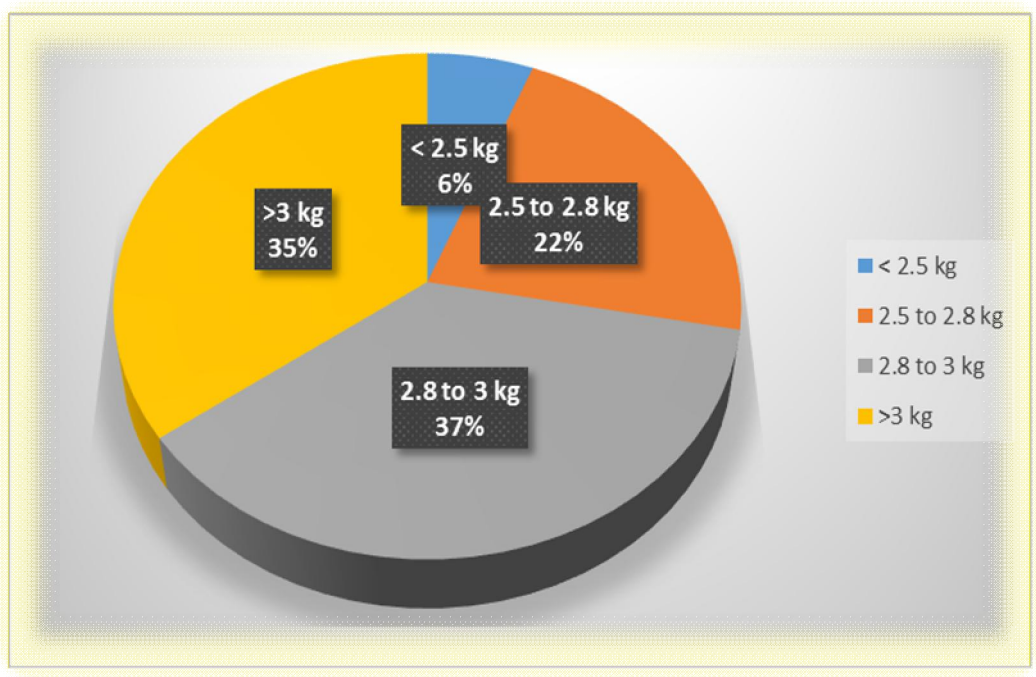


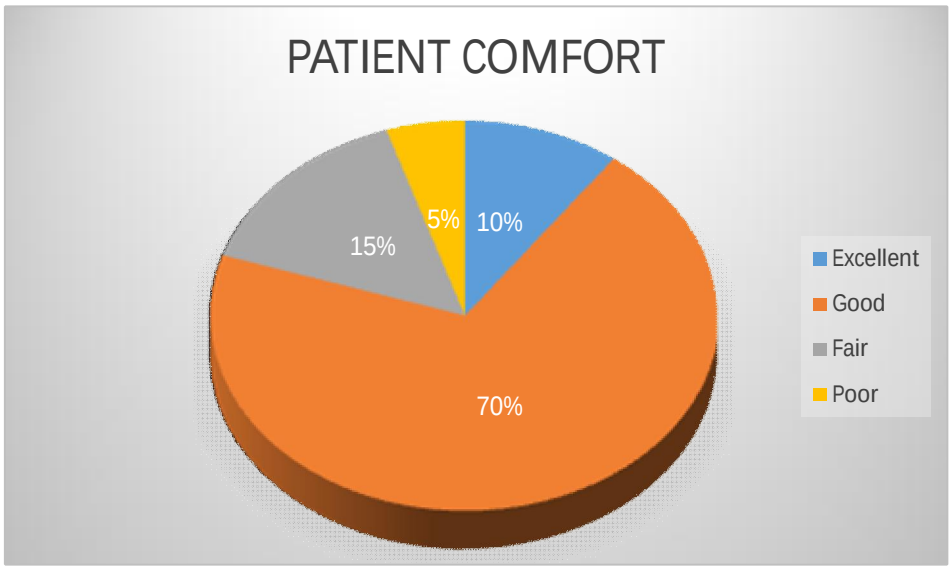
WEIGHT OF BABY

Weight in Kg	No. of babies	%
< 2.5 kg	4	6%
2.5 to 2.8 kg	15	22%
2.8 to 3 kg	26	37%
>3 kg	25	35%
Total	70	100%

In my study 37% of babies were of 2.8 to 3 kg 35% of them were of more than 3 kg 22% of them were of weight 2.5 to 2.8 kg.and were comparable to controls.

WEIGHT OF THE BABY





In my analysis 70% of the patients had good pain relief and 15% had fair and only 5% complaint of poor pain relief.

Overall patients had good pain relief and satisfaction and had good comfort.

Group Statistics

	Group	N	Mean	Std. Deviation	Std. Error Mean
Age	1	70	24.80	3.545	.424
	2	70	25.21	3.639	.435

T test values: -0.682 P= 0.496 Not significant.

Group Statistics

	Group	N	Mean	Std. Deviation	Std. Error Mean	p
Durationof 2nd stage of labour	1	70	90.57	23.614	2.822	0.000 Significant
	2	70	72.87	17.661	2.111	

Group Statistics

	Group	N	Mean	Std. Deviation	Std. Error Mean	P
APGAR 1 minute	1	70	6.57	1.199	.143	0.422 Not significant
	2	70	6.41	1.110	.133	
APGAR 5 mts	1	70	7.66	1.102	.132	0.388
	2	70	7.50	1.046	.125	Not significant.

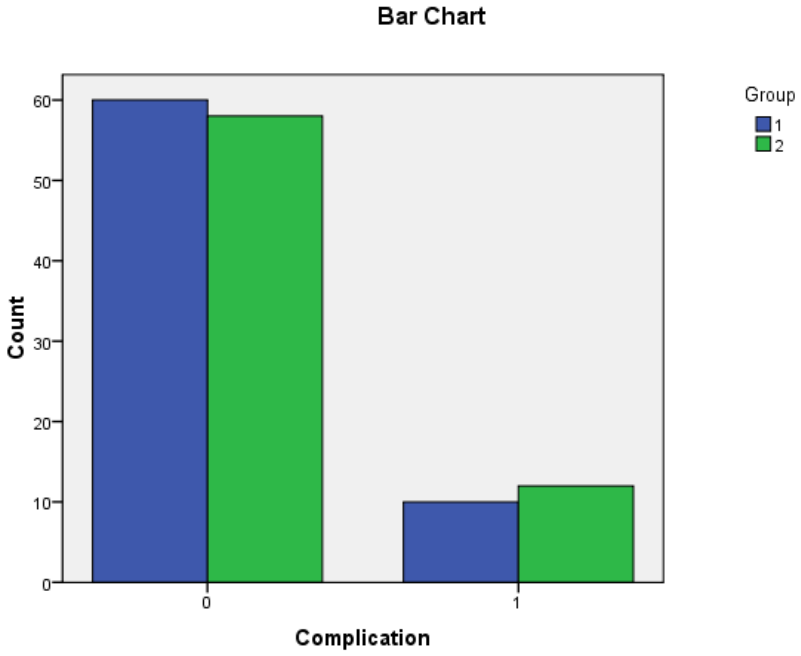
Group Statistics

	Group	N	Mean	Std. Deviation	Std. Error Mean	p
Birth weight	1	70	2.884	.2801	.0335	0.096 Not significant.
	2	70	2.803	.2954	.0353	

Complication * Group Crosstabulation

			Group		
			1	**2**	**Total**
Complication	0	Count	60	58	118
		% within Group	85.7%	82.9%	84.3%
		% of Total	42.9%	41.4%	84.3%
	1	Count	10	12	22
		% within Group	14.3%	17.1%	15.7%
		% of Total	7.1%	8.6%	15.7%
	Total	Count	70	70	140
		% within Group	100.0%	100.0%	100.0%
		% of Total	50.0%	50.0%	100.0%

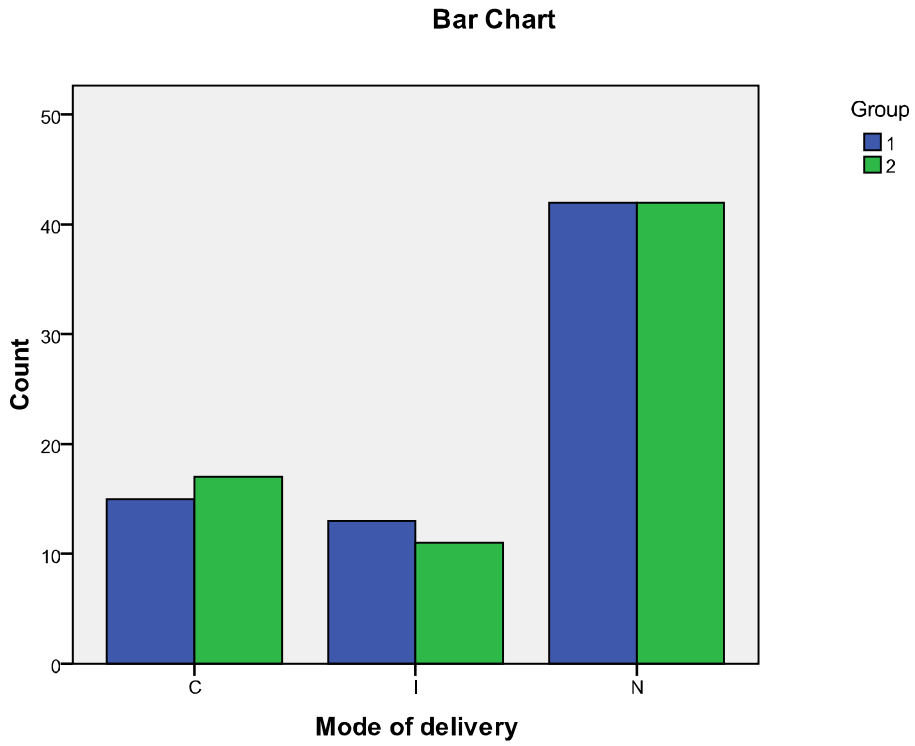
Chi square= 0.216 P= 0.642 not significant.



Mode of delivery * Group Crosstabulation

			Group		Total
			1	2	
Mode of delivery	C	Count	15	17	32
		% within Group	21.4%	24.3%	22.9%
		% of Total	10.7%	12.1%	22.9%
	I	Count	13	11	24
		% within Group	18.6%	15.7%	17.1%
		% of Total	9.3%	7.9%	17.1%
	N	Count	42	42	84
		% within Group	60.0%	60.0%	60.0%
		% of Total	30.0%	30.0%	60.0%
Total		Count	70	70	140
		% within Group	100.0%	100.0%	100.0%
		% of Total	50.0%	50.0%	100.0%

Chi square= 0.292 P= 0.864 Not significant.



DISCUSSION

An epidural analgesia is a technique that will make a woman more comfortable in the birthing process. The procedure allows the patient in fully awake state and participating in all aspects of the labour. Epidural analgesia with an experienced anaesthetist, a dedicated obstetrician and a well trained mid-wife can help parturients to convert the painful labour into a less stressful event. Pain relief is considered an integral part of labour management. Epidural analgesia is the well recognised effective method for the pain control during labour due to irregularity of analgesia, toxicity of local anaesthetics (LA) in some are the major limitations Epidural analgesia also allows emergency cesarean io be proceeded with the same. Epidural dose is often reduced in the second stage of labour in order to improve the maternal expulsive efforts and minimising the need for instrumental vaginal delivery (IVD) The woman's need for epidural analgesia (EDA) has been believed strongly related to birth-weight. Prolonged duration of labour and instrumental delivery, that may be observed during epidural analgesia, are due to large infants.

This study was conducted in labour ward **Institute of Social Obstetrics Govt Kasturba Gandhi** to study the maternal and perinatal outcomes of obstetric analgesia [low dose lumbar epidural] during

labour.[October 2012 to November 2013] About 70 patients in active labour [cervix effacement >50% and dilatation of >3 cm] who consented for epidural analgesia chosen and a control group who did not receive analgesia with similar age literacy socioeconomic status gestational age in weeks and cervical dilatation at the beginning of study chosen. Maximum no of patients 47% belonged to age group 20 to 25 yrs mean age 24.8 and in the control group mean age 25. The study by Writer Steienstra [2006] et al mean age 27 yrs the PEOPLE study [2008] mean age 26 and standard deviation 4.2 and in Fowzia anwer et al [2008] which also included 70 patients The mean age was 27 yrs.

In our study maximum gestational age was in 38 to 39 wks [28%] The studies by PEOPLE [2008] and Writer Stienstra et al also showed gestational age of 39 wks 24% delivered in 6 to 8 hrs and in our study and by PEOPLE study [2008] initiation of main dose to delivery interval was 29% and in study it was 30%.

Regarding patient comfort 70% showed good pain relief rated good to excellent and showed satisfaction as compared to Sharma and colleagues [1997] 90% rated pain relief good to excellent 95% expressed a desire for the same analgesia in future pregnancy. Fowzia Anwer study [2008] showed 57% no pain and 21% showed little discomfort.

In our study mean duration of 1 st stage was 8 to 10 hrs and in studies by Dickinson and Macdonald et al [2002] the mean duration was 8 to 9 hrs.Writer Stienstra [2006]mean duration 9 hrs. Studies by Sharma et al [2002]first stage duration was 8 to 12 hrs.

Duration of second stage in our study group mean 90 min and in control group 70 min In studies by Stephen Halpern leighston[1998] the second stage was 42 min longer and by Writer Stienstra [2006] the duration of second stage mean 90 min and in Dickinson Mcdonald study [2002] the mean duration of second stage was 1.33 hrs and Halpern et al [1990] metaanalysis prolonged active phase by 42 min and second stage by 14 min.

Sleep et al [1990] stated the adverse effect of prolonged second stage due to underlying causative factor and not on absolute duration. Chestnut et al [1999] Thorp et al [1996]epidural analgesia prolonged second stage with no adverse effect studies by Sharma et al [2002] showed duration of second stage 110 min. In our study 64% of patient needed oxytocin augmentation in studies by Sharma et al [2002] 48 % of patients needed oxytocin augmentation PEOPLE[2008] trial showed 57.6% need for oxytocin augmentation Dickinson study[2002] showed 40% need for oytocin.

In our study regarding the mode of delivery spontaneous vaginal delivery was 60% and instrumental delivery 19% caesarean rate 21% in study group and in control group 60% spontaneous vaginal delivery 16% instrumental delivery and 24% caesarean delivery.In studies by Sharma et al [2002] 77% had spontaneous vaginal 13% had instrumental delivery and 10% had caesarean delivery showing no difference .Stephen Halpern Leighton [1998] reported 8.2% caesarean rates Studies by Writer Stienstra stated 50% spontaneous vaginal 30% instrumental and 11% caesarean delivery. COMET trial showed 37% instrumental delivery with conventional epidurals and 29% with low dose epidurals.Dickinson study [2002] showed no difference in operative vaginal or caesarean rates. Thorp et al [1993] showed increase in caesarean rates.Chestut [1998] stated no increase in caesarean rates in nullipara. Amin somuah [2005] based on Cochrane database review [2005]studied no difference in caesarean rates.

With regard to fetal outcome in our study 63% had Apgar score at 1 min 6 to 8 and 80% had Apgar score of 8 to 10 at 5 minwhich were comparable with our controls. In studies by Chestnut et al [1999] no effect on Apgar score or Neurobehavioural scores Stephen Halpern [1998] studies showed no difference, Mansoori et al showed low Apgarat 1 min and no difference in 5 min Apgar.

Amin Somuah [2005 no difference in Apgar scores.

In relation to complications it was similar in both study and control group1 patient had retained placenta, 6 patients hah Atonic PPH. 2 patients had traumatic PPH, 5 patient had inadequate analgesia, 4 patient had hypotension, 2 had urinary retention, 2 had backache, 3 had headache and none had neurological deficits Fowzia Anwer study [2008] showed, 2 patient with retained placenta, 2 with urinary retention and 5 patient with inadequate analgesia. Sharma and collegues [1997] showed hypotension in one third of patients.In studies by Liberman O Donoghue [2002] and Richard Johanson [2002] Anim Somuah [2005] concluded no association between epidural analgesia and new or long term backache.

In our study no influence of analgesia on breast feeding, in studies by Wilsion et al also showed no Association.

SUMMARY

In my study on obstetric analgesia using low dose epidural analgesia initiated with the help of anesthesiologist majority of paturients had effective pain relief with more than 70% had good to excellent comfort and satisfaction and more than 80% acceptance expressed their preference for the same in their subsequent pregnancies.The mean age 25 yrs and gestational age 39 weeks same as the controls.

Regarding the onset of analgesia more than 55% showed rapid onset in less than 15 min of initiation and also had longer duration of analgesia.

Regarding duration of labour patients with epidural analgesia had longer labours particular;y of the second stage which showed significance with controls.M.ajority of patients delivered in 8 to 10 hrs of initiation of main dose of analgesic which was little lengthier than the controls Regarding mode of delivery 60% had spontaneous vaginal delivery consistent with the controls and 19% instrumental delivery and 21% caesarean consistent with the controls and showed no significance.

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The indication for caesarean was fetal distress in 3 patient which was not due to the direct result of epidural but due to cord around the neck and oligohydramnios.

The indication for instrumental delivery was failure of maternal expulsive efforts in 60% that holds same for in the controls.

The mean Apgar in 1 min and 5 min were 6 and 7 similar to the controls implying epidural had no adverse effect on neonatal outcome. The perinatal mortality was lesser in the study group compared to the controls.

Regarding maternal complication, 2 patients had retained placenta successfully managed with manual removal under epidural analgesia without the need for general anesthesia and no curettage needed subsequentl. 2 patients who had urinary retention treated with continuous bladder drainage which occurred due to prolonged labour in one patient with instrumental delivery and the other with traumatic PPH which needed suturing. Other minor complications were managed symptomatically. None of them developed long term neurological deficits.

CONCLUSION

In my study conducted in labour ward of **ISO KGH** for 70 parturients who requested and consented for epidural analgesia for pain relief I conclude that the use **of low dose epidural with predominant Sensory block with preservation of motor function was effective with quick pain relief and excellent patient comfort and satisfaction and freely movable in the first stage without major adverse effec**t on maternal hemodynamics with more spontaneous vaginal delivery and the rate of instrumental and caesarean comparable to controls but with longer labours particularly of second stage and favourable neonatal outcomes . Lesser perinatal mortality and few manageable maternal side effects and proven **safety to the mother and fetus in quality labour management** offered by the dedicated obstretrician with the help of an experienced Anesthesiologist to our expectant mothers of today and tomorrow.

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LIST OF ABBREVIATION

FD	-	Fetal distress
FIND	-	Failed inclusion
FTP	-	Failure to progress
LN	-	Labour naturale
C	-	Cesarean
I	-	Instrumental
HD	-	Heart Diseases
AR	-	Asphyxiated and revived
HIE	-	Hypoxic Ischemic Encephalopathy
HB	-	Hyperbilurubinemia

PROFORMA

No Date

Patient name IP no

Age Gravida

Height Weight

LMP EDD

Menstrual history

Marital history

Obstetric history

Period of gestation

Any medical comorbid condition complicating

ASA assessment

Baseline conscious orientation PR BP VAS SPO2 CVS RS of mother Presentation station of presenting part

Cervical dilatation effacement uterine contractions its duration frequency and intensity baseline fetal assessment of wellbeing including fetal heart rate

Events recording

Indication for epidural analgesia patient request / medical condition

Time of onset of active phase of labour

Timing of events

Start of procedure

Epidural catheter placement

Administration of drug [first dose]

Onset of sensory loss

Epidural top ups

Time

Volume

Obstetric intervention/complication

Oxytocin augmentation

Membrane ruptured

Others

Duration of labour in hrs

1 stage

11 stage

111 stage in hrs

Total duration

Record of intranatal maternal and fetal conditions

Variable baseline 0 min 2 min 5 min 10 min 15 min 30 min 45 min 60min 90 min 120min

Maternal pulse rate

Blood pressure

Respiratory rate

Maternal temperature

Hydration

SPO2

VAS score

Sensory level

Fetal heart rate

Cervical dilatation and uterine contractions

Time of delivery

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Time since initiation of first dose of analgesic to delivery interval

Complication during labour
1 stage yes /no
11 stage
111 stage

Mode of delivery

Laour naturale

Labour natural with episiotomy

Instrumental

LMC forceps

Outlet forceps its indication

Caesarean section

Indication failure to progress failed induction fetal distress CPD others

Any maternal complication
Yes/no if yes details

Patient comfort

Excellent/good/fair/poor
Baby weight Apgar Score 1 min 5 min
Intrapartum /postpartum/early neonatal complications

INSTITUTIONAL ETHICS COMMITTEE
MADRAS MEDICAL COLLEGE, CHENNAI -3

EC RegNo.ECR/270/Inst./TN/2013
Telephone No : 044 25305301
Fax : 044 25363970

CERTIFICATE OF APPROVAL

To
Dr.R.Sridevi,
PG in MS (OG),
Institute of Social Obstetrics Govt. Kasturba Gandhi Hospital,
Madras Medical College, Chennai-3.

.

Dear Dr.R.Sridevi

The Institutional Ethics committee of Madras Medical College, reviewed and discussed your application for approval of the proposal entitled "Maternal and perinatal outcome of obstetric analgesia during labour" No.17072013.

The following members of Ethics Committee were present in the meeting held on 02.07.2013 conducted at Madras Medical College, Chennai -3.

1. Dr.G.SivaKumar, MS FICS FAIS --- Chairperson
2. Prof. R. Nandhini MD -- Member Secretary
   Director, Instt. of Pharmacology ,MMC, Ch-3
3. Prof. Shyamraj MD -- Member
   Director i/c , Instt. of Biochemistry , MMC, Ch-3
4. Prof. P. Kerkuzhali. MD -- Member
   Prof., Instt. of Pathology, MMC, Ch-3
5. Prof. Kalai Selvi -- Member
   Prof of Pharmacology, MMC, Ch-3
6. Prof. Siva Subramanian, -- Member
   Director, Instt. of Internal Medicine, MMC, Ch-3
7. Thiru. S. Govindsamy. BABL -- Lawyer
8. Tmt. Arnold Saulina MA MSW -- Social Scientist

We approve the proposal to be conducted in its presented form.

Sd/ Chairman & Other Members

The Institutional Ethics Committee expects to be informed about the progress of the study, and SAE occurring in the course of the study, any changes in the protocol and patients information / informed consent and asks to be provided a copy of the final report.

R Nandini 12/7/13

Member Secretary, Ethics Committee

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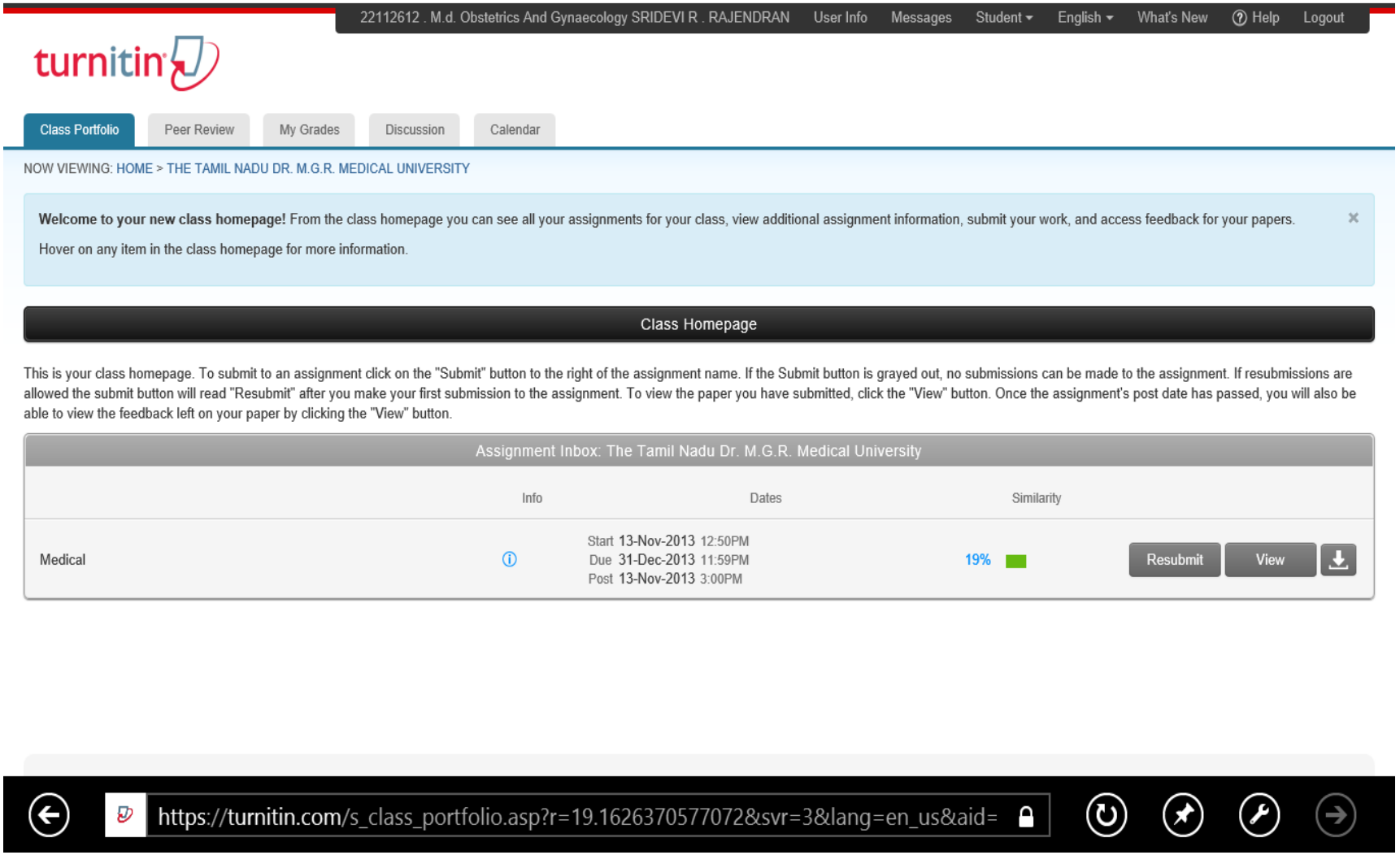
INTRODUCTION The birth of an neonate to the painfree parturient will be the most rewarding moment in Obstetric practice.' The most painfull experience in a woman s life is labour. Quite unbearable is the pain of child birth and its related agony at times is beyond description.' The mother of yesterday is no more the mother of today". Complex,psycological,physiological interactions are involved in labour. Multiple system like gastrointestinal,cardiovascular,respiratory,genito urinary,neuro endocrine may be affected if pain not adequately controlled, blood flow to the placenta which may be reduced due to pain lead to altered fetal homeostasis . These consequences are avoidable by effective...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1	Subha	22	19117	156	55	primi	39		4	5	8	1hr	30m	LN				2.9	5	6	AR
2	Razia	25	20111	148	58	primi	38	HD	3	7	9					C/FTP	PPH	2.5	8	9	N
3	MADHU	20	14800	160	60	primi	42	postdated	4	5	10					C/CPD		2.3	7	8	n
4	Sathya	25	152707	156	58	G2/ND	40		6	5	6	90m	30m		outlet		PPH	2.9	4	6	AR
5	Sujatha	23	18529	146	55	primi	37		4	7	10	90m	15m		outlet			2.5	8	9	N
6	Gomthy	26	18663	156	58	G2/ND	42	postdated	4	4	6	30m	30m	LN				3	7	8	N
7	Sasikala	22	18978	155	55	G2A1	38	HD	4	6	8	1hr	30m	LN				3.2	7	9	N
8	Meena	23	19588	150	58	primi	38	Anemia	4	8	10					C/FD		3.4	7	8	N
9	Nandhini	28	19396	160	55	G2/ND	38	HD	6	8	8	2hr	15m		LMC			3,8	5	7	AR
10	Famitha	22	19372	148	56	primi	40		4	6	10					c/FIND	rigor	3.4	5	7	AR
11	Reshma	20	19147	152	60	primi	40	GDM	4	6	8					C/FTP	hypotension	3.2	7	8	N/HB
12	Selvi	23	18279	158	65	G2/ND	42	postdated	6	6	8	2hr	30min		outlet			3.6	6	7	N
13	Vasanthy	22	18647	155	62	primi	40		4	6	8	1hr	15m	LN				2.9	7	8	N
14	Vanitha	26	19181	160	65	primi	38	HD	4	6	10	30m	30m	LN				2.8	7	8	N
15	Geetha	28	19861	162	65	G2/lscs	38		6	4	6	30m	30m	LN/V BAC				3	7	8	N
16	Karthiga	26	19768	156	55	primi	38		4	6	8	1hr	15m	LN			rigor	2.8	7	8	N/HB
17	Malar	22	19438	162	60	primi	40	HD	4	5	7	30m	15m	LN				2.7	7	8	N
18	Susheela	26	19439	164	62	G2/ND	42	postdated	4	4	6	1hr	15m	LN				2.9	7	8	N
19	Parvathy	25	19874	170	60	primi	40		4	7	8	90m	30m		outlet		hypotension	3	7	8	N
20	Anandhi	25	19974	164	58	primi	39		4	8	9	120	30m		LMC			3.4	6	7	AR
21	Jayalakshmi	29	9058	148	52	primi	39		4	8	10	12om	45m		outlet		retainedpl	2.8	8	9	N
22	Kumari	29	11340	162	55	G2/LSCS	38	HD	6	2	4	1HR	15M					3	8	9	N
23	Suguna	23	14514	158	56	primi	38	HD	3	6	8					C/FD		2.8	6	9	AR/
24	Madhumathi	19	14800	156	59	primi	38	mildPET	4	8	10					c/FIND		2.5	7	8	N
25	Sathya	23	15207	152	52	primi	38	HD	3	8	10	120m	15min		outlet			2.6	8	9	N
26	Reena	22	16427	154	55	primi	38		3	7	10	1hr	15m	LN				2,6	8	9	N
27	Saranya	18	16512	144	56	primi	39	mildPET	3	8	10					c/FD		3,4	4	5	BA/HIE2/MAS
28	Mahadevi	25	16550	154	55	G2/LSCS	39	HD	6	3	6	90m	15m	LN/V BAC				3,2	7	8	N
29	Devagi	23	16974	148	52	primi	38	Anemia	4	6	10	1hr	15m	LN				2.7	8	9	N
30	Maha	23	16974	148	52	G2/LSCS	38		4	4	6	2hr	30m		outlet		PPH	2.7	8	9	N
31	Dhanam	23	16534	162	60	Primi	38	GDM	4	4	6	2hr			outlet		N/V	3.2	8	9	N
32	Ashwini	22	17502	158	56	primi	39	GDM	4	6	8	30m	15m	LN			hypotension	2.8	7	8	N/HB
33	Raji	26	18056	152	56	primi	38	mildPET	4	6	10	1hr	30m	LN			headache	3	7	8	N
34	MAHI	28	19876	154	58	primi	39	Anemia	3	6	12	30m	15m	LN			headache	2.9	6	7	N
35	Rekha	22	18765	154	67	primi	38	mildPET	4	6	12	1hr	30m	LN			N/V	2.8	6	7	N

36	Radha	30	17685	163	60	G2/ND	40		4	5	8	30m	30m	LN				3	3	4	BA/D
37	Kavitha	23	17684	154	64	G2/ND	42	postdated	6	3	6	1hr	30m	LN			backache	3.4	3	6	AR
38	gowri	30	17658	157	60	primi	39		4	6	8	1hr	20m	LN				2.9	6	7	N
39	Akila	29	16945	158	62	PRIMI	39		4	6	8	1HR	30M	LN				3	7	8	N
40	Mary	24	17682	153	56	primi	38	GDM	4	7	10	90m	30m		LMC		PPH	3.4	3	6	AR
41	Punitha	22	17645	160	64	primi	37	PET	4	8	10					C/FIND	headche	3	4	6	AR
42	Priyanka	30	16890	165	67	primi	37	HD	4	8	10	60m	15	LN				3.2	7	8	N
43	Jansi	26	17653	156	64	primi	38		4	8	10	60m	15m	LN				2,3	7	8	N
44	Preetha	26	16745	164	57	primi	39		4	8	9	30m	15m	LN				2.4	7	8	N
45	Kamala	23	16543	165	54	primi	38	HD	3	8	10	90m	30m		outlet			2.9	7	8	N
46	Baby	25	15687	165	64	primi	38		4	8	9	60m	15m	LN				2,6	7	8	N
47	Devi	26	15890	164	67	primi	39	HD	4	8	10	90m	30		LMC		PPH	2,9	4	6	A/HIE
48	Shakthi	23	17890	164	66	primi	38		4	8	10					C/FD		3	6	7	N
49	Menaka	25	16432	156	67	primi	39		4	8	9	60m	15m	LN				3	7	8	N
50	Valli	22	16321	153	53	primi	37	PET	4	9	8	90m	30m		outlet			3.2	6	7	N
51	Tamil	30	17685	169	67	primi	38		4	6	9					C/FTP		3	7	8	N
52	Malar	24	18976	168	66	primi	39		4	7	8	60m	30m	LN				2,9	7	8	N
53	Divya	22	17654	154	67	primi	38	HD	4	7	9	90m	15m		Outlet			2.9	6	7	AR
54	Jothi	19	18765	169	67	primi	39	Anemia	4	6	10					C/FTP		3.1	7	8	N
55	Bavani	25	16854	170	68	G2/ND	38		4	6	9	60m	15m	LN				3	7	8	N
56	Madhu	27	18760	168	69	primi	37	GDM	4	6	8	30m	15m	LN				2,8	8	9	N
57	Sasi	26	18340	169	70	primi	38		4	6	8	60m	15m	LN				3,2	7	8	N
58	Rupa	30	18761	170	66	primi	39		4	7	8					C/FD		3	4	4	A/HIE/D
59	Usha	32	19876	156	60	primi	38	HD	3	8	10					C/CPD		3.6	7	8	N
60	Kumari	30	18760	154	67	primi	39		4	7	9	60m	15m	LN				3	7	8	N
61	Mayil	28	16780	170	66	G2/LSCS	38		4	6	8	30m	14m	LN/VBAC				2.8	7	9	N
62	Kani	22	19870	165	68	primi	39	PET	4	6	8	60m	5m	LN				2.9	6	7	N
63	Purnima	30	18760	166	70	primi	38		4	6	9					C/CPD		2.8	7	9	N
64	Ramya	32	18760	170	69	primi	38		4	6	9	30m	14m	LN				3	8	9	N/HB
65	Sathya	25	15689	168	79	primi	41	PET	4	8	10					C/FIND		3.2	6	7	N
66	Naadhiya	26	18760	165	67	primi	40	Anemia	4	6	8	30m	15m	LN				3	7	8	AR
67	Farzana	29	16549	176	68	G2/ND	38		4	5	9	30m	30m	LN				3	7	8	N
68	Divya	32	17893	145	58	G2/ND	39	PET	6	4	7	60m	15m	LN				2,6	5	7	N
69	Deepa	21	15799	167	78	primi	37	PET	5	6	9	60m	30m	LN				2.8	6	7	N
70	lakshmi	26	17860	154	56	primi	40	PET	3	6	7	20m	30m	LN				2.4	7	8	N/HB

	GROUP 2	**Controls**																			
1	Indrani	22	16678	145	54	primi	37	HD	3		8	30m	15m	LN				2.8	6	7	N

2	Jansi	23	18870	156	53	primi	38	Anemia	4		9	30m	15m	LN				2,9	4	6	AR
3	Sangeetha	24	16643	165	56	primi	38		4		8	30m	20m	LN				2.7	7	7	N
4	Uma	26	14556	146	65	primi	39	HD	4		7	20m	20m	LN				2.7	8	8	N
5	Vanathi	28	17655	176	68	G2/ND	41	PET	4		6	20m	30m	LN				3	7	8	N
6	Sunitha	30	18760	156	65	G2/ND	40		5		8	30m	30m	LN				3.2	6	7	N
7	Malliga	32	16687	145	54	G2/ND	40		6		9	40m	15m	LN			PPH	2.3	7	9	N
8	Latha	21	16445	176	56	primi	39	Anemia	4		10	40m	15m	LN			PPH	2,5	4	6	AR
9	Sundari	27	14557	156	65	primi	38	HD	4		7	38m	15m	LN				2.7	4	4	A/HIE/D
10	Lakshmi	30	18876	165	67	primi	39		4		8	40m	15m	LN			PPH	2.6	6	7	N
11	Meena	32	14553	167	68	primi	37		4		7	30m	30m	LN				2.9	6	7	N
12	Gomathi	20	19987	168	69	primi	38		4		8	30m	30m	LN				3	6	7	N
13	Sruthi	18	15663	169	75	G2/LSCS	39		6		7	60m	30m		OUTLET			3.1	4	6	AR
14	Kamala	19	13444	145	70	G2/LSCS	40	GDM	5		7	70m	15m		LMC		PPH	3.2	4	6	AR
15	Gayathri	20	18760	156	54	primi	41		4		8	45m	15m		OUTLET			3	6	7	N
16	Kala	21	13456	167	55	primi	40		4		9	30m	15m	LN				2.9	7	8	N
17	Vimala	29	18976	176	59	primi	42		4		9					C/FD		2.8	6	7	N
18	Malathy	28	16678	145	60	primi	41	Anemia	5		9					C/FTP		2.7	8	9	N
19	Selvi	27	19870	160	63	primi	40	HD	3		6					C/FD	PPH	2.6	7	8	N
20	Gowri	26	16786	156	62	primi	37		4		7	30m	20m	LN				3	6	8	N
21	Mary	22	16759	158	62	primi	38		4		7	45m	20m		OUTLET			2.9	8	9	N
22	Baby	21	17865	167	67	primi	39		4		8	60m	20m		LMC			2.8	6	7	N
23	Ramya	20	19806	158	65	G2/ND	40		6		5	30m	30m	LN				2.6	4	6	N
24	Priya	27	16564	170	64	G2/ND	37	GDM	5		6	30m	30m	LN				2.9	6	7	N
25	Radha	28	15432	154	61	G2/LSCS	38	GDM	6		7	20m	20m	LN				3	7	8	N
26	Sudha	24	15437	153	60	primi	39		4		8	60m	20m	LN			PPH	3	7	8	N
27	Saranya	31	15320	152	63	primi	38	Anemia	4		9	30m	30m	LN				2.3	6	6	N
28	Preetha	22	15437	150	62	primi	38		4		8	30m	30m	LN				2.4	6	7	N
29	Lavanya	21	16732	148	69	primi	38		4		9	30m	20m	LN				2.6	7	8	N
30	Jeyapriya	26	15489	176	70	primi	38	HD	4		10	30m	20m	LN				2.6	7	8	N
31	Akila	25	17654	158	72	primi	37	HD	4		8	30m	15m	LN				2.5	7	8	N
32	Anitha	26	16754	167	73	primi	38	PET	3		8	30m	15m	LN				2.7	7	8	N
33	Punitha	20	18732	145	74	primi	39		4		8	20m	15m	LN				2.8	6	7	N
34	Parameshwari	21	15690	145	75	primi	39		4		6	40m	15m		OUTLET			3	6	7	N
35	Priyanka	20	15643	156	78	G2/ND	38	Anemia	6		8	40m	15m		Outlet			2.5	7	8	N
36	Indrani	21	14421	145	56	primi	37	Anemia	4		10	45m	30m		LMC			2.6	6	7	N

37	Thilaga	22	14456	156	57	primi	38	HD	4		8	60m	30m		OUTLET			2.8	4	6	AR
38	Usha	32	15543	167	67	primi	39	PET	4		9	60m	15m		outlet			2.7	6	6	AR
39	Guna	30	16654	176	69	primi	37		4		9					C/FD	PPH	3	6	7	N
40	Jaya	25	14467	156	70	primi	40		4		9	30m				C/FTP		3,1	7	8	N
41	Rupa	27	14489	145	76	primi	41	PET	4		8					C/FD		2,3	6	7	N
42	Chitra	26	14432	154	54	primi	40	PET	4		9	60m	15m		outlet			2.4	6	8	N
43	Sasi	28	15567	165	56	primi	42		4		9					C/CPD		2.5	6	7	N
44	Sindhu	29	16678	168	55	primi	40		4		8	30m	5m	LN				2.6	7	8	N
45	Sumathi	30	14435	167	65	G2/ND	38	Anemia	6		7	60m	30m	LN				3	7	8	N
46	Gomathi	22	17798	167	67	G2/LSCS	39	HD	5		6	60m	15m	LN				3	7	8	N
47	Kumari	21	15564	145	64	G2/ND	38	HD	6		8	40m	20m	LN				3	7	8	N
48	Fahath	20	16660	154	62	primi	39		4		9	30m	15m	LN				2.6	7	8	N
49	Nisha	25	14456	153	60	primi	37		4		9	30m	15m	LN				2.7	7	8	N
50	Aithya	27	14431	152	61	primi	38	GDM	4		9					C/FTP		2.8	7	8	N/HB
51	Susan	29	14470	145	69	primi	39	GDM	4		10					C/CPD	PPH	2.4	7	8	N/HB
52	Riyana	24	15567	168	76	primi	38		4		8					C/FD		2.3	7	8	N
53	Rizwana	24	14467	134	74	G2/ND	39		6		8	30m	15m	LN				2.1	8	8	N
54	Madhi	27	14789	146	73	G2/LSCS	40		6		7	30m	15m	LN				2.7	8	9	N
55	Mehraj	28	15670	156	70	G2/ND	40		6		8	60m	20m	LN				3.2	6	7	N
56	Banu	29	15578	145	72	G2/ND	40	Anemia	6		8	30m	15m	LN				3.4	7	8	N
57	Biswana	32	14476	165	71	primi	37	Anemia	4		9					C/FD		2.6	4	4	A/HIE/D
58	Zeenath	32	15546	154	58	primi	39		4		9					C/CPD		2.7	6	7	N
59	Fahath	21	15567	154	59	primi	37		4		9	30m	15,m	LN				2.5	7	8	N
60	Aniz	19	`14465	160	67	primi	40		4		9	30m	15m	LN				2.8	7	8	N
61	Fathima	18	14478	160	68	primi	38		4		9	30m	20m	LN				2.9	7	8	N
62	Malar	19	14489	156	60	primi	39		4		9	30m	25m	LN				3	7	8	N
63	Yasmine	20	155567	150	54	primi	38	HD	4		10	50m	15m	LN				3,2	7	8	N
64	Joshwine	20	15342	165	53	primi	40	HD	4		10	60m	20m		LMC			3	4	6	AR
65	Anitha	21	15346	165	52	primi	38		4		8					C/FTP		2.8	6	7	N
66	Lalitha	23	134562	145	58	primi	39		4		9					C/CPD	PPH	2,3	6	7	N
67	Hillypushpam	24	17689	165	54	primi	40		4		8					C/CPD		2.9	6	7	N
68	Durgadevi	26	15638	156	59	primi	37		4		9					C/FD		2.8	4	6	A/HIE/RDS
69	Dhanam	30	15647	165	70	G2/ND	38		6		9	30m	15m	LN				3	8	8	N
70	Regana	32	15980	154	65	G2/ND	38	PET	6		9	30m	20m	LN				3	8	9	N