INTRODUCTION OF EPIDURAL LABOR ANALGESIA AND ITS OUTCOMES AT MUHIMBILI NATIONAL HOSPITAL DAR-ES-SALAAM

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By

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Dissertation submitted in (partial) fulfillment of the Requirement for the Degree of Master of Medicine (Anesthesiology) of the Muhimbili University of Health and Allied Sciences

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CERTIFICATION

The undersigned certify that he has read and hereby recommend for acceptance for examination by the Muhimbili University of Health and Allied Sciences a dissertation entitled **"*Introduction of epidural labor analgesia and its outcomes at Muhimbili national Hospital Dar-es-salaam,"*** in (partial) fulfillment of the requirements for the degree of master of medicine in Anesthesiology of the Muhimbili University of Health and Allied Sciences**.**

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Date

DECLARATION AND COPYRIGHT

I, **Dr. Mariam Leoni Msimbe**, declare that this **dissertation** is my own original work, and that it has not been presented and will not be presented to any other university for a similar or any other degree award.

Signature ……..... Date …….....…

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I am grateful to Dr. Edwin Lugazia, Dr. Albert Ulimali, Mr. Mereck and Mr Bendera for the tireless assistance they offered me during the development of this dissertation. I am also thankful to my colleague Frederick Tembo for assistance during data collection and MNH staff for the support and cooperation they offered during my data collection.

DEDICATION

This work is dedicated to my family. My father, mother, husband and my daughter, Malaika Lulu Msimbe, my friends and family members. It is also dedicated to the MUHAS department of anesthesiology, and my sponsors,

ABSTRACT

Background

Epidural labor analgesia use is widespread and safe and it gives excellent pain relief. It involves the injection of local anesthetic agent with or without an opiod into lumbar epidural space to produce segmental sympathetic and sensory nerve block.

Indications for epidural labor analgesia are maternal consent, medical reasons like patients with pregnancy induced hypertension, parturient with Diabetic mellitus, cardiovascular diseases, respiratory diseases like asthma, sickle cell diseases excites contraindications are refusal of consent, coagulopathy, maternal haemorrhages, maternal sepsis, infection at the site of needle and catheter placement and so on. Advantages of using it is it provides excellent pain relief and cooperation between health attendants and parturient. Disadvantages are the side effect associated with its use in labor and childbirth like prolongation of labor, increase rates of caesarian section and instrumental vaginal deliveries, poor neonatal APGAR score and failure to breastfeed.

This study looked at the association between use of epidural labor analgesia and the perceived side effects.

Methodology

A cross sectional study was conducted among 53 patients who received epidural analgesia with (0.1% 10 mls bupivacaine) for labor analgesia when they were in active phase of first stage of labor. Patients who were admitted in labor ward for delivery had the study explained to them and were told about their rights to decline participation at any stage of the study if they do wish to. Study participants were recruited after being admitted if they met the inclusion criteria and gave informed consent. A lumbar epidural catheter was placed and a bolus dose of (plain bupivacaine 0.1% 10mls) was given. Analgesia was maintained with intermittent bolus doses plain bupivacaine 0.1% 10mls hourly. Participants were followed until discharge from the labor ward. The duration of labor, instrumental delivery and its indication, the neonatal APGAR score and the participants' satisfaction with the epidural analgesia were documented.

Healthcare worker(61) responsible for taking care of these patients were also interviewed after patient was discharged from labor ward using a separate questionnaire which was attached to the patients questionnaire about their opinion of epidural labor analgesia services. The data collected and analyzed with IBM SPSS Statistics Version 20.

Results: A total of 53 women were enrolled. 94.2% of the participants were satisfied and happy with the service and reported that they would ask again for it in future days. 11.3% and 18.6% had prolonged first and second stage of labor respectively, 5.7% had instrumental assisted delivery due to prolongation of second stage of labor. The rate of caesarian section among was 22.6% reasons being (maternal -obstructed labor, cervical dystocia and poor progress being (17.0%) and (1.9%) due to motor weakness and fetal distress 3.7%. APGAR score of the neonates was above 7 score by 92.5%and 98.9% at 1 and 5 minutes respectively. The health care worker participants (61) were also interviewed after introduction of Epidural labor analgesia at MNH 83.6% agreed and among them 29.5% strongly agreed to the routine use of Epidural labor analgesia. The greatest hindrance to routine use of epidural labor analgesia was given as inadequate anesthesia staff, inadequate equipment. 13.1% of healthcare workers thought epidural labor analgesia denies mother's natural birth experience.

Conclusion and recommendations: From the study it is noted that Epidural labor analgesia was accepted among women as most were satisfied with pain relief and it had manageable side effects. Therefore these pain relief services should continue as they are beneficial to parturient in labor.

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PCEA……. Patient Controlled Epidural Analgesia

BMI……. Body Mass Index

PROM……. Premature Rupture of Membrane

FHR……. Fetal Heart Rate

NACS SCORE……..Neurological and Adaptive Capacity Score

APGAR SCORE…….. Activity, Pulse, Grimace, Appearance and Respiration score

CSE…… Combined Spinal Epidural Analgesia

IV……Intravenous

MNH……Muhimbili National Hospital

MUHAS……...Muhimbili University of Health and Allied Sciences

SPSS……Statistical Package for Social Sciences

SVD…… Spontaneous Vertex Delivery.

CHAPTER ONE

1.0 INTRODUCTION

Pain relief for labor is a very important concern for women both during pregnancy and in childbirth. Pain increases stress hormone levels and its intensity is related to fear. It is consequently recommended to relieve the pain of labor (1). Severe, unrelieved labor pain causes patient

dissatisfaction and is known to be associated with postpartum depression and posttraumatic stress disorder.(2) but high risk parturient with cardiac disease, pulmonary hypertension and severe pre-eclampsia may not tolerate these changes of effects of labor without an adverse outcome (3). Pain relief methods; includes, hypnosis, water bath, birthing exercises, acupuncture and intravenous and Neuraxial which includes both spinal and epidural use of opioids with o without local anesthetics.(4)

The use of epidural analgesia in labor is widespread and gives excellent pain relief. In Britain, birth rate is 12.1 births/1,000 population approximately 100,000 women use this form of pain relief each year (2). Epidural labor analgesia was first used in 1949, became popular in the early 80s and since then it has been the gold standard for labor analgesia (5).

Epidural analgesia involves the injection of a local anesthetic agent and an opioid into the lumbar epidural space. It produces segmental sympathetic and sensory nerve block (6), and is generally safe and does not increase caesarean section rate although it seems to increase the number of operative vaginal birth and the duration of labor (1).

Approximately 2-3mls of 2% plain lidocaine with adrenaline is given as a test dose, this establishes effective analgesia with minimal motor block. If there are no adverse reactions after 5-10 minutes, another 10-20ml of 0.125% of bupivacaine with or without fentanyl 25mcg is added. Thereafter, maintenance of epidural analgesia may be achieved by intermittent bolus injections of 10ml/ hr, continuous epidural infusion of (1-6ml/hr of the same concentration) or patient-controlled epidural analgesia (PCEA) set to a maximum of 6mls/hr (7).

Patient-controlled epidural analgesia, intermittent top-up and continuous infusion are equally effective in providing epidural pain relief during labor. Patient-controlled epidural analgesia is associated with a significant reduction in hourly dose requirements when compared with continuous infusion, and by transferring the responsibility for epidural top-up, it offers the parturient the psychological benefit of being in control (8).

Epidural analgesia provides superior pain relief during the first and second stages of labor and therefore a more positive birth experience. It may also allow parturient to rest and relax facilitating patient cooperation during labor and delivery (9), In the event of complicated labor it provides anesthesia for episiotomy or forceps delivery as well as allowing extension of anesthesia for cesarean delivery. Unlike intravenous medications an epidural avoids opioid-induced maternal and neonatal respiratory depression (10).

The advantages of not using an epidural is perceived that women may have a higher success breast-feeding, better mobility, and possible lower risk of instrumental vaginal delivery. Other perceived reason being decreased risk of cesarean delivery (11).

The primary complications of epidural analgesia are hypotension that results from peripheral vasodilatation occurring during the onset of epidural blockade(12). Post Dural puncture headache (13). Other rarer ones include shivering, ringing of the ears, backache, fever, nausea, difficulty in urinating and permanent nerve damage (14).

The most common indication for epidural analgesia is maternal request but there may be instances when epidural analgesia is preferred for medical reasons. These include pre-eclampsia, multiple pregnancy, breech presentation for vaginal delivery, Diabetes mellitus, Respiratory disease e.g. asthma, Cardiovascular disease, Sickle cell disease, premature labor, prolonged labor, intrauterine growth retardation, intrauterine death, and anticipated instrumental delivery (15).

The absolute contraindications include patient refusal, maternal hemorrhage, coagulopathy, maternal septicemia or untreated febrile illness, low platelets (<50 x 109 g/dL) and infection at the site of lumbar puncture. Relative contraindications include; progressive neurologic diseases, hypovolemia, raised intracranial pressure (15).

Some parturients are more likely to require epidural analgesia and these include advanced maternal age, null parity, a high pre-pregnancy body mass index (BMI), a large birth weight infant, oligohydramnios, premature rupture of membranes (PROM), and induction of labor. These maternal characteristics or pregnancy complications have associated with increased Caesarean delivery (16). Because nulliparous women have a different baseline risk for Caesarean delivery compared with multiparous women, it is not clear whether similar effects of epidural analgesia on the progression of labor, modes of delivery, and perinatal outcomes exist between these two groups of women (16).

The use of intravenous opiates has been limited because of side effects such as respiratory depression. Commonly used epidural analgesia drugs are a combination of opiates with local anesthetics. Evidence indicate that opiates administered through the epidural route are safe, with proven benefits such as good pain relief, less pain during movement, fewer cardiopulmonary complications, a lower incidence of thromboembolism, and earlier discharge from the hospital (17) .

One study showed addition of fentanyl (an opioid) to epidural analgesia was resulted in difficulty establishing breastfeeding after delivery. The impact on breastfeeding was less clear (18).

Women who receive labor epidurals are more likely to have attended childbirth classes or read related books. In addition, institutional and social factors may determine whether women receive labor epidurals. Institutional factors include, lack of anesthesia providers and hospital practice policies and social factors include family members discouraging the patient, and previous patient experiences(11).

CHAPTER TWO

2.0 LITERATURE REVIEW

The use of epidural analgesia techniques has increased, especially in the developed countries. It is unlikely that this will change soon as compared with other techniques.

2.1 Maternal satisfaction with epidural labor analgesia

The satisfaction of birth experience is greater with epidural analgesia techniques. In recent advances by Pandya ST, showed that availability of regional analgesia for labor is considered a reflection of standard obstetric care in many countries. According to the 2001 survey, the epidural acceptance is up to 60% in the major maternity centers of the US. The National Health Services Maternity Statistics of 2005–2006 in the UK reported that one-third of the parturient chose epidural analgesia.(19)

According to Fyneface-Ogan et al in their study where they look at epidural anesthesia views and outcomes of women in labor in Nigeria Hospital, reported the overall experience of labor was much better in the epidural group when compared with that in the non-epidural group (80% versus 4%) and (8% versus 72%) had inadequate pain relief (2) . Also in another in study in Nigeria by Gredilla E et al in a study which looks at maternal satisfaction with quality of epidural analgesia for pain relief in labor whereby 91.3% of the participants were satisfied with the use of epidural labor analgesia and 93.8% stated that they would recommend the technique to be used in their hospital and 94% would request again for epidural on their other childbirth admission(20). Moreover in Spain a study by Marenco-Arellano which assessed maternal satisfaction with epidural analgesia for pain control during labor showed that mean overall satisfaction with epidural using SERVQHOS scale was 4.4 and 84.3% of the participants were satisfied with Epidural analgesia and 100% of the women said they would ask again for it(21). In a study by LeeCoq G et al which was looking at risk factors of inadequate pain relief during epidural analgesia for labor showed factors like overweight, obstetrical factors (duration of labor, posterior fetal presentation) and epidural-related factors (radicular pain during epidural placement) and inefficacy of the first bolus dose used for epidural induction increase the risk of inadequate epidural analgesia(22). Advanced labor analgesia advances by Cynthia A.

Wong said that pain scores are lower and patients are more satisfied with epidural analgesia compared to other forms of non neuraxial analgesia with the ability to walk to the toilet, or sit in a chair at the bedside which is desirable to many laboring women (9). In a randomized trial done by Collis et al which compared combined spinal-epidural and standard epidural in labor, reported that use of 0.25% bupivacaine was associated with less satisfaction compared to use of 0.1% bupivacaine as in this later group patients felt they had better self control while those with 0.25% were not active and confined to bed due to motor weakness (52).

2.2 Maternal outcomes with epidural labor analgesia

Maternal outcomes in labor are affected by different reasons, Muhimbili National Hospital as a referral hospital has high levels of caesarian section due to different causes in a study by Janurius H et al 2011 which looked at time of delivery and perinatal outcomes showed that 50.0% had spontaneous vertex delivery, 46.9% had caesarian section and 1.8% had low cavity vacuum extraction and 1.2% had assisted breech delivery (50). Longer durations of the first and second stages of labor in the women with a vaginal delivery who received epidural analgesia had been reported compared to the women who did not receive epidural analgesia though women receiving labor epidurals also had other obstetric reasons for the prolongation of labor (16). Prolonged second stage occurred in 9.9% and 13.9% of nulliparous and 3.1% and 5.9% of multiparous women, with and without an epidural, respectively (51). Several retrospective studies consistently demonstrated an association between epidural analgesia and increased durations of both the first and second stages of labor, oxytocin augmentation, instrumental vaginal delivery and cesarean section for dystocia while randomized prospective studies have produced contrasting findings regarding the effects of epidural analgesia on labor and mode of delivery. It is unclear whether or not epidural block prolongs the first stage of labor. However, maintenance of profound epidural analgesia beyond complete cervical dilation will increase the duration of the second stage of labor or increase the probability of an instrumental vaginal delivery especially in nulliparous patients (10).

It has also been the observation that fentanyl injected into the intrathecal space seems to cause more rapid cervical dilation and to shorten the first stage of labor by as much as 100 minutes in comparison with epidural analgesia (19).

Kjaegaard H et al who looked at obstetrics indications for labor dystocia in nulliparous women showed different characteristics present at admission to hospital, and use of epidural labor analgesia were associated with dystocia during labor (dilatation of cervix < 4 cm, tense cervix, thick lower segment, fetal head above the inter-spinal diameter and poor fetal head-to-cervix contact) (24).

Hung T-H et al. in a cohort retrospective study looked at Caesarean delivery rates in nulliparous and multiparous women receiving epidural analgesia. Nulliparous women receiving epidural analgesia had a lower rate of C-section 19. 4% versus 24.4 % than nulliparous women who did not receive epidural .The rate of Caesarean delivery was not significantly different between the women who did or did not receive epidural analgesia in the multiparous women(16).

Moreover Sharma et al who looked at labor analgesia and caesarian delivery showed no difference in caesarean section rates between women receiving epidural analgesia and that receiving intravenous meperidine analgesia during labor. 10.5% and 10.3%(25).

Also Norris et al who compared the effects of combined spinal epidural analgesia and epidural analgesia in labor showed similar indications for cesarean deliveries between the CSE and epidural groups, Most of these patients had existing risk factors for urgent cesarean delivery (prematurity, pregnancy induced hypertension, absent prenatal care, maternal substance abuse or compromised fetal condition (26). Another study by Lee H-L et al who looked at timing epidural analgesia and mode of delivery showed early administration was found to be associated with increased Caesarian section rates when compared with the late administration group(16.4% vs. 7.7%,) and this group required more top-up boluses of local anesthetic to achieve adequate pain relief. (27).

2.3 Neonatal outcomes with epidural labor analgesia

Fyneface-Ogan et al assessed neonatal outcomes by APGAR score of between mothers who received epidural labor analgesia and those who received intravenous 30mg pentozocine or 25 mg promethazine and showed neonatal outcome was the same in both

groups, and there were no indications for admission to the special care baby unit(2). Moreover in a study by Liu and Sia which looked at rates of caesarian section and instrumental delivery in nulliparous after low concentration of epidural infusion or opioids analgesia showed no statistical difference in the APGAR Scores of neonates born to mothers using epidural analgesia when compared to those using opioid analgesia(28).

Another study by Wesam Fari Mousa et al. which looked at the outcomes of labor between mothers who had received epidural labor analgesia during labor and those who did not receive analgesia showed use of low dose local anesthetic has led to good neonatal outcomes(29). But Cochrane review by Anim-Somuah M showed use of epidural analgesia during labor with high concentrations of local anesthetics was associated with poor neonatal outcomes(30).

Wang LZ et al who compared bupivacaine, ropivacaine, and levobupivacaine with sufentanil for patient controlled epidural analgesia during labor showed significant more obstetric interventions (instrumental deliveries) and prolonged duration of first and second stage of labor with the parturients who received epidural analgesia and more malpositions at the second stage of labor in the epidural group with no differences in fetal outcome (APGAR scores and Special Care Nursery admissions) (31).

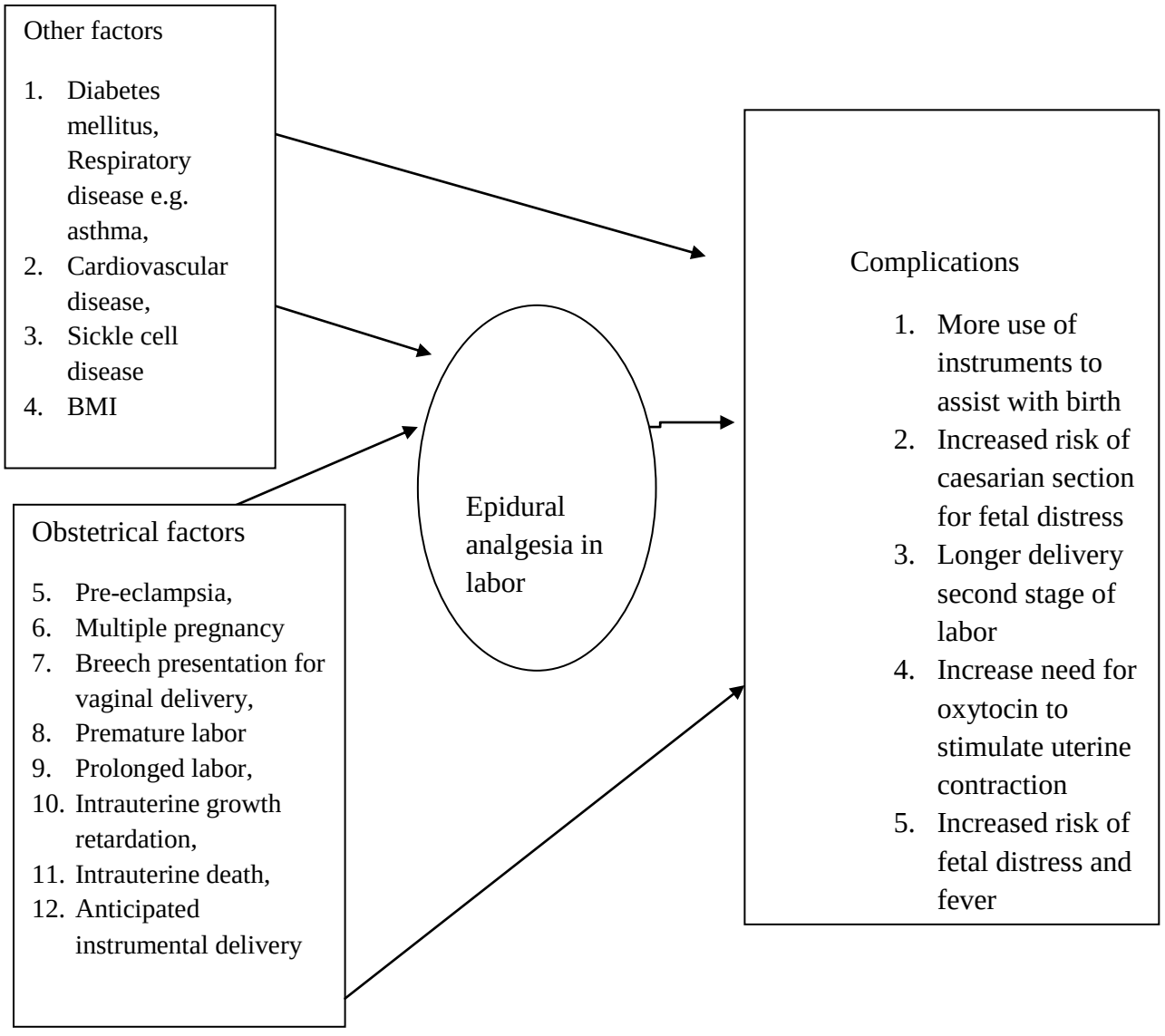
2.4 Healthcare workers attitude and satisfaction

Klein MC et al in the Canadian study who looked at attitudes of new generation Canadian obstetricians showed that epidural analgesia was favored by younger female obstetricians compared to the old male obstetricians aged more than 40 years (32). Studies that looked at obstetrician's knowledge of epidural analgesia and its complications showed that Response rates varied from 68% in Australia(33) to 94.7% in Turkey(34). Many obstetricians seemed to have only received lectures post specialty training, about half rating the lectures inadequate in Nigeria and 20% to 35% achieved inadequate knowledge scores in Australia and Turkey respectively (35).

Pirbudak L et al who looked at Turkish obstetricians attitude and knowledge of epidural analgesia in labor showed that obstetricians have no formal education about epidural analgesia and they obtain information about it from anesthesiologists, their obstetrician colleagues,
or their own readings and experiences, this was evidenced as obstetricians failed to achieve the score designated as indicative of adequate knowledge for minor and major complications of epidural analgesia(34).
And all studies above favored a collaborative effort between anesthesiologists and obstetricians both during and after specialty training to improve knowledge with regard to use, complications and effect of epidural analgesia on labor.

Despite the low prevailing request rate for epidural analgesia in labor, there appears to be a lack of adequate resources to meet the demand (36).

3.0 CONCEPTUAL FRAMEWORK OF THE RELATIONSHIPS BETWEEN USE OF EPIDURAL ANALGESIA IN LABOR AND ITS MATERNAL AND NEONATAL OUTCOME.



Explanation of Conceptual Framework: The factors which are associated with highest number of requests for epidural analgesia in labor are pre-eclampsia, multiple pregnancy, breech presentation for vaginal delivery, diabetes mellitus, respiratory disease e.g. asthma, cardiovascular disease, sickle cell disease, premature labor, prolonged labor, intrauterine growth retardation, intrauterine death, and anticipated instrumental delivery . These are also risk factors for poor maternal and neonatal outcome and can lead to controversy about the benefits and risks of epidural analgesia in labor. This can in turn affect patient and doctor satisfaction about the kind of service being given.

4.0 PROBLEM STATEMENT

Labor pain is a complex and subjective interaction between multiple physical and psychological factors. The parturient deals with not only her pain but myths created for her by culture, and may be forced to endure a long and painful experience that may lead to exhaustion, hysteria and fear rendering her in-capable of cooperating with birth attendants and disruption of mother to child relationship(37).

Epidural analgesia is an effective and popular method for pain relief in labor in developed world but it is not widely practiced in developing countries. In fact, access to pain relief during labor, in some developing countries, is limited. Patients may demand pain relief, but providers may not recognize the need. Even, when providers are willing to provide epidural analgesia, patients in developing countries may resist. In Malaysia, a study showed that patients refused epidural analgesia because of fear, ignorance, resistance by their husbands, religious reasons, lack of knowledge about the procedure, and poor feedback from friends.(38)

Data's for obstetric pain management are lacking in Tanzania and there are fewer facilities that offer maternal pain management during labor.

5.0 RATIONALE

The use of Epidural labor analgesia is important as severe unrelieved labor pain causes patient dissatisfaction, exhaustion and is known to be associated with postpartum depression and posttraumatic stress disorder.

Therefore the study tried to identify the relationship between epidural labor analgesia and maternal satisfaction, and maternal and fetal outcomes in the conditions found in a Tanzanian hospital. It will also provide data for further research.

The study is also a part of partial fulfillment of my course Mmed Anesthesiology.

6.0 RESEARCH QUESTION

What are the obstetric and neonatal benefits and outcomes of using epidural labor analgesia at MNH?

Research Hypothesis

Epidural analgesia provides significantly better analgesia as measured by Visual Analog Scale in both the first and second stage of labor, facilitates patient cooperation during labor and delivery, provides anesthesia for episiotomy and instrumental delivery, allows extension of anesthesia for caesarian delivery and while avoiding the opioids induced maternal and neonatal respiratory depression.

7.0 OBJECTIVE

7.1 Broad objective:

To assess the outcomes of using epidural analgesia (bupivacaine) on women in labor at Muhimbili National Hospital, Dar-es-salaam**.**

7.2 Specific objectives:

1. To determine obstetric pain management satisfaction among patients using epidural labor analgesia at Muhimbili National Hospital
2. To determine the incidence of women with complications related to use of epidural analgesia in labor such as prolonged labor, increase rate of assisted delivery and caesarian section at Muhimbili National Hospital
3. To determine neonatal outcomes measured by APGAR score of the neonates from mothers who had epidural labor analgesia at Muhimbili National Hospital
4. To determine attitude to and satisfaction among healthcare providers to the use of Epidural labor analgesia at Muhimbili National Hospital

CHAPTER THREE

8.0 METHODOLOGY

8.1 Study design

Hospital based cross-sectional observational study.

8.2 Study Area

The study conducted at Muhimbili National Hospital which is a tertiary as well as a teaching hospital, located in Dar es Salaam Tanzania. It has a maternity block in which all obstetric cases are being attended. The maternity block has three labor wards namely, ward 34, Intramural Private Practice (IPPM) Annex and ward 35 which is special for eclampsia patients and it acts as a semi Intensive Care Unit (ICU) for obstetric cases. The labor ward receives admissions from home (some of these women are attending the antenatal clinic at Muhimbili National Hospital (MNH) and others are from other antenatal clinics so they are self-referred), and also receives referrals from municipal hospitals and nearby district hospitals like Mkuranga and Kisarawe. The hospital has all levels of health personnel from consultants to medical students. Usually there are 2 residents, an intern doctor and specialist on call working in labor ward, obstetric theatre and admitting ward in 24 hour shift. Midwives work in three shifts per 24 hours, first shift is called morning shift (8 hours) from 8 am to 2 pm which has a maximum of 8 midwives per shift. Although in this shift there are more nurses only 5 nurses are directly involved in the care of patients and the rest are administrators. The evening shift is from 2 pm to 8 pm. It has 4 midwives and the third is (night shift) from 8 pm to 8 am with maximum of 5 midwives. On average there are about 20-30 deliveries in 24hrs. Almost every morning the major ward rounds are conducted in the labor ward except for Wednesdays, weekends and public holidays. The major ward rounds involve consultants, specialist, residents, interns, midwives and medical students and they are usually teaching ward rounds. There are two residents on call who divide themselves after the major ward round, one staying in the obstetric theatre and the other one staying in the labor ward together with an intern doctor; they are responsible also for seeing patients in the admitting ward. When a patient is admitted to the labor ward initial

measurements of vitals, fetal heart rate and pelvic examination are recorded in the Partograph.

The progress cervical dilatation and fetal heart rate details until delivery are documented in Partograph. Usually no pain medication is given.

All admissions in the labor ward are done admitted by a nurse midwife and assessed by a resident doctor and treatment decisions are made by the resident and in case of difficulties a specialist on call is consulted. The specialist on call during working hours is readily available. During the night time sometimes there are delays on getting specialist review since most of them reside far from the hospital. However phone consultations are regular.

8.3 Study population

This will include all women in active phase of labor with cervical dilatation of 4cm or above at MNH who had received Epidural analgesia.

8.4 Study duration 4 months (From December 2016- April 2017).

8.5 Sample size

The estimated sample size n is calculated from this formula

$n = \frac{z^2 pq,}{d^2}$ Margin of error 5%

Where;

N is sample size

Z is the standard normal deviation at the required confidence level (95%), in this case 1.96

P is the proportion in the target population estimated to have characteristics being measured.

(Epidural labor analgesia being the Gold standard pain management 3.1% of women in Abu dhabi expressed concern effect to the baby which affected the plan of receiving or refusing epidural labor analgesia (39).

D is the statistical significance = 0.05

Therefore

$$n = \frac{1.96^2 \times 0.031 \times 0.969,}{0.05^2} + \text{Margin of error } 5\%$$

$$= 46 \pm 5\ \%(\ 2)$$

Hence the desired sample size is 46 parturients

8.6 Sampling technique

A convenient sampling method used, where all patients in labor with inclusion criteria's and had consented to the study were taken.

8.7 Inclusion criteria

- Parturient who have consented to the study
- Patients aged of 18-40years with a gestational age of ≥36 weeks in labor
- Both nulliparous and multiparous patients in active labor with cervical dilatation of ≥4cm
- Parturients with single fetus with vertex or breech presentation
- ASA I and II parturients.

8.8 Exclusion criteria

- Multiple gestation pregnancy
- Women with clear indications for caesarian section on arrival (fetal malpresentations, cephalopelvic disproportion)
- Women presenting with antepartum hemorrhage.

8.9 Data Collection

After obtaining informed written consent, parturient who fulfilled inclusion criteria's were enrolled in the study. Principal investigator resident anesthesiologist was available to manage the patients for labor analgesia. Midwives conducted the obstetric management of all parturient women during labor, under the direct consultation of an obstetrician according to the hospital protocol and routine intrapartum management of all women including fluid management and monitoring of uterine contraction and fetal heart rate.

Pelvic examination was performed every 4 hours to evaluate the progress of labor. When the rate of cervical dilatation was less than 1 cm/hour over a 2-hour period, poor progress of labor was diagnosed and Oxytocin augmentation of labor provided. At cervical dilatation of ≥ 4cm epidural pain relief was initiated, whereby automatic noninvasive arterial blood pressure monitoring and pulse oximetry, ECG leads were applied, and 10 mL/kg of normal saline solution infused through the Intravenous line before the procedure.

Baseline demographic data and vital signs recorded. Basic resuscitation equipment's were prepared and kept ready. With the patient in the sitting position, lumbar epidural puncture performed at the L_{3-4} interspace using a midline approach with an 18-gauge Tuohy needle. Once the needle was appropriately placed in the epidural space, a 20-gauge multi-orifice epidural catheter (Minipack; Portex Ltd) threaded 4 cm into the space through the cranially directed tip of the needle. Confirmation of the right space by negative aspiration test for blood or cerebrospinal fluid, 3 mL of 2% lidocaine with epinephrine 5 mcg/ mL was injected through the needle as a test dose. The patients were observed for any increase in heart rate indicated intravascular injection of epinephrine and was questioned about dizziness, tinnitus, metallic taste in the mouth or sudden warmth or numbness in the legs.

With a negative response after 5 minutes, 10 mL of 0.1% bupivacaine injected hourly as a bolus single dose via the epidural catheter. The catheter fixed to the skin, and the patients returned to the left lateral position.

The Principal investigator (resident anesthesiologist) noted any paresthesia during insertion of the catheter, inability to advance the catheter and intravenous or subarachnoid cannulation.

Intravenous or subarachnoid cannulation detected by aspiration of frank blood or cerebrospinal fluid through the catheter and the catheter was withdrawn by 1 cm, when still there was aspiration of blood or cerebral spinal fluid the catheter was removed.

When it was impossible to thread the catheter, the needle and catheter were withdrawn together. The procedure then repeated at the level of L_{2-3}; if unsuccessful again, the patient was excluded from the Epidural group followed up for normal delivery.

Following variables were assessed: The onset of sensory block (assessed by pinprick); the existence of unblocked segments; the extent of sensory and motor block (assessed by the modified Bromage score); the ability of the parturient woman to cooperate (push on demand) during delivery (graded as "yes" or "no"); and side effects or complications caused by the epidural analgesia, including hypotension (systolic blood pressure <100 mmHg or a decrease of >20% from baseline), postpartum urinary retention, postdural puncture headache (PDPH), and transient neurological deficits. Complete loss of cold sensation to T8 on both sides was regarded as a dense block. Analgesia was maintained throughout the labor and delivery with an intermittent (hourly) bolus injection of 10 mL 0.1% bupivacaine.

The term "failed epidural" was used for situations in which either it is impossible to insert the catheter or there is no sensory block after injection of the local anesthetic. Blood pressure, heart rate and oxygen saturation were measured and recorded every 5 minutes for the duration of the labor. Hypotension (systolic blood pressure <20% of baseline), bradycardia (heart rate <60 beats/min) and desaturation (SpO_2 <90%) were recorded. Hypotension was treated with intravenous ephedrine 3mg and bradycardia with 0.6 mg of intravenous atropine; desaturation was treated with oxygen via a facemask. The duration of labor, time taken to locate the epidural space, catheter-related complications encountered and amount of intravenous fluid given were documented.

Pain intensity by using a numeric rating scale (NRS; 0 no pain, 10 worst pain imaginable), sensory levels to pinprick, motor block by using a 0–3 scale (0 can raise extended leg off bed, 1able to bend knees, 2 able to move only ankles, 3 unable to bend knees or ankles), and side effects including nausea, pruritus, and respiratory depression were assessed at baseline, 5 min, 60 min, then every 2 hours until complete cervical dilation, and delivery.

Immediate neonatal outcome was assessed using the APGAR scores, and measuring of the newborn temperature and vital signs, and those of mothers who had caesarian section were assessed once admitted in neonatal ward.

Healthcare worker responsible for taking care of these patients were also interviewed after patient was discharged from labor ward using a separate questionnaire which was attached to the patients questionnaire about their opinion of epidural labor analgesia services.

8.10 Training of Research Assistants

Research assistants were trained for two days on choosing patients with inclusion criteria monitoring the patient during labor and assessing for complications that are related to obstetric and epidural labor analgesia.

There were two (2) research assistants in total, who were nurse's midwives recruited from the labor ward.

Their duty was document progress of labor, pain assessment, vitals of the patient after every 10 minutes and any complications with regards to use of Epidural labor analgesia.

8.11 Follow up

After patients has delivered either vaginally or by caesarian section patient and the neonates were being followed for any occurrence of adverse event until discharged from labor ward and from theatre.

8.12 Data Analysis

Data collected and entered into a computer and analyzed using Statistical Package for Social Scientists (SPSS) from IBM SPSS Statistics Version 20 computer program. The dependent variable was maternal satisfaction, maternal and fetal outcome post epidural analgesia, and health workers attitude and satisfaction while factors like age, gravidity, diagnosis at admission, cervical dilatation at initiation were used as the independent variables.

Data presented as proportions for categorical variables. The means and standard deviations used to summarize continuous variables while categorical data were expressed as frequencies with their corresponding percentages. The chi-square testing used to test for association between independent variables and dependent variable. If the p-value was found to be less than 0.05 then the association was deemed significant. In case of continuous variables, a Student t-test was used.

8.13 Ethical considerations

1. The nature of the study explained to the participants and their rights were told to them and all information about good and adverse outcomes provided and the means of managing any adverse effects if they occur. A written Informed Consent signed by the agreeing patients with the inclusion criteria's at Muhimbili National Hospital.
2. No denial of services for refusal to participate, and all patients even those who are not included in the study got the standard care there is.
3. There were no cost implications on the participants.
4. Only initials used forming unique identification and each participant remain anonymous and their opinion handled in absolute confidentiality.
5. The ethical clearance obtained from the Muhimbili University of Health and Allied Sciences ethical review board. The permission to do the study obtained from The Director of Muhimbili National Hospital and data preserved for future reference.

CHAPTER FOUR

9.0 RESULTS

The present study enrolled a total number of 53 pregnant women admitted in the labor ward for delivery at MNH and each followed up until discharged from the labor ward and from theatre. Among these participants 32 were primegravida while 21 were multiparous. These women all received Epidural bupivacaine while being monitored for progress of labor and delivery, (60.4%) were having cervical dilatation of 4cm at the initiation of Epidural, reasons for admission in labor ward was labor pain without other diagnosis (77.4%), while other (22.4%) had other both obstetrics diagnosis and none obstetrics diagnosis.

Table 1: Socio demographic characteristics of the study population (Parturients n=53 and Healthcare workers n=61)

Variable	Frequency (n)	Percentage (%)
Age Group (Years)		
18-24	17	32.1%
25 – 34	31	58.5%
35 – 44	5	9.4%
Level of education		
No formal education	1	1.9%
Primary level	2	3.8%
Secondary level	27	50.9%
University level	23	43.4%
Gravidity		
Primegravida	32	60.4%
Two	14	26.4%
Three	6	11.3%

Four	1	1.9%
Total	**53**	100.0%
OBS Health providers		
Consultants	11	18.0%
Residents	22	36.1%
Midwives	28	45.9%
Years of Experience		
1-5 years	26	42.6%
6-9 years	18	29.8%
10-14 years	10	16.4%
15-20 years	5	8.2%
>20 years	2	3.3%
Total	**61**	100%

Table1. Shows that more than half (58.5%) of the participants were aged between 25-34 years with the range between(18-43 years), and about 50.9% had secondary level of education while 43.4% had University level of education. More than half (60.4%) of studied women were primegravida, and the mean gestation age at delivery time was 38.62 ± 1.43weeks.

Table 2(a): Maternal satisfaction with Epidural analgesia of the study population (n=53)

Variable	Frequency (n)	Percentage (%)
Maternal satisfaction		
Did you experience any pain		
Yes	2	3.8
No	51	96.2
Pain score on the scale		
0-3(Pain)	0	0.0
4-6 (Neutral)	2	3.8
7-10(Pain free)	51	96.2
Were you satisfied with pain free labor(Five point Likert scale		
1-3(Unsatisfied)	03	5.7
4-5(Satisfied)	50	94.3
Were you worried on the effect to the baby?		
Not worried	21	39.6
Somewhat worried	32	60.4
Extremely worried	0	0.0
How would you grade pain relief		
Adequate	50	94.3
Inadequate	2	3.8
Not sure	1	1.9

A: (94.3%) of all the women who had received Epidural analgesia while in labor were satisfied with the service of these 30 were primegravida 60.0% and 20 were multiparous. And of those who were not satisfied 2 mothers were primegravida and 1 was multiparous.

Table 2(b): Maternal satisfaction with Epidural labor analgesia characteristics (N=53)

	Total N	**Satisfied with Epidural**				P-Value
Variable		**Yes**		**No**		
		N	**%**	**N**	**%**	
Age groups						
18-24	17	17	34.0	0	0.0	0.296
25-34	30	28	56.0	2	66.7	
35-44	6	5	10.0	1	33.3	
Gravidity						
Primegravida	32	30	60.0	2	66.7	0.819
Multiparous	21	20	40.0	1	33.3	
Neonatal outcome						
<7 score	1	0	0.0	1	33.3	0.000
≥7 score	52	50	100.0	2	66.7	
Pain experience						
Yes	2	0	0.0	2	66.7	0.000
No	51	50	100.0	1	33.3	
Mode of delivery						
SVD	38	36	72.0	2	66.7	0.839
IAD	3	3	6.0	0	0.0	
Caesarian section	12	11	22.0	1	33.3	
Total	53	50		3		

Two third (36)of those who were satisfied with Epidural labor analgesia were among those whose mode of delivery was spontaneous vertex delivery as compared to those who had Caesarian section, The observed difference was however not statistically significant (P=0.839), Mothers with neonates with good APGAR score at 1 and 5 minutes after delivery were more satisfied with Epidural analgesia than (33.3%) of those who were not happy with the service had poor neonatal APGAR score and this was statistically significant with (P=0.000). Also 66.7% of those who were not satisfied with the service had experienced pain during the period of labor analgesia and this was also statistically significant (P=0.000)

Table 3(a): Maternal Labor effects and its outcomes with epidural analgesia (n=53)

Variable	**Frequency (n)**	**Percentage (%)**
Duration of first stage		
Normal	47	88.7%
Prolonged	6	11.3%
Duration of second stage		
Normal	35	81.4%
Prolonged	8	18.6%
Oxytocin augmentation		
Yes	41	77.4%
No	12	22.6%%
Mode of delivery		
Normal delivery	38	71.7%
Instrumental assisted delivery	3	5.7%
Caesarian section	12	22.6%

With Epidural labor analgesia it was noted 6 mothers had prolonged first stage and 8 mothers had prolonged second stage of labor. And among all participants 41(77.4%) had received Oxytocin for labor augmentation and the end result was 38 women had Spontaneous vertex delivery, 3 mothers had Instrumental assisted delivery with vacuum and indication for it was documented to be prolongation of second stage of labor and 12 mothers had caesarian section delivery and the indications documented were maternal causes(obstructed labor, poor progress due to cervical dystocia), fetal causes which was fetal distress which was seen by the reduction of the Fetal heart rates and Fetal kicks reported by the mother and among these patients who had caesarian section 1.9% of the participants indication was motor weakness which was caused by use of Epidural labor analgesia,

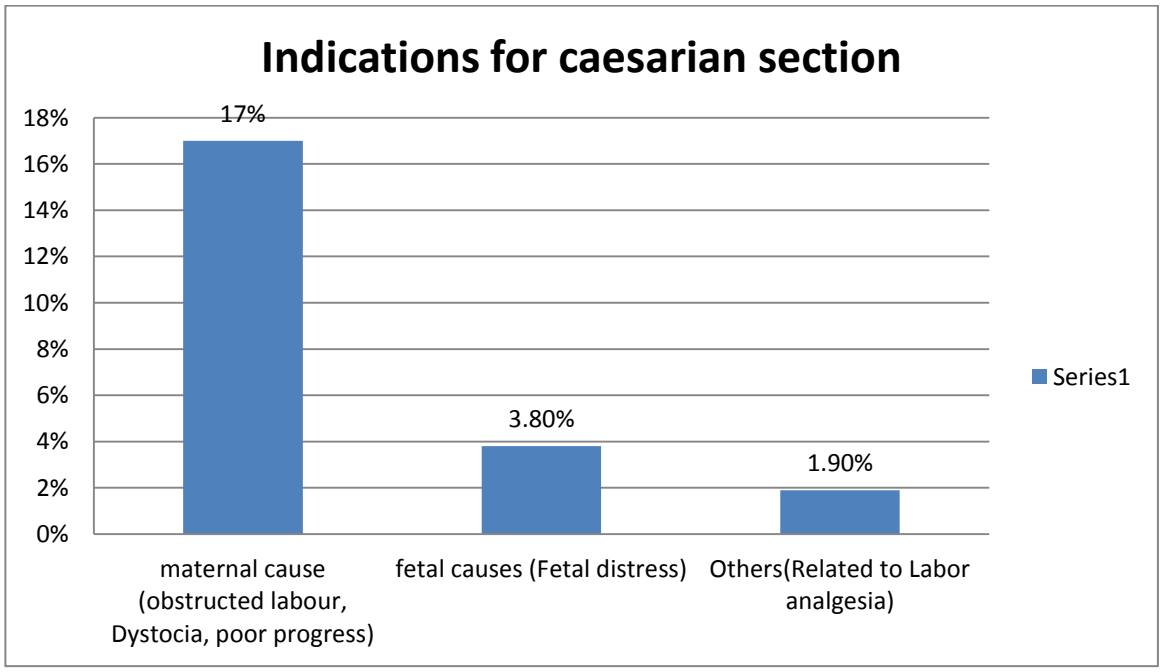


Figure 1. Indications for caesarian section

The figure above shows the indications for caesarian section among participants and it shows that maternal causes had the highest incidence about 18%of those whose mode of delivery was Caesarian section. Epidural analgesia contributed about 2% of the outcome.

Table 3(b): Maternal outcomes characteristics with Epidural labor analgesia (N=53)

	Total N	Prolongation of labor					
Variable		**1st stage**		**2ns stage**		**P-Value**	**P-values**
		Yes	**No**	**Yes**	**No**	**1st stage**	**2nd stage**
Gravidity							
Primegravida	32	4(66.7%)	28(59.6)	7(87.5)	18(51.4)	0.738	0.062
Multiparous	21	2(33.3%)	19(40.4)	1(12.5)	17(48.6)		
Cervical dilatation at initiation							
<4	6	0(0.0)	6(12.7)	2(25.0)	4(11.4)	0.353	0.318
≥4	47	6(100.0)	41(87.3)	6(75.0)	31(88.6)		
Diagnosis at admission							
Labor pain	41	3(50.0)	38(80.8	4(50.0)	31(88.6)	0.089	0.011
Labor pain and ((pre-eclampsia, breech presentation, PROM)	12	3(50.0)	9(19.2)	4(50.0)	4(11.4)		
Total	53	6	47	8	35		

Table 3b above shows that prolongation of labor both first and second stage was more among primegravida were by 66.7 of those who had prolonged first stage were primegravida and 33.3% were multiparous and 87.5 of those with prolonged second stage were primegravida while multiparous were 12.5, but this was not statistically significant (P= 0.738 and P=0.062).

Initiation of Epidural analgesia at <4cm cervical dilatation did not have any effect on prolonging the first stage and second stage of labor and this was statistically not significant (P=0.353 and P=0.318).

Other obstetrics diagnosis with labor pain at admission contributed about 50% to the prolongation of first stage of labor but it was not statistically significant (P=0.089) but statistically significant in 50% contribution of second stage of labor (P=0.011).

Table 3(c): Maternal mode of delivery characteristics with Epidural labor analgesia (N=53)

	Total N	**Mode of delivery**						
Variable		**SVD**		**IAD**		**C/S**		**P-Value**
		N	**%**	**N**	**%**	**N**	**%**	
Gravidity								
Primegravida	32	22	57.9	2	66.7	8	66.7	0.841
Multiparous	21	16	42.1	1	33.3	4	33.3	
Diagnosis at admission								
Labor pain	42	32	84.2	2	66.7	8	66.7	0.077
Labor pain and (pre-eclampsia, breech presentation, PROM)	11	6	15.8	1	33.3	4	33.3	
Complications of Epidural(motor weakness)								
Yes	1	0	0.0	0	0.0	1	8.3	0.175
No	52	38	100.0	3	100.0	11	91.7	
Cervical dilatation at initiation								
<4cm	6	6	15.8	0	0.0	0	0.0	0.263
≥4cm	47	32	84.2	3	100.0	12	100.0	
Total	**53**							

*****SVD-spontaneous vertex delivery, IAD-instrumental assisted delivery, C/S-caesarian section.

Table 3(c) above shows that most participants had spontaneous vertex delivery 38 participants and among them 57.9% were primegravida while 42.1% were multiparous, the occurrence of Instrumental assisted delivery caesarian section was5.7% and 22.6%respectively but it was more in primegravida by 66.7% and this was statistically not significant (P=0.841). Moreover mode of delivery was not affected with factors like diagnosis at admission and initiation of Epidural analgesia at <4 cm at of cervical dilatation, Complication of Epidural analgesia labor had contributed to caesarian section whereby 8.3% of mothers who had caesarian section had motor weakness but this was statistically not significant (P=0.175)

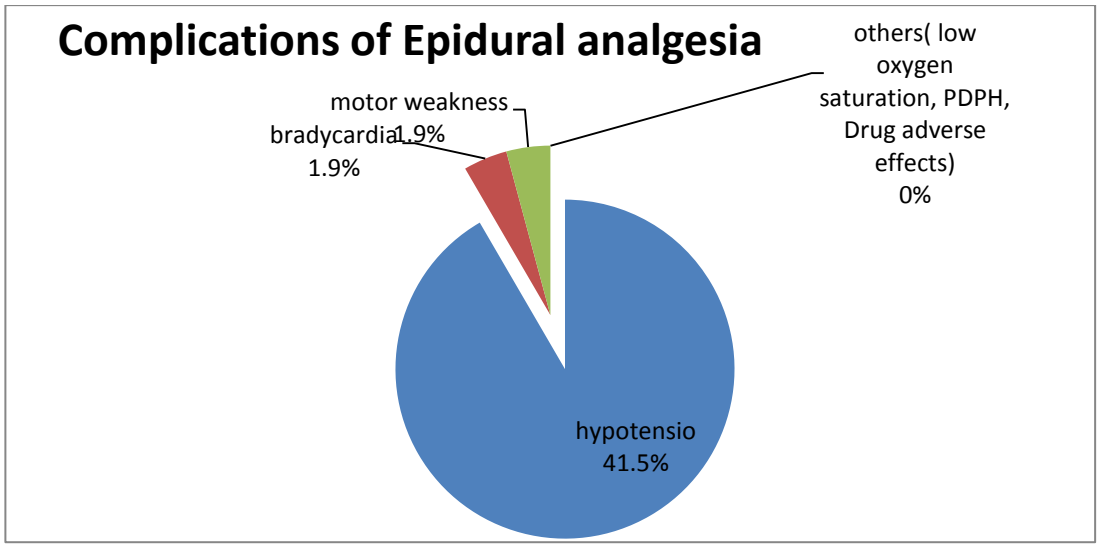


Figure 2. Other complications associated with the use of Epidural labor analgesia.

This figure shows the occurrence of other complications of Using Epidural labor analgesia to the mothers where hypotension occurred frequently (41.5%) than other complications which includes, bradycardia, low oxygen saturation, Post-Dural puncture headache and motor weakness, and drug averse effect.

Table 4(a): Neonatal outcomes of the study population (n=53)

Variable	Frequency (n)	Percentage (%)
APGAR score 1 minute		
< 7	4	7.5%
>7	49	92.5%
APGAR score at 5 minutes		
< 7	1	1.9%
>7	52	98.9

From the study it was noted the APGAR SCORE of newborn from mothers who had Epidural labor analgesia at 1 minute was good that is above 7 score whereby 49 neonates had a score of above 7 at 1 minute and the number increased to 52 at 5minutes.

Table 4(b): Neonatal outcomes characteristics with Epidural labor analgesia (N=53)

	Total N Neonatal outcome					
Variable		**Good**		**Poor**		**P-Value**
		N	**%**	**N**	**%**	
Diagnosis at admission						
Labor pain	41	41	78.8	0	0.0	0.062
Labor pain and (pre-eclampsia, breech presentation, PROM)	12	11	21.2	1	100.0	
Complication of Epidural(Hypotension)						
Yes	22	22	42.3	0	0.0	0.395
No	31	30	57.7	1	100.0	
Prolonged First stage						
Yes	6	6	11.5	0	0.0	0.694

No	47	46	88.5	1	100.0	
Prolonged second stage						
Yes	8	7	16.3	1	100.0	0.034
No	35	35	83.7	0	0.0	

*PROM-Premature rupture of membranes

Table 4(b) showed that other obstetrics diagnosis contributed to poor neonatal outcome although not statistically significant (P=0.062) and also prolongation of second stage of labor had an effect to the neonatal outcome and this was statistically significant (P=0.034). But other factors like prolonged first stage and hypotension as complication of epidural did not have an effect to the neonatal APGAR score.

Table 5(a): Health workers attitude and opinions with Epidural labor analgesia of the study population (n=61)

Variable	**Frequency (n)**	**Percentage (%)**
Inadequate professionals	58	95.1%
Inadequate equipments	57	92.5%
Denies participation of birth experience	8	13.1%
Should it be routinely offered?	51	83.6%
Have you ever experience EA	2	3.3%
Do you often practice EA(not at all)	61	100%
*EA-Epidural analgesia		

Table 1 of social demographics showed that among interviewed health care participants in the department of Obstetrics and Gynecology involved in taking care of the patients who had received Epidural labor analgesia, (45.9%) were midwives, 36.1% were residents and 18.0% were consultant's doctors.

From these participants, 42.6% had been working in the department for duration of 1-5 years, while most of the consultants had worked in the departments for more than 15 years.

Table 5(a) above shows that 95.1% of all the participants' healthcare workers said Muhimbili National Hospital had inadequate professionals (obstetricians, anesthesiologists, and nurses) which is a core in enabling Epidural analgesia services provisions and of these participants 93.4% said Muhimbili National Hospital had inadequate equipments so as to facilitate Epidural labor analgesia services. 13.1% did not agree to the use of Epidural labor analgesia as they thought it denies the mother the experience of childbirth, while others thought it was useful and helpful to the laboring mothers and to themselves as they were working in a quiet and cooperative environment.

3.3% of health workers had some points in their life experience Epidural analgesia services through themselves or their spouse, and the rest had no life experience with Epidural labor analgesia and reasons being services was not available when they or their spouse were admitted for childbirth.

From participants opinion 83.6% said that Epidural labor analgesia should be routinely offered to laboring mother as it was beneficial to both the parturients and those taking care of them.

Table 5(b): Health workers satisfaction with Epidural labor analgesia (N=61)

	Total N Satisfied with Epidural							
Variable		**Yes**		**No**		Neutral		
		N	**%**	**N**	**%**	**N**	**%**	**P value**
Cadre								
Consultants	11	11	21.6	0	0.0	0	0.0	0.007
Residents	22	22	43.1	0	0.0	0	0.0	
Midwife	28	18	35.3	5	100.0	5	100.0	
Years of Practice								
1-5years	26	25	49.1	1	20.0	0	0.0	0.019
6-9years	18	14	27.5	0	0.0	4	80.0	
10-14 year	10	7	19.6	2	40.0	1	20.0	
15-20years	5	3	5.9	2	40.0	0	0.0	
>20years	2	2	3.9	0	0.0	0	0.0	
Opinions(Denies mother participation)								
Denies	8	1	1.9	5	100.0	2	40.0	0.000
Neutral	3	0	0.0	0	0.0	3	60.0	
Does not deny	50	50	98.1	0	0.0	0	0.0	
Total	**61**							

Table 5(a) Satisfaction with Epidural was more among the residents participated in the study, but also young health workers with 1-5 years of experience were more satisfied with Epidural labor analgesia. Majority of those health worker who were not supportive of epidural had an opinion that it denies mother experience of childbirth and this was statistically significant (P=0.000)

CHAPTER FIVE

DISCUSSION

This study was aimed at determining the effects and outcomes of using Epidural labor analgesia after being introduced in MNH. This was done by collecting information about satisfaction with its use, maternal effects after using epidural labor analgesia, Neonatal effects of the mothers who used the services and Obstetrics health workers of those involved in taking care of these mother's attitude and satisfaction in the period the mothers were admitted for delivery until discharged from the labor ward.

With the rising rates of knowledge and awareness in our settings and globally, there is increase need for establishing and securing labor analgesia services. This highlights the need to develop strategies and guideline for labor analgesia services.

The satisfaction with the use of Epidural labor analgesia was 94.3% in this study; other studies found a pretty closer result with higher proportions of satisfaction among women with use of Epidural labor analgesia i.e. 80% of women satisfied with Epidural pain relief in a study by (Fyneface-Ogan et al 2009)(2), another study by (Gredilla E et al 2008) showed that 91.3% of the participants were satisfied with the use of epidural labor analgesia, 93.8% stated that they would recommend the technique to be used in their hospital and 94% would request again for epidural on their other childbirth admission(20) reasons for not being satisfied was noted to be due to factors like mode of delivery, neonatal outcomes and complications associated with epidural labor analgesia but also the inadequacy of analgesia. Overall satisfaction proportion is higher signifying the importance of pain relief methods during labor.

From this study prolongation rate of both first and second stages of labor was 11.3% and 18.6% respectively with epidural use, prolongation of labor can occur without using epidural labor analgesia. In a study by (Loughon et al. 2014) showed that prolonged second stage occurred in 9.9% and 13.9% of nulliparous and 3.1% and 5.9% of multiparous women, with and without an epidural respectively(51), other studies had contradicting results whereby in a study by (Fyneface-Ogan et al 2009)(2) and another study by (Wong et al 2005)(40)found that the use of Epidural has been associated with

shorter durations of First and Second stages of labor, while others have reported that use of Epidural labor analgesia had no effect to the progress of labor and does not cause prolongation of both first and second stages of labor(Wang F et al 2009)(41)and a study by (Nafisi S et al 2006) (38), (Halpern SH et al 2010) shown that use of epidural labor analgesia causes prolongation of only second stage (42)while study by (Sharma K et al. 2004) had shown prolongation of both first and second stage of labor(43). Reasons for improved outcomes for shorter duration of labor being the use of newer safe methods, drugs and techniques for example use of lower concentration of local anesthetics like 0.0625% bupivaciane, use of better newer drugs like ropivacaine, addition of opioids like fentanyl, sufentanil and others so as to help reduce doses of local anesthetics, use of newer techniques like walking epidural and use of combined Spinal epidural analgesia.

The rate of caesarian section and assisted instrumental delivery with Vacuum delivery from the results of the study was 22.6%, and 5.6% respectively, this number was explained with more the obstetrics causes rather than for it to be due to use of Epidural analgesia as the reasons were indicated during the study. Other studies have shown different results with regards to Epidural labor analgesia and mode of delivery, an early study by (Susan M Ramin et al. 1995)[44] has reported significantly higher incidences of caesarean or instrument deliveries with epidural labor analgesia, while of recent studies such as results from study by (Nafisi S et al 2006) and study by (Fyneface-Ogan et al 2009) showed that epidural labor analgesia usage had no difference on the caesarian section rates (38), (2). The observed difference between early and recent studies was due to improved techniques like use of active obstetrics management, restriction of analgesia close to second stage, additional of opioids so as to reduce local anesthetics dose and new drugs like ropivacaine which is a potent analgesic which improved outcomes and care of these patients.

With regards to Instrumental assisted delivery, its proportion from the study was low but mostly observed reasons were due to prolonged second stage, but from the past studies done to patients who had Epidural labor analgesia results also were different whereby (Liu EH et al. 2004)(28) and (Sharma K et al 2004)(43) reported an increase in the

incidence of instrumental assisted delivery-both vacuum delivery, episiotomy and forceps delivery, while (Roberts et al. 2009)(46)reported a fall in instrumental birth from 26% to 22% among nulliparous and 0.5% to 0.4% among multiparous parturient with epidural analgesia.

Many factors could be responsible for the decline in operative and instrumentally assisted deliveries as compared to earlier reports. Use of lower concentrations of local anesthetic solutions (0.0625% bupivacaine instead of 0.25%), but active obstetric management protocol and continuous midwifery support by (Dickson JE et al 2002)(47) during labor have resulted in lower incidences of assisted or operative deliveries.

Neonatal outcome assessed by using APGAR score in this study at 1 and 5 minutes was above 7 in 92.5% and 98.9% respectively of the baby delivered to mothers who had received epidural labor analgesia. Poor neonatal outcomes could be attributed by different factors apart from the use of epidural labor analgesia. In a study done by (Januarius H et al 2011) at MNH 10.4%had an APGAR score of less than 7 at five minutes due to different causes not including epidural labor analgesia(50).Results from others studies, (Fyneface-Ogan et al. 2009) (2) showed that 92% of the neonates had an APGAR score of above 7 at 1 minute and at 5 minutes all the neonate had a score of above 7. Another study by (Liu EH et al 2004) showed no statistical difference in the APGAR Scores of neonates born to mothers using epidural analgesia when compared to those using opioid analgesia and reasons for good neonatal APGAR score in this study was due to increase use of continuous electronic fetal monitoring and decreasing vaginal assisted delivery with vacuum (28) and study by (Mousa W et al. 2012) showed use of low dose local anesthetic has led to good neonatal outcomes (29). Moreover review by (Anim-Somuah M et al. 2005) showed that use of epidural labor analgesia was associated with poor neonatal outcomes due to the use of higher doses of local anesthetics (30).

The current study reported 95.1% of all the participants' healthcare workers said Muhimbili National Hospital had inadequate professionals (obstetricians, anesthesiologists, and nurses) to handle an epidural analgesia program, this is a setback for Epidural analgesia program as professionals are very relevant as epidural rates are affected by the availability of anesthesia providers, nurses and practice policies in hospitals (49). Healthcare workers at MNH 93.4% said the referral hospital has no adequate equipment to handle epidural analgesia and its possible complications. In many low to middle income countries in adequate equipments affects practice the practice of epidural analgesia (49). In a survey by (WWK To in Hongkong 2007) it was noted that despite the low prevailing request rate for epidural analgesia in labor, there appears to be a lack of adequate resources to meet the demand (36)

82.0% of health workers participants at the current study reported that from observation of patients while taking care of them that Epidural labor analgesia did not deny mothers to participate in the labor process but rather they got full participation and they were working in a peaceful environment, Canadian obstetricians were less positive about the role of mothers in their own birth when using epidural labor analgesia(32), this contradicting results thought to be due to different cultures.

83.6% of the participants favored the routine use epidural labor analgesia at the Muhimbili National Hospital whereby young health workers supported more its use by 49.1% participants and this finding is supported by the study by (Klein MC et al.) showed that epidural analgesia was favored by younger female obstetricians compared to the old male obstetricians aged more than 40 years (32), (Osinaike et al in south west Nigeria) showed that despite epidural labor analgesia having interference with labor process 97.8% of obstetricians would prefer using it to their patients(48). Hindrance to an epidural labor analgesia services at the current study was inadequate resources that is inadequate equipments and inadequate professionals by 96.2% of the participants, also the report from Nigeria study (Osinaike et al.) said that improving knowledge and interpersonal relationship between obstetricians and anesthetists would improve epidural labor analgesia services (48).

Study limitations

Since Epidural analgesia is not commonly done in Tanzania and more so in Muhimbili National Hospital number of patient who consented to the study did not reach the desired sample size since most participants were not aware of the service and had no knowledge about it, so fear of development unwanted effects was high which may require the presence of a caregiver not to leave patient bedside for reassurance and spending whole day in one patient.

Availability of equipment's which includes epidural kits, syringe pumps, monitors and drugs for analgesia was a challenge in labor.

Also since the procedure is not common in our setup availability of well experience co-workers was also a challenge hence being a setback in getting enough data.

CONCLUSION

This study concluded that epidural labor analgesia is safe with fewer complications and participants were satisfied with services and would wish to get it again in future labor and delivery.

Maternal outcomes were not much affected with the use of Epidural labor analgesia except in few cases of adverse outcomes which were manageable.

Epidural labor analgesia did not have an effect to the neonate.

Most healthcare workers in the labor ward were satisfied with epidural analgesia and recommended its routine use.

The greatest hindrance to epidural labor analgesia at MNH is the lack of adequate professions and equipments, other issues of awareness and knowledge could be addressed with providing education to both health workers and mothers.

RECOMMENDATIONS

The importance of analgesia as a contributor to overall satisfaction to healthcare services has been recognized. Pain relief in childbirth is subject to many social and cultural modifiers, which continue to change.

As it was observed that acceptability and satisfaction was high among women in our setting, there is an urgent need to establish a routine use of epidural labor analgesia in

our hospital as a wide gap between desire for labor analgesia and its provision was noted.

Obstetricians and anesthesia providers have a great role to play in educating the mothers, and possibly their colleagues, on Epidural labor analgesia before the service can be set up. Epidural Labor analgesia is a standard of care in obstetrics and so should be provided at least in national referral hospitals.

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APPENDICES

Appendix I: Consent Form English Version

Introduction

I am Dr. Mariam Leoni Msimbe, a researcher from Muhimbili University of Health and Allied Sciences (MUHAS). I am conducting a study titled 'Introduction of Epidural analgesia labor analgesia in women who are in labor and its outcomes: The practice at Muhimbili National Hospital, Dar es salaam, Tanzania'. The aim of this research is to 'To determine the outcomes related to the use of Epidural analgesia in women who are in labor at Muhimbili National Hospital Dar es salaam, Tanzania'.

Participation in the study

You are kindly requested to participate in this study. If you accept to participate in this study your particulars/information will be taken and used for the purpose of this research and this will certainly not bother you or cause any discomfort to you. Your participation in this study will involve the following: Taking your records from clinical notes, being directly observed in during labor and delivery. You will be as well called through your phone number during the follow up period.

Confidentiality

You are strongly assured of the confidentiality of the information obtained that will only be used for the purpose of this research and anonymity will highly be observed when collecting data and compiling report. To assure you, even your name will not be required to appear in the questionnaire.

Risk to participant

No anticipated risk or harm that may result from participating in this study.

Right of participation in the study. Your participation is absolutely voluntary and there is no penalty for refusing to participate. You are free to ask any question and you may stop to participate in this study any time.

Contact Person

The principal investigator Dr. Mariam Leoni Msimbe (0714492880, is a key contact person with regard to any queries about this study. If you have any questions/concerns about your rights as a participant you may contact The chairman of the university senate research and publications, MUHAS P.O.BOX 65001 Telephone: 2552152489 Dar es salaam. And Dr. Lugazia who is the supervisor of this study, Phone: 0713283900.

Signing of the consent

If you agree to participate in this study please sign in this consent form.

I (initials)…… have read and understood the contents of this form and I have been given satisfactory explanation with all my questions answered. I therefore consent to participate in this study.

Signature of interviewee .....……Date.....

Signature of interviewer .....Date ……

Appendix II: Consent form Kiswahili version

FOMU YA RIDHAA KUSHIRIKI KATIKA UTAFITI YA KISWAHILI

Utangulizi

Mimi naitwa Dr. Mariam Leoni Msimbe, mtafiti kutoka Chuo Kikuu cha Sayansi ya Tiba Muhimbili. Ninafanya utafiti kuhusiana na wa mama waja wazito kuhusu ' Matokeo yatokanayo na matumizi ya njia za kuondoa maumivu kwa kutumia njia ya epidural kwenye uti wa mgongo kwa kina mama wakati wa kujifungua katika Hospitali ya Taifa Muhimbili, Dar es Salaam, Tanzania'. Lengo la utafiti huu kujua matokeo yanayotokana na matumizi ya kuondoa maumivu kwa kutumia njia ya epidural kwenye uti wa mgongo kwa kina mama wajawazito katika hospitali ya Taifa Muhimbili, Dar es Salaam, Tanzania.

Kushiriki katika utafiti huu

Tafadhali unaombwa kushiriki katika utafiti huu, na mara tu utakapo ridhia ,unahakikishiwa kuwa habari zako na maelezo utakayotoa yatatumika kwa makusudio na malengo ya utafiti huu tu na kuwa hii haitakuletea usumbufu wowote.

Usiri wa taarifa za mshiriki

Unahakikishiwa tena kuwa taarifa zozote zitakazopatikana kutoka kwako wakati wa utafiti huu zitapewa usiri mkubwa sana na hazitatumika kwa malengo mengine yeyote tofauti na utafiti husika. Kuhakikisha hilo dodoso litakalo husika halitakuwa na jina lako wakati wote wa utafiti na hata baada ya utafiti.

Athari za utafiti huu kwa mshiriki

Hakuna athari au madhara yeyote yatakayokupata kutokana na kushiriki katika utafiti huu.

Haki ya kushiriki au kutoshiriki katika utafiti huu

Ushiriki wako katika utafiti huu ni wa hiari kabisa.unayohaki ya kushiriki au kutoshiriki bila kulazimika. Pia unayo haki ya kukataa kuendelea kushiriki/kuacha kujibu maswali

wakati wowote utakapojisikia kufanya hivyo na hakutakuwa na hatua yeyote itakayochukuliwa dhidi yako au kulaumiwa kwa kufanya hivyo.

Mawasiliano

Wasiliana na mtafiti mkuu, Dr. Mariam Leoni Msimbe (0714492880) wakati wowote utakapokuwa na maswali au jambo lolote lenye kuhitaji ufafanuzi kuhusu utafiti huu. Hata hivyo endapo utakuwa na maswali kuhusu haki yako kama mshiriki unaweza pia kuwasiliana na Mwenyekiti wa Baraza la Utafiti na Uchapishaji wa Chuo Kikuu cha Sayansi ya Tiba Muhimbili. S.L.P. 65001, Simu namba 2552152489 Dar es Salaam. Na Dr. Lugazia msimamizi wa utafiti huu simu namba 0713283900.

Kukubali kushiriki

Ukikubali kushiriki tafadhali thibitisha kwa kujaza na kusaini sehemu ya fomu hii hapa chini.

Mimi …….nimesomewa na kuelewa yaliyomo kwenye form hii na maswali yangu yote yamejibiwa vizuri. Hivyo ninakubali mwenyewe kwa hiari yangu bila kushurutishwa au kushawishiwa kushiriki katika utafiti huu.

Sahihi ya mhojiwa……..... Tarehe…….....……..

Sahihi ya mhoji. ……Tarehe …….

Appendix III: Questionnaire

ASSESSING EFFECTS OF USING EPIDURAL ANALGESIA ON WOMEN IN LABOUR AND ITS OUTCOMES AT MUHIMBILI NATIONAL HOSPITAL, DAR-ES-SALAAM, TANZANIA FROM DECEMBER 2016-APRIL 2017

1. Initials……..

2. What is your age in years

a) 18-24
b) 25-34
c) 34-44

3. Level of education.

a) no formal education
b) primary level
c) secondary level
d) university level

4. Gestational age…….

5. Gravidity……..

6. Date of admission……..

7. Diagnosis at admission……

8. Cervical dilatation at request of analgesia……and Time ……

9. Oxytocin augmentation……, dose……..

10. Duration of first stage of labor …….

11. Duration of second stage of labor …….

12. What is the mode of delivery?

a) Spontaneous Vertex Delivery with no assistance
b) Spontaneous Vertex Delivery with assistance
c) Operative delivery- Caesarian section

13. Indication for Spontaneous Vertex Delivery with assistance

a) Maternal exhaustion
b) Prolonged second stage
c) Maternal illness; such as heart disease, hypertension, aneurysm, or other things which make pushing difficult or dangerous
d) Hemorrhage
e) Analgesic drug-related inhibition of maternal effort (especially with epidural/spinal anesthesia)
f) Non-reassuring fetal heart tracing
g) After-coming head in breech delivery

14. Indication for Caesarian section

a) Obstructed labor
b) Fetal Distress
c) Previous CS scar
d) Others (Specify)……

15. Neonatal outcome

a) APGAR score at 1 minute…….

b) APGAR score at 5 minutes…….

16. Did you experience any kind of pain during the period of labor pain relief?

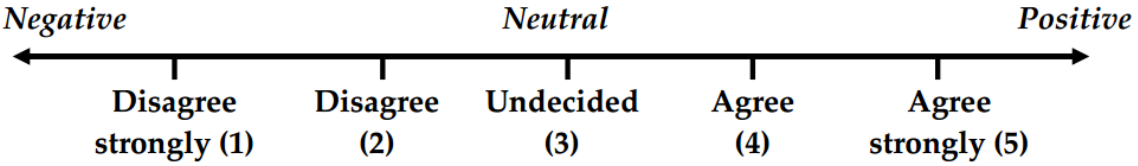
a) Yes b) No

17. Using any number from 0 to 10, where 0 is the total pain free state and 10 worst pain experienced, what number would you use to rate your epidural analgesia while in labor? Circle the appropriate answer

	10 Worst pain experienced	9	8	7	6	5	4	3	2	1	0 Total pain free.

18 .SATISFACTION SCALE

Five point Likert scale



I. COMPLICATIONS(Tick where appropriate)

COMPLICATION	YES	NO	Medication given
Hypotension			
Bradycardia			
Low Oxygen saturation			
DRUG SIDE EFFECT • nausea, • pruritus, • respiratory depression			
Muscle weakness			
Postdural puncture headache			

19. Were you worried about the effect of the pain relief on your baby?
    a) Not worried
    b) Somewhat worried
    c) Extremely worried

20. How would you grade pain relief during labor?
    a) Adequate
    b) Inadequate
    c) Not sure

HEALTH WORKERS PART:

1. Cadre; a) Consultant b) Resident c) Registrars d) midwife

2. Length of obstetric career (during and after post graduate studies);

1) 1-5 yrs
2) 6-9 yrs
3) 10-14 yrs
4) 15-20 yrs
5) > 20 yrs

3. What is your opinion on the following?

A: Muhimbili National hospital has adequate professionals (obstetricians, anesthesiologists and nurses) to handle an Epidural Analgesia programme ?

a) Strongly Agree b) Agree c) Neutral d) Disagree e) Strongly disagree

B: Muhimbili national hospital has adequate equipment to handle Epidural Analgesia and its possible complications?

a) Strongly Agree b) Agree c) Neutral d) Disagree e) Strongly disagree

C: Epidural analgesia denies mothers the participation in their birth experience?

a) Strongly Agree b) Agree c) Neutral d) Disagree e) Strongly disagree

D: Epidural Analgesia should be routinely be offered to parturient at the Muhimbili National Hospital

a) Strongly Agree b) Agree c) Neutral d) Disagree e) Strongly disagree

4. Have you or (if male) your spouse had an epidural done in labor?

i) Yes ii) No

If yes why;

a) I have had good experiences with Epidural Analgesia in my patients so I used it

b) My friends encouraged me after their pleasant experiences

c) I had read about it and I wanted to try it

d) Other specify

If no why;

a) I have no children

b) I didn't know much about Epidural Analgesia when I had my baby (ies)

c) I don't support the use of Epidural Analgesia

d) Other specify

5. In your opinion what is the greatest hindrance to an effective Epidural Labor Analgesia program at the Muhimbili National Hospital.

a) Poor attitude of the nursing staff

b) Poor attitude of the mothers

c) Inadequate resources

d) Lack of knowledge on epidural Analgesia by obstetricians

e) Other specify

6. How often do you practice Epidural Labor Analgesia at the Muhimbili National Hospital on a scale of 1-5?

1-Not at all

2- Rarely (once in a while)

3- Common (often)

4- Frequent (more than twice a week)

5- Always