Addis Ababa University

College of Health Sciences

Department of Anesthesia

The practice of labor analgesia and its perceived barriers among health care providers working in public hospitals of Addis Ababa, Ethiopia.

Investigator: Hailemariam Mulugeta (BSc)

Advisor: Misrak Weldeyohannes (BSc, MSc)

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June, 2016,

Addis Ababa, Ethiopia.

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Research Thesis

Name of investigator	Hailemariam Mulugeta (BSc)
Name of Advisor	Misrak Woldeyohannes (BSc, MSc)
Full Title of the Research Thesis	**The practice of labor analgesia and its perceived barriers among health care providers working in public hospitals of Addis Ababa.**
Data collection period	Feb 1-30, 2016.
Study Area	Public Hospitals of Addis Ababa, Ethiopia
Address of investigator	Tel: +251 923 68 07 14 or +251 970 41 52 08 e-mail: hmerry1990@gmail.com

June, 2016,

Addis Ababa, Ethiopi

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ABSTRACT

Background: Almost all women experience moderate-to-severe pain during labor which adversely affects parturient and fetuses. Authorities in the fields of obstetrics and anaesthesia encourage use of labour analgesia. The practice of labor analgesia in Africa is not a well-established service, especially in the low-income countries like Ethiopia. The goal of this study was to assess the practice of labour analgesia and its perceived barriers among health care providers working in public hospitals of Addis Ababa, Ethiopia.

Methods and materials: Institutional based cross sectional study was conducted in four public hospitals of Addis Ababa. Cluster sampling technique was used to select the public hospitals. All of the healthcare providers who are supposed to be involved in the management of labor pain in the clustered hospitals were included. Pretested structured questionnaires were used to collect data with regular supervision and follow up. Data was entered in to epi info-7 and analyzed with SPSS-20 statistical software. Results were presented using narratives, graphs, tables and charts. Conclusions were drawn by means of simple percentages and inferential statistics using binary logistic regression, with P-value < 0.05 at 95% Confidence Interval (CI) taken to be statistically significant.

Results: Of the 177 respondents**,** 81 (45.8 %) Anesthetists, 61 (34.5%) Midwives, 26 (14.7%) Obstetricians/gynecologists, and 9 (5.1%) Anesthesiologists were involved. About 54.2% practitioners offered any form of labor analgesia. Among these, only 1(0.6%) offered it routinely, 42 (23.7%) sometimes and 53 (29.9%)on maternal request. Eighty-one respondents (45.8%) never practiced labor analgesia. The commonest pharmacological labor analgesia used were opioids (35.6%). The major reasons adduced for not offering labor analgesia routinely or not at all were; non-availability of drugs and equipment (59.9%), lack of emphasis towards labor pain management by health service management system (44.1%), shortage of skilled man power (38.4%), and fear of fetal distress to administer systemic analgesics (33.3%).

Conclusion and Recommendations: The routine practice of labor analgesia by healthcare providers was very low in the study facilities. There is need for team work by all the stakeholders in the health sector and the government to step up its use, and make childbirth a more fulfilling experience for laboring mothers.

Key words: labor, pain, analgesia, practice, barriers

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LIST OF ABBREVIATIONS

AA-Addis Ababa

AAU-Addis Ababa University

ACOG -American College of Obstetricians and Gynecologists

ASA -American Society of Anesthesiologists

CDC-Center for Disease control

CI-Confidence Interval

CSE-Combined Spinal Epidural

EFMoH-Ethiopian Federal Ministry of health

NICE- National Institute of Clinical Excellence of United Kingdom

N_2O-Nitrous Oxide

NSAIDS-Non-Steroidal Anti-Inflammatory Drugs

OR-Odds Ratio

PI-Principal Investigator

PSI- Primary Sampling Unit

S2-S4-Sacral nerve fibers 2 to 4

SPSS-Statistical Package for Social Sciences

SSU- Secondary Sampling Unit

T11-T12-Thorasic nerve fibers 11 to 12

TENS-Transcutaneous Electrical Nerve Stimulation

UK-United Kingdom

USA-United States of America

WHO-World Health Organization

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1. INTRODUCTION

1.1. BACKGROUND INFORMATION

Concerns about pain in labor are as old as mankind. Biblical texts contain vivid accounts on the origin of pain in labor and up until the present time. The medical and lay press have engaged in debates about the origin of labor pains, as well as their severity and relief. Accounts from the medical literature have shown that pain perception in labor varies in onset, timing, duration, and severity. Studies have shown that these variations are related to socio-demographic and biological variables like age, parity, race, religious affiliation, and ethnicity (1).

Most women experience moderate-to-severe pain during labor. In the first stage of labor, pain is caused by uterine contractions, associated with dilation of the cervix and stretching of the lower uterine segment. Pain impulses are carried in visceral afferent type C fibers accompanying the sympathetic nerves. In early labor, only the lower thoracic dermatomes (T11 to T12) are affected, but with progressing cervical dilation in the transition phase, adjacent dermatomes may be involved and pain referred from T10 to L1. In the second stage, additional pain impulses from distention of the vaginal vault and perineum are carried by the pudendal nerves composed of lower sacral fibers (S2 to S4) (2).

A scientific definition of pain is ‘an unpleasant sensory and emotional experience associated with actual or potential tissue damage’ (5). Acute pain such as labor pain has two dimensions; a sensory or physical dimension, with the transmission of information, the pain stimuli, to the brain, and an affective dimension due to interpretation of these stimuli through the interaction of a wide variety of emotional, social, cultural and cognitive variables unique to the individual. For the management of pain, conventional medicine focuses more on the physical side, while alternative methods deal mainly with emotional considerations. Therefore, the issue of pain relief during child birth is a way of promoting a satisfactory birth experience and healthy reproductive outcome in women during child bearing by addressing both the emotional and physical components (6, 31).

1.2. STATEMENT OF THE PROBLEM

Addis Ababa is the capital city of Ethiopia with an area of 530 km^2 and a total population of more than 3,384,569 according to the 2007 population census. It has 11 public hospitals with in its 10 sub-cities providing health service including management of labor and delivery.

Severe pain adversely affects parturient and fetuses. Pain-induced stress accelerates the basal metabolism of a parturient and increases cardiac output and ventilation. In extreme cases, reflex hyperventilation leads to respiratory alkalosis manifesting with maternal tetany and fetal cardiac arrhythmia. Maternal respiratory tetany shifts the haemoglobin dissociation curve to the left, leading to deterioration of the transplacental oxygen transport. The sympathetic stimulation and increased endogenous catecholamine concentration cause uterine vasoconstriction, which reduces the utero-placental flow and is likely to lead to intrauterine fetal hypoxia and acidosis. This could be again dangerous for women with pre-existing cardiopulmonary problems. Released catecholamines impair uterine contractile function, which prolongs the delivery and secondarily deteriorates the postpartum status of the newborn (4, 35). Additionally, lipolysis, the release of free fatty acids freely permeating the placenta, and hyperglycemia are observed, which increases fetal hypoxia and acidosis. Pain during labor has also been correlated with the development of maternal post-traumatic stress disorder (3, 37).

Since pain relief in labor is an important aspect of the management of pregnant women during child birth, efforts to evaluate its practice becomes important in order to determine aspects of it that require improvement. A lot of controversy has existed since the inception of pain relief in labour to date. According to the American Society of Anesthesiologists (ASA) and American College of Obstetricians and Gynecologists (ACOG), maternal request represents sufficient justification for pain relief (7, 8). The American College of Obstetricians and Gynecologists also states that ‘labor results in severe pain for many women. There is no other circumstance where it is considered acceptable for a person to experience untreated severe pain, amenable to safe intervention, while under a physician's care’ (9). So also, the National Institute of Clinical Excellence (NICE) of the United Kingdom recommends the education of women on the options and availability of effective analgesia in labour as a means of ensuring that women receive optimal analgesia during child birth (13).

In a bid to attain Millennium Development Goals 4 and 5 (10), attention is being focused on the very important area of childbirth. Provision of effective labor analgesia is not only the measure of maternal satisfaction but also is indirect evidence that the health system is functioning, health institutions are well organized and equipped, and there are competent maternal health care providers. Unfairly large disparities exist between developed and developing countries in this practice. Analgesia for labor is widely utilized in high-income countries but this is not the case in Africa (11). Issues in high-income countries are focused on the choice of methods and complications, while in developing countries; the issue revolves around awareness, acceptability and availability of analgesia for labor (12). In another words, the major barriers perceived by practitioners for non-offering of labor analgesia in developing countries has been associated with non-availability of drugs and equipment due to their cost, and practitioners' attitudes and awareness towards provisions of different forms of analgesics (1, 62).

There are different expectations for the management of pain during labor according to the category of professionals. Obstetricians, Anesthesiologists and Anesthetists are expected to provide pharmacological therapy, whereas midwives, nurses and other auxiliaries are required to assist patients with psychological methods, and in fact use alternative approaches more often (6). In addition, successful relief of labor pain in itself is not necessarily associated with high levels of satisfaction on the part of parturient women. Factors such as the woman's involvement in decision making, social and cultural factors, the woman's relationship with her caregivers, and her expectations regarding labor may be equally, if not more, important (39, 40).

Many pharmacologic and non-pharmacologic treatments have been developed to alleviate the labor pains, and their use has become popular, especially in developed countries. Treatments found to have been used at one time or another includes parenteral opioids (14-16), epidural analgesia (17, 18) and inhalational agents like nitrous oxide. The place of non-pharmacologic agents, like transcutaneous electrical nerve stimulation (TENS) (19, 20), hypnosis (21) and acupuncture (22, 23) to relieve labor pains has also been shown in many studies. The effectiveness of these methods varies. Overall, epidural analgesia remains the gold standard, based on the findings of many researchers, including meta-analysis (18, 24-26). The available evidence suggests that parenteral opioids are only somewhat effective and could even be harmful to the baby, yet are widely used

(27-29). The evidence for effectiveness of non-pharmacologic agents like TENS, acupuncture, and hypnosis is also scanty, although there are isolated reports of efficacy (6, 30-34).

The EFMoH has developed and implemented the first standard of midwifery care practice in 2013. Among the practice competencies stated; provision of physical and psychological support, and use of pharmacological and non-pharmacological comfort measures during labor and birth are listed as core competencies under Practice Standard III (38). This is one of the critical components in the FMOH's efforts to improve the quality of maternal health services available to the Ethiopian public. However, there is no any protocol for labor pain relief in our actual clinical setting and its practice is not clearly known. In addition, the administration of epidural analgesia, which is the gold standard technique (18, 24-26), for normal labor and delivery by anesthesia providers is not determined under the national practice standards in Ethiopia. Therefore, the study was aimed at assessing the practice of labor analgesia its perceived barriers in public hospitals of Addis Ababa city.

1.3. SIGNIFICANCE OF THE STUDY

Administration of appropriate analgesia for normal labor is mandatory for better maternal outcome and satisfaction. On the other hand, assessment of the practice of labor analgesia is important to determine the barriers observed, with a view to make recommendations for improvement.

Therefore, this study is expected to provide benefits primarily to maternal healthcare providers to appraise the forms and use of labor analgesia in such a way that it meets the internationally accepted standards. Then, it will remind clinical preceptors and medical educators to give emphasis on training and retraining of obstetric analgesia as a core competency for their students in their pre-service and in-service environment. In addition to this, the base line data in this study will open the gate to further research activities by researchers. Finally, an overview of the practice of labor analgesia for hospital administrators and policy makers will be a clue for planning and intervening on areas of deficit thereby organizing and equipping the health institutions in ways to improve the quality of care.

2. LITERATURE REVIEW

Even though delivery is a natural phenomenon, it has been demonstrated that the accompanying pain is considered severe or extreme in more than half of cases. Besides conventional approaches, such as epidural analgesia, many complementary or alternative methods have been reported to reduce pain during labor and delivery.

Most methods of non-pharmacological pain management are non-invasive and appear to be safe for mother and baby, however, their efficacy is unclear, due to limited high quality evidence. In many reviews, only one or two trials provided outcome data for analysis and the overall methodological quality of the trials was low. High quality trials are needed. There is more evidence to support the efficacy of pharmacological methods, but these have more adverse effects (41).

2.1. Conventional Approaches (Pharmacologic Treatments)

2.1.1. Regional analgesia techniques (Epidural and combined spinal-epidural analgesia)

Epidural analgesia has been shown to be the most effective method of providing pain relief in labour (18, 24-26) when compared with non-epidural methods (44, 45). On a national level, an epidural technique is used for pain relief in approximately 25% of labouring women in the UK (46, 47) and in as many as 58% in the USA (51).

A cross sectional study was conducted in United Kingdom by Davies M.W, et al between September 1991 and February 1992 to assess the practice of epidural analgesia during normal labour. Out of 234 questionnaires filled by maternal health care providers, the average epidural rate was 19.7% and 78% of units offered a 24-h service (56).

A survey conducted in Poland by Jacek Furmanik (2009) to assess labor epidural analgesia of the country, 432 questionnaires with questions regarding regional and other pain relief methods used in labour were distributed to obstetric units. Response rate was 24% (n=98). There were around 45% hospitals with 1 to 3 deliveries per year which makes it difficult to provide separate obstetric anaesthetic cover. Only 10 hospitals (11%) employed anesthetists for labour ward. Epidural analgesia was used in 55% hospitals but only 20% provide the service 24 hours per day and free of charge. Entonox (N_2O) was used very occasionally; most common way of pain relief was pethidine injection (57).

Since the early 1990s, the combined spinal-epidural (CSE) technique has become popular because it provides more rapid onset pain relief with minimal motor weakness (58, 59).

David Gambling, et al, conducted a randomized prospective comparative study on combined spinal-epidural (CSE) analgesia and epidural analgesia to determine the pain score in the first, and second stage of labor from 398 epidural and 402 CSE subjects. Compared with traditional epidural labor analgesia, CSE analgesia provided better first-stage analgesia despite fewer epidural top-up injections by an anesthesiologist. Pain scores during the second stage of labor and at delivery were the same between groups (60).

A retrospective study was conducted in Stellenbosch University and Tygerberg Hospital, Cape Town, South Africa to audit the epidural labour analgesia records of a one-year period from 1 January 2012 to 31 December 2012. Out of 7005 parturients, only 157 (2.2%) had received labour epidural analgesia and the study recommended an urgent need for improvement of the labour epidural service at this institution (65).

2.1.2. Systemic Opioids

Most obstetric units in developed countries offer intramuscular opioids, along with facilities for epidural analgesia. Opioids are relatively inexpensive drugs, and the use of pethidine, meptazinolr, and diamorphine during labour is common midwifery and obstetric practice in some countries. In other parts of the world, parenteral (intravenous or intramuscular) opioids commonly used in labour include morphine, nalbuphine, fentanyl and more recently remifentanil (50). The extent of usage of parenteral opioids during labour worldwide is unclear. Worldwide, pethidine is the most commonly used opioid (29, 41, and 61).

In the United States, the incidence of parenteral administration of opioids ranges from 30% in hospitals with more than 1500 deliveries annually to 56% in hospitals with 500-1500 annual births. In small hospitals, i.e., those with fewer than 500 deliveries per year, parenteral opioids are used in 50% of the deliveries. In Great Britain, this percentage is approximately 38%, on average (61).

A questionnaire-based, cross-sectional study was conducted to assess the practice of labor analgesia on 151 obstetricians in Nigeria by Lawani LO, et al. Of the 151 participants, only 74 (49%) offered obstetric analgesia. Among users, only 20 (13.3%) offered obstetric analgesia routinely to parturients, 44 (29.1%) sometimes and 10 (6.6%) on patients' requests. The

commonest analgesia was opioids (41.1%) followed by Psychological support (39.7%), Paracetamol (4.6%), Epidural (2.0), and Entonoux (1.3%). Among non-users (51%), the commonest reasons adduced were fear of respiratory distress (31.1%), cost (24.7%) and late presentation in labour (15.6%) (62).

2.1.3. Nitrous Oxide (Entonoux)

Nitrous oxide gas is given for inhalation at sub-anesthetic concentrations. Despite being used for more than 100 years, there is no clear quantitative evidence of the efficacy of nitrous oxide in relieving labor pain. The subjective feelings of mothers giving birth suggest, however, that nitrous oxide is beneficial in many cases. Many women report significant analgesia with it, and many would choose it again for another delivery (6).

When Klomp et al (2012) reviewed literatures comparing N_2O inhaled analgesia with placebo or no treatment (oxygen or compressed air or no treatment); nitrous oxide was found to offer better pain relief. However, nitrous oxide was associated with more adverse effects for women such as nausea, vomiting, dizziness and drowsiness when compared with placebo or no treatment (42).

2.1.4. Non-opioid systemic labor analgesia

Non-opioid drugs may have antipyretic (drugs that reduce fever), sedative (drugs that induces sedation or reduce irritability) or anti-inflammatory actions (reduce inflammation), as well as analgesic properties (relieve pain). They are milder forms of painkiller (43). Non-opioid drugs include acetaminophen (paracetamol); the most commonly used over-the-counter non-narcotic analgesic used for all types of pain relief. Other drugs include non-steroidal anti-inflammatory drugs (NSAIDs). Aspirin and acetaminophen are two of the most widely used non-opioid analgesics and are effective for mild to moderate pain. Alternatively, for moderate to severe pain, they can be used in combination with opioid drugs to enhance pain relief (49).

2.2. Alternative Systems of Medical Practice (Non-pharmacologic Approaches)

The place of non-pharmacologic agents, like trans-cutaneous electrical nerve stimulation-TENS (19, 20), hypnosis (21), acupuncture (22, 23), biofeedback, yoga (52), music therapy (53), subcutaneous water injection (54) and water immersion (55) to relieve labor pains has also been shown in many studies. The effectiveness of these methods varies.

Many developed countries specify the non-pharmacologic labor analgesia methods in their national guidelines. The Clinical practice guideline on care in normal childbirth of Spain ministry

for health (63) recommends immersion in hot water, Massage and calming physical contact, Relaxation techniques and injection of sterile water as effective pain relief methods. The TENS method is not recommended to women in established labour. Similarly, National Institute for Health and Care Excellence (NICE) of London (UK) recommends breathing and relaxation techniques, massage and labouring in water as effective ways of alleviating labor pain. However, injection of water papules and trans-cutaneous electrical nerve stimulation (TENS) are not indicated. Acupuncture or acupressure and hypnosis are also not indicated to offer, but it recommends using for women who wish to use these techniques (64).

When we come to Ethiopia, there is no any research available about the practice of labor analgesia. In addition, the issue of labour analgesia has not been given emphasis at national and institutional level.

3. OBJECTIVES OF THE STUDY

3.1. General objective

To assess the practice of labour analgesia and its perceived barriers among health care providers working in public hospitals of Addis Ababa, Ethiopia, 2016.

3.2. Specific objectives

1. To assess the practice of labour analgesia among healthcare providers working in public hospitals of Addis Ababa.
2. To identify the barriers to the practice of labour analgesia among health care providers working in public hospitals of Addis Ababa.

4. METHODOLOGY

4.1. **Study area and period:** this study was conducted in four high-volume public hospitals (Black-lion, Alert, Gandhi and Yekatit 12) of Addis Ababa. Addis Ababa is the capital city of Ethiopia with an area of 530 km^2 and a total population of more than 3,384,569 according to the 2007 population census. It has 11 public hospitals with in its 10 sub-cities. The service of labor and delivery has been practiced in most of the hospitals. The study was conducted from Feb 1-30, 2016.

4.2. **Study design:** Institutional based, cross sectional study design was used.

4.3. **Population**

*4.3.1. Source population***:** All health care providers who are supposed to be involved in the practice of obstetric analgesia in public hospitals of Addis Ababa.

4.3.2. Study population: health care providers who are supposed to be involved in the practice of obstetric analgesia in selected public hospitals of Addis Ababa during data collection period.

4.4. ***Inclusion criteria***: obstetric care givers (obstetricians, anesthesiologists, anesthetists, and midwifes) who are supposed to be involved in the provision of analgesia for normal labor and delivery were included in the study.

4.5. **Sample size determination**

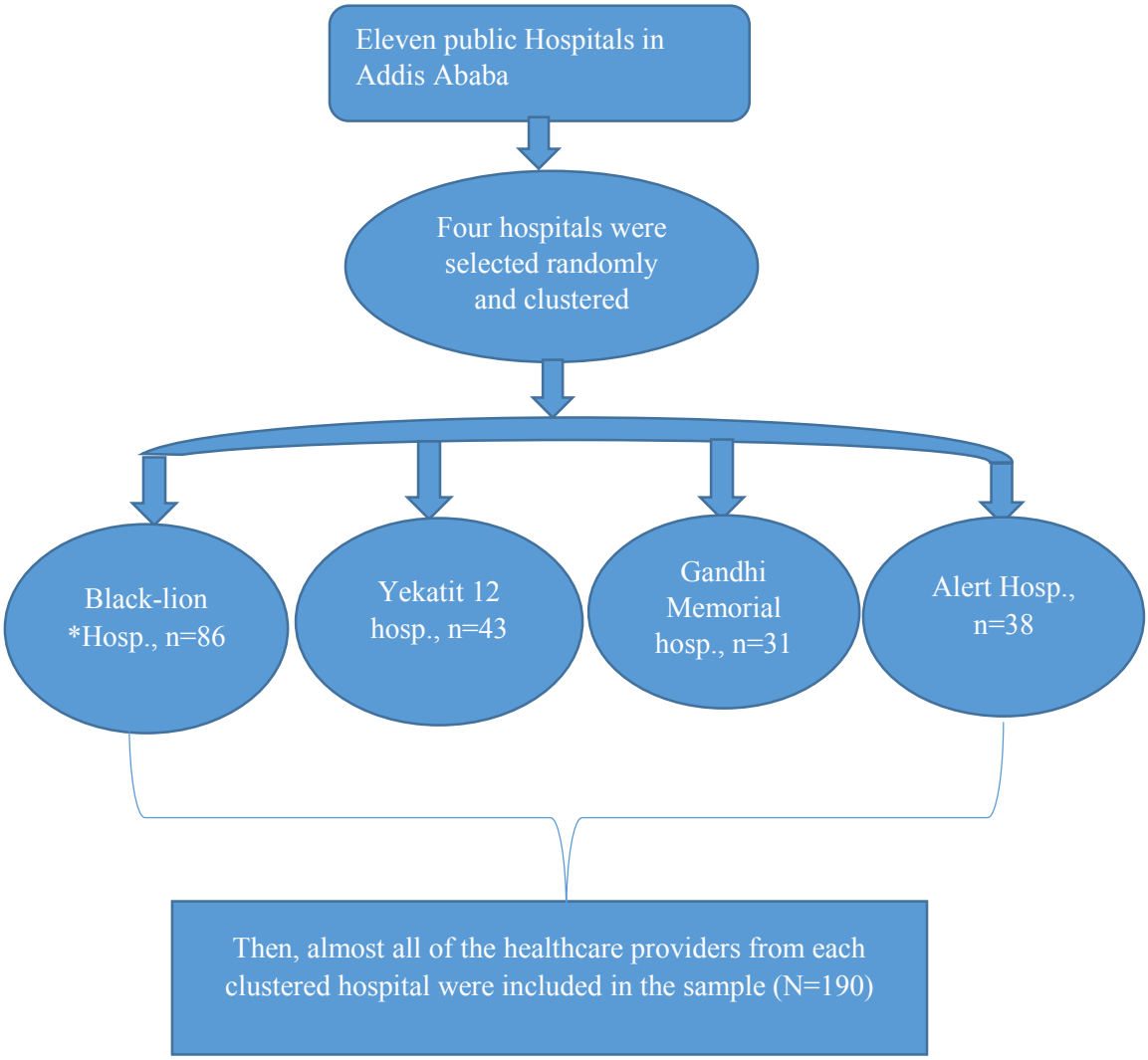
The ***sample size*** was calculated using the single population proportion formula, $n = (z_{\omega/2})^2 pq/e^2$, where;

- n= number of sample size.
- $Z\alpha_{/2}$ at 95%CI=1.96
- p = percentage of users of labour analgesia routinely, 13% (62)
- q =1-p; for this study, maximum variability is presumed, hence p = 0.13; q = 1-p=1-0.133=0.867
- e= level of precision at 95 % confidence level, i.e. 5% of Sample size=0.05

Therefore, by calculating 13 % at 95 % confidence level; $n = (1.96)2\ (0.13)(0.87)/(0.05)2 = 173$. Finally, 10% of the calculated sample size was added for incomplete answers giving total sample size, N of 190.

***Sampling Technique*:** the four public hospitals were selected randomly. Then, all of the healthcare providers who are supposed to be involved during labor pain management from each of the selected hospitals were included in the sample using cluster sampling technique.

Sampling procedure



Total number of healthcare providers from the sampling procedure was about 198, but only 190 self-administered questionnaires were prepared for data collection as per the expected sample size.

4.6. Study variables:

4.6.1. Dependent variable: practice of labour analgesia

4.6.2. Independent variables

- Socio-demographic characteristics: age, sex, profession, years of service, hospital of practice.
- Patterns of use of labor analgesia and types of labour analgesia provided
- Reasons for non-administration of labor analgesia (Fear of fetal distress to administer a drug, fear of adverse maternal side effects to administer a drug, late presentation of mothers for labor and delivery, fear of prolonged second stage of labor if drug is administered, availability of drugs and equipment, shortage of skilled man power, lack of emphasis towards labor pain management by health service management system)

4.7. Data collection technique and instrument

Training was given for three BSc holder data collectors comprising one midwife and two anesthetists, and one MSc holder Anesthesia professional as supervisor. Data were collected using a pretested self-administered questionnaire with multiple choice and open-ended questions on respondents' socio-demographic characteristics, use/non-use of obstetric analgesia for labour pain, the forms of labour analgesia provided and barriers adduced. Maternal health care providers were requested to complete the structured questionnaire following written informed consent. The trained data collectors were available to assist participants completing the questionnaire and clarified any questions that arose.

4.8. Data quality control

To assure the reliability and validity of the data, self-administered questionnaire was pretested on 10 healthcare providers working in Ras Desta Hospital, which is one of the public hospitals of Addis Ababa. It was thereafter corrected and modified for clarity. Training and orientation about the objectives and relevance of the study, each items included in the study tools and the whole process of data collection was provided for data collectors and supervisors. Informed consent was obtained from maternal health care providers and the proper information was gathered without limitation and frustration. During data collection, regular supervision and follow up had been undertaken. Supervisors checked each questionnaire daily with further cross check by principal investigator for completeness and consistency of data.

4.9. Data analysis and interpretation

After questionnaire clearance for completeness, Data was collated with Epi info statistical software (version 7.0, CDC, USA) and analyzed with SPSS windows statistical software (version 20.0, SPSS Inc., Chicago, IL) to determine the practice of labour analgesia in the study population. Results were presented using narratives, graphs, tables and charts. Conclusions were drawn by means of simple percentages or proportions. Univariate and bivariate analysis was performed, and appropriate tests were carried out to determine significant relationships between the dependent and independent variables, with the level of statistical significance set at $P < 0.05$.

4.10. Ethical consideration

The research was conducted after approval by Anesthesia department, Addis Ababa University. Official support letter was written to Black-lion, Alert, Gandhi, and Yekatit 12 Hospitals and permission for data collection was sought from the responsible authorities. Informed verbal consent was obtained from respondents after giving them information about the study. In addition, all the responses were kept confidential and anonymous.

4.11. Dissemination plan

The copies of final results will be disseminated to college of health science and medicine, Hospitals and health centers in Addis Ababa, Addis Ababa Health Bureau, Federal and Regional Ministry of Health, and Ethiopian Association of Anesthetists. After presentation on workshops and seminars, it will be published in multi-national and international languages.

5. RESULTS

Out of 190 questionnaires administered to healthcare providers, 177 of them were correctly filled and analyzed giving a respondent rate of 93%. Table 1 shows the bio-demographic characteristics of the participants. Ninety-eight (55.4%) were males, and the others 79 (44.6 %) females. Their ages ranged from 27 –51 years, with a mean age (±standard deviation) of 32.9

Table 1 Socio-demographic characteristics of participants (N=177), Addis Ababa, Ethiopia, 2016.

Characteristics	n, (%)
Sex	
Male	98 (55.4)
Female	79 (44.6)
Age (years)	
<=30	74 (41.8)
31-40	86 (48.6)
41-50	16 (9.0)
51-60	1 (0.6)
Profession	
Obstetrician/gynecologist	26 (14.7)
Midwife	61 (34.5)
Anesthesiologist	9 (5.1)
Anesthetist	81 (45.8)
Duration of practice/year of experience	
≤5	100 (56.5)
6-10	59 (33.3)
11-15	11 (6.2)
16-20	4 (2.3)
≥21	3 (1.7)
Hospital of practice	
Federal	112 (63.3)
Addis Ababa city administration	65 (36.7)

(±5.0) years. From the total healthcare providers on the study, 81 (45.8 %) anesthetists, 61 (34.5%) Midwives, 26 (14.7%) Obstetricians/gynecologists, and 9 (5.1%) Anesthesiologists were involved. The majority (100 or 56.5%) of practitioners have been in their respective professional practice for 5 years or less, while only three (1.7%) had practiced for 21 years or more. The mean duration of practice (±SD) was 5.71(±4.0) years. One hundred twelve (63.3%) practiced in federal hospitals, while the rest practiced in hospitals of Addis Ababa City Administration Health Bureau.

A total of 96 (54.2%) practitioners offered any form of labor analgesia to mothers in labor. Table 2 and figures 1 to 3 show the patterns of use of obstetric analgesia, types of obstetric analgesia used, and the overall frequency of usage of labor analgesics among health care providers. One

Table 2 practice, pattern of use of labor analgesia and types of labor analgesia offered by heath care providers (N=177), Addis Ababa, Ethiopia, 2016.

Characteristics	n, (%)
Labor analgesia practice	
Used/practiced	96 (54.2)
not used	81 (45.8)
Types of labor analgesic offered *	
Opioids systemic analgesics	63 (35.6)
Non-opioid systemic analgesics	35 (19.8)
Regional nerve block technique	15 (8.5)
Non-Pharmacological	84 (47.5)
N2O inhalation (Entonoux)	0 (0.0)
Pattern of use of labor analgesia	
Routinely	1 (0.6)
Sometimes	42 (23.7)
On maternal request	53 (29.9)
Never used	81 (45.8)
*Percentages do not add to 100% because respondents might use multiple techniques of labor analgesia at a time.	

respondent (0.6%) offered labor analgesia routinely, while 42 (23.7%) offered it sometimes and 10 (6.6%) on maternal request. Eighty-one respondents (45.8%) never practiced labor analgesia.

Non-pharmacological labor pain management techniques were the commonest form practiced by 84 respondents (47.5%), while 63 (35.6%) prescribed opioid systemic analgesic, 35 (19.8 %) used non-opioid systemic analgesics, and 15 (19.8%) of them practiced regional nerve block techniques. Pethidine injection was the most commonly used opioid by respondents, while psychological support was the only non-pharmacological technique used during labor and delivery. From non-opioid systemic analgesics, diclofenac injection was used by 23% of practitioners. Epidural nerve blockage was used by only 8 respondents (4.5%) among regional techniques of labor analgesia.

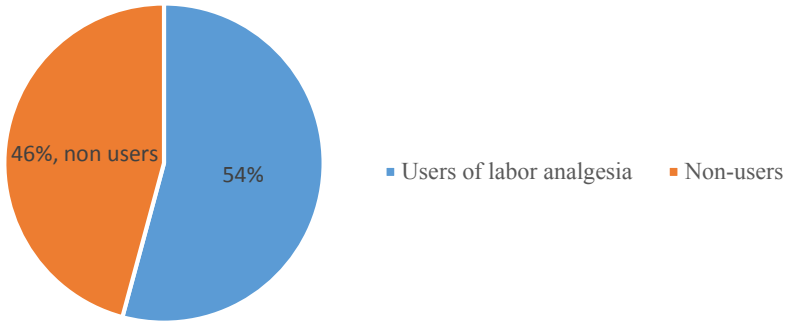


Figure 1. Pie chart showing overall usage rate of any form of labor analgesia by respondents (N=177), Addis Ababa, Ethiopa 2016.

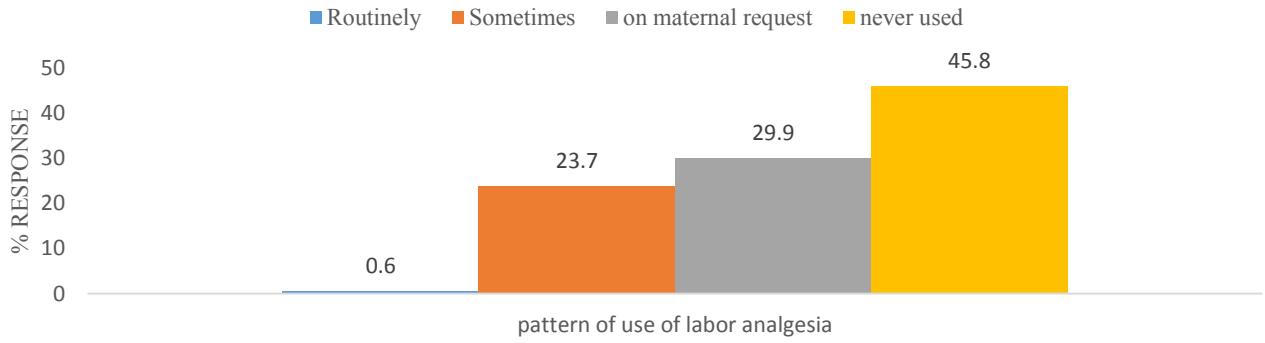


Figure 2. Patterns of labor analgesia practice by respondents (N=177), Addis Ababa, Ethiopia, 2016.

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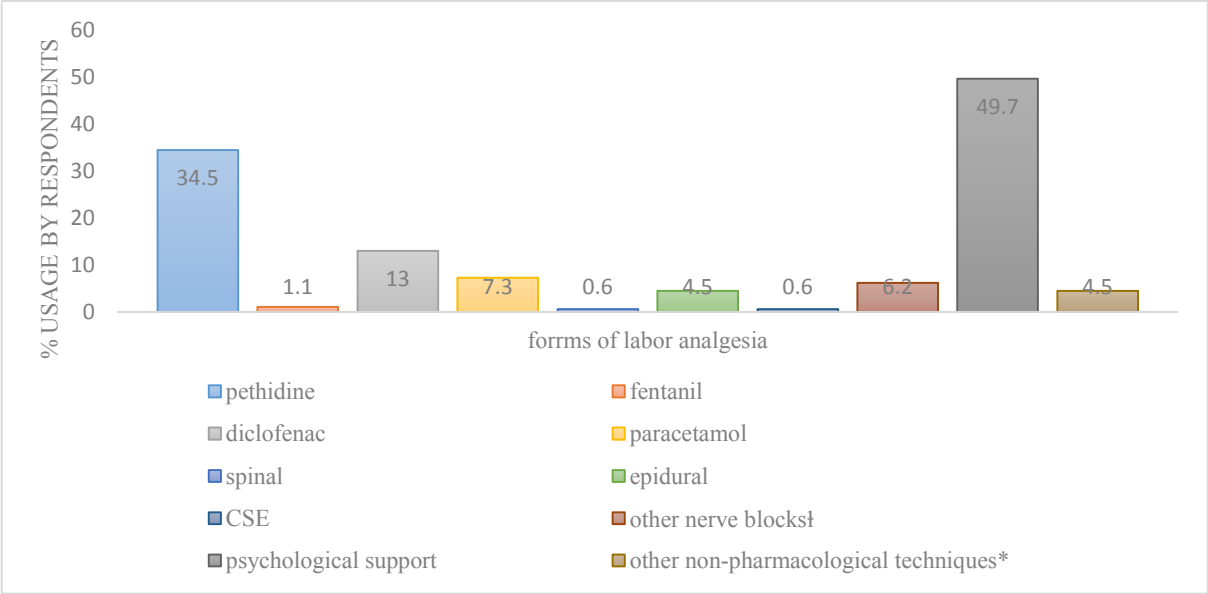

Figure 3. Rate of usage of different forms of labor analgesics by respondents (n=177), Addis Ababa, Ethiopia, 2016.**

*include allowing the family to be in the delivery room, ambulation, and massage

ł others include pudendal nerve block, and perineal infiltration of episiotomy area

**Percentages do not add to 100% because respondents might use multiple techniques of labor analgesia at a time.

CSE-combined spinal epidural

The major reasons adduced by respondents for not offering labor analgesia routinely or not at all were; non-availability of drugs and equipment 106 (59.9%), lack of emphasis towards labor pain management by health service management system 78 (44.1%), shortage of skilled man power to practice standard labor analgesic techniques 68 (38.4%), and fear of fetal distress to administer systemic analgesics 59 (33.3%), (Figure 4). Overall, 74 (41.8%) participants think that obstetric analgesia would offer women a better birth experience (Table 3).

The study inquired about healthcare providers' previous in-service and preservice education; whether the curriculum included provision of labor analgesia as one of core competencies or not, and results showed that about 117 (66.1%) of respondents had learned the practice as a core competency, while 59 (33.3 %) of them did not remember (Table 3).

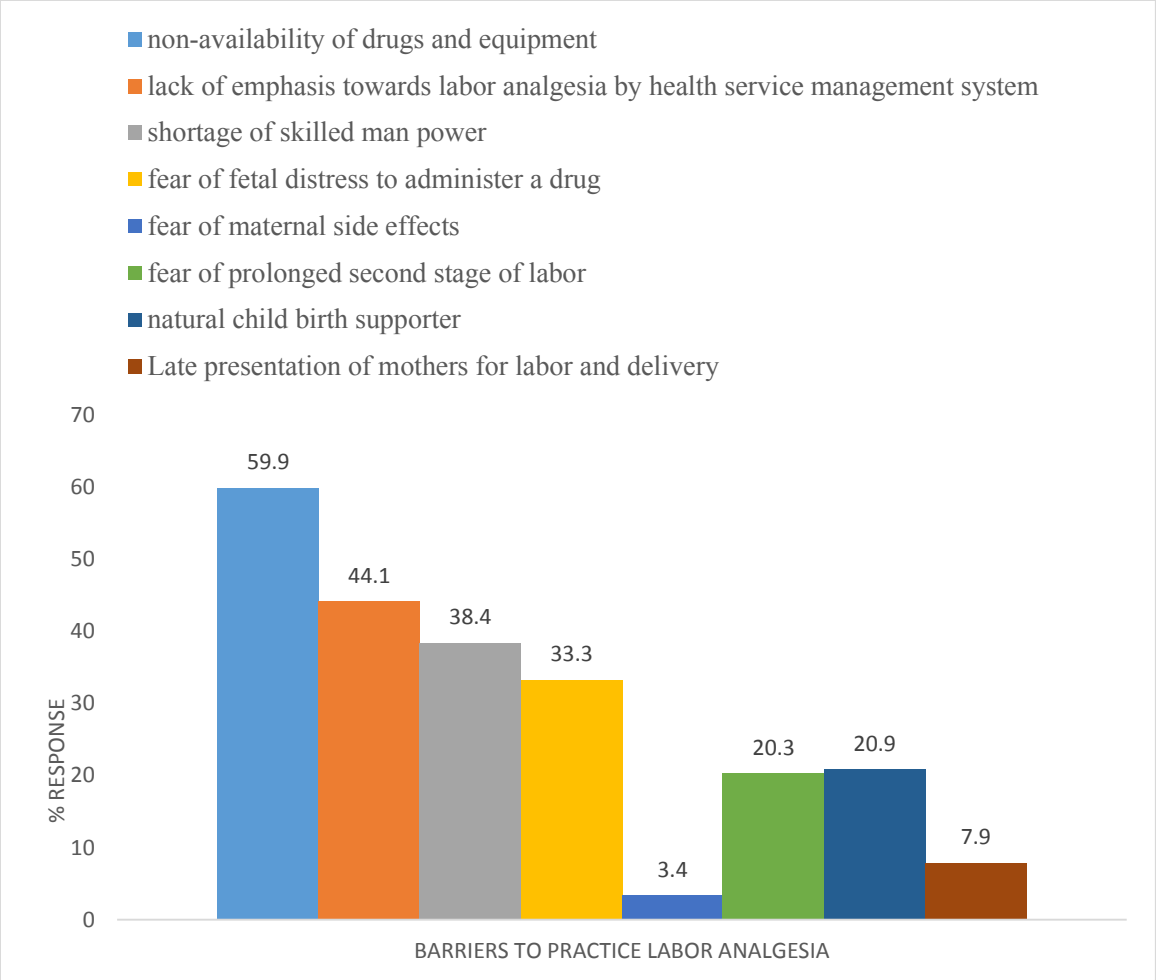

Figure 4. Barriers to practice labor analgesia by healthcare providers (N=177), Addis Ababa, Ethiopia, 2016. *

*Percentages do not add to 100% because respondents might give multiple reasons at a time.

Table 3 Participants' opinion on whether labor analgesia would offer a better birth experience and their view on their previous curricular activities (n=177), Addis Ababa, Ethiopia, 2016.

Characteristics	n, (%)
Opinion on whether labour analgesia would offer a better birth experience or not.	
Yes, it does.	74 (41.8)
Not sure	103 (58.2)
Participants view of their previous in-service and preservice education about labour analgesia in your	
Trained it as a core competencies	117 (66.1)
They don't remember	59 (33.3)
They didn't learn it at all	1 (0.6)

Healthcare practitioners working in federal hospitals were compared with those practitioners working in hospitals of Addis Ababa city administration for use/non-use of labor analgesia at 95% CI. The comparison showed no statistical significance (OR= 2.673, 95 % CI for OR= 0.790-9.043, and p-value=0.114). Similarly, responses to the practice of labor analgesia did not differ by years of experience (COR= 0.479, 95 % CI for OR= 0.176-1.302 and p-value=0.149). On the other hand, lack of emphasis towards labor pain management by health service management system (COR= 13.412, 95 % CI for OR= 5.873-30.626 and p-value<0.001) was statistically significant for non-using of labor analgesia by practitioners, i.e., when there is lack of emphasis towards labor analgesia, there could be 13 times more likelihood of non-usage of labor analgesia among healthcare providers. Shortage of skilled man power to practice standard labor analgesic techniques (OR= 0.208, 95 % CI for OR= 0.108-0.399 and p-value<0.001), non-availability of drugs and equipment (COR= 0.199, 95 % CI for OR= 0.101-0.391 and p-value<0.001) were statistically associated with the practice of labor analgesia by practitioners among the barriers adduced. This indicates shortage of skilled man power could be associated with o.21 times less likely to practice labor analgesia, while non-availability of drugs and equipment could be associated with 0.20 times less likely to practice labor analgesia.

6. DISCUSSION

This study is the first to assess healthcare providers' labor analgesia practice and perceived barriers in Ethiopia. It targeted clinicians who are supposed to be involved in the management of pain during labor and delivery. The vast majority of respondents never involved in the practice of labor analgesia (n=81, 45.8%), while only 0.6 % (n=1) of respondents administered labor analgesia routinely, 23.7% (n=42) offered it sometimes and 6.6% (n=10) on maternal request. Overall, 54.2% of respondents had provided any form of pain relief in labor including psychological support alone. These findings are not encouraging, especially when it is expected that women should be offered among other things, effective pain relief during labour. However, it is comparable with the finding in Zaria, Nigeria where a user rate of 48.8% was reported (1) and 38.9% in Benin (66).

Although the utilization of labor analgesia is very poor allover Africa (11), this study showed a very low figure as compared to the 13.3% routine use reported in Nigeria (62). It is also pertinent to note that all of the respondents in this study are from hospitals of the capital city of Ethiopia where most of senior clinicians are found out of the reach of majority of the populace who lives in rural communities, but with worrisome labor analgesia practice. Therefore, one can understand that the situation in many rural health institutions will probably be that no analgesia is available at all to women in labour. Working in federal hospitals and practitioners' duration of practice were not associated with greater report of labor analgesia practice (p=0.114 and p=0.149, respectively).

There are various techniques of providing obstetric analgesia which may be regional nerve block techniques, systemic pharmacological management approaches and non-pharmacological techniques. In this study, the forms of analgesia offered by participants to mothers during labour and childbirth were limited. Surprisingly, majority of the respondents (47.5%) offered psychological support, a form of non-pharmacological analgesia, even though there are inconsistent evidences about its efficacy to manage labor pain (67). Opioids, offered by 35.6% of the participants, were the commonest form of pharmacological analgesia utilized. This may be because opioids are readily available and do not require special skills to administer. Opioids, however, have limited pain relief effect (27-29). These results are consistent with the studies reported in Nigeria where opioids were offered by 41.1% of respondents, and psychological support by 39.7% of them. Regrettably, the gold standard technique of labor analgesic, epidural

nerve blockage, was employed only by 4.5% (n=8) of the practitioners in this study. This is probably due to the fact that, there are only small number of skillful Anesthesiologists and Senior Anesthesia Specialists whom responsibility is mainly during surgical procedures. However, it is comparable with the findings in Africa where an epidural analgesia user rate of 2.0 % was reported in Nigeria (62) and 2.2% in South Africa (65). As compared to the developing world, the rate of epidural labor analgesia usage is approximately 25% in UK (46, 47) and as many as 58% in USA (51) showing much greater discrepancy. Among the other pharmacological labor pain management techniques assessed in this study, non-opioid systemic analgesics (paracetamol and diclofenac) were offered by 19.8% of respondents. Pethidine injection was offered by most of the respondents as compared from other forms of pharmacological management of labor pain (n=61,34.5%). This is consistent with other studies done in different parts of the world (1, 29, 41, 57, 61 and 62).

According to the participants (mainly Anesthesiologists, Anesthetists, and Obstetricians) that did not offer pain relief to laboring mothers routinely or not at all, their actions were adduced by non-availability of drugs and equipment (e.g. epidural analgesia kit), lack of emphasis towards labor pain management by health service management system, and shortage of skilled man power to practice standard labor analgesic techniques like labor epidural. Each of these barriers were statistically significant with high impact on the practice of labor analgesia ($p<0.01$). On the other hand, fear of fetal distress to administer opioids was the top reason with statistical significance (OR=29.459, CI=2.559-339.134, and P=0.007) given by midwives for not offering labor analgesics among the other barriers adduced. Most of the reasons for non-administration of analgesia in labour by non-users corroborates with the results of study from Nigeria (1, 62). After all, the results showed that the practice of labor analgesia is worrisome in our setup. It is noteworthy that unrelieved labour pain may have deleterious effects on maternal and fetal health. Pain-induced stress accelerates oxygen consumption of a parturient which increases cardiac output and ventilation. In extreme cases, reflex hyperventilation leads to respiratory alkalosis manifesting with maternal tetany and fetal cardiac arrhythmia. Maternal respiratory tetany shifts the haemo-globin dissociation curve to the left, leading to deterioration of the transplacental oxygen transport. The sympathetic stimulation and increased endogenous catecholamine concentration cause uterine vasoconstriction, which reduces the utero-placental flow and is likely to lead to intrauterine fetal hypoxia and acidosis (3). Released catecholamines impair uterine contractile function, which prolongs the delivery and secondarily deteriorates the postpartum status of the newborn (4). Severe

labor pain can also have psychological consequences to the laboring mother which has been correlated with the development of post-traumatic stress disorder (3, 4, and 37). This goes to support the fact that clinicians through the practice of routinely offering obstetric analgesia can significantly improve the maternal and perinatal outcomes of pregnancy. Hence, healthcare professionals are enjoined to consider how their own values and beliefs inform their attitude to coping with pain in labour and ensure their care supports the woman's choice (13).

7. LIMITATION OF THE STUDY

This study assessed the practice of healthcare providers working in high volume public hospitals of Addis Ababa, the capital city of Ethiopia. Considering that most of the labor and delivery practices of the country are conducted by healthcare providers of private hospitals, primary health institutions and by traditional birth attendants within and outside the cities, seeking information about their analgesia practice from these health institutions and care givers would have enhanced the findings of this work. The results represent a baseline for our setup, but cannot fully address all potential barriers towards the practice of labor analgesia in Ethiopia. Furthermore, the study did not include administrative leaders. Understanding administrator attitudes towards the practice of labor analgesia is necessary when addressing hospital-level barriers including resource allocation and staffing. Finally, even if pretesting was utilized for questionnaire development and clearance, the study was limited in length and scope by timing of administration and feasibility. Potential interactions may exist between questions that may introduce response bias.

8. CONCLUSION AND RECOMMENDATIONS

8.1. Conclusion

Pain relief in labor is an important aspect of the management of pregnant women during child birth. It is desired by many women and contributes immensely to their satisfaction. Unrelieved, labour pain may impact negatively on the lives of parturient to such an extent that her baby and family may also be affected. Unfortunately, labor analgesia is rarely practiced in our setup by clinicians to all mothers in labor in keeping with international recommendations. This was related with the non-availability of drugs and equipment, lack of emphasis by the healthcare management system, shortage of skilled man power to practice standard analgesic techniques, and fear of maternal and fetal side effects to administer systemic analgesics among other barriers adduced by respondents. The poor practice of labor analgesia in the study facilities will notify all obstetric care givers and other responsible bodies of Health institutions to introduce pain relief services in a systematic way into the facilities.

8.2. Recommendations

Federal Ministry of Health, and health policy makers in Ethiopia should develop a national protocol on obstetric analgesia for obstetric caregivers. The protocol should be evidence-based and within the limits of available manpower, resources and technology in Ethiopia. It should be matched with training and retraining of obstetric caregivers to improve their acceptance and proficiency in the available forms of obstetric analgesia in the country. Efforts should also be made to address the respondents' reasons for non-provision of labor analgesia, as elucidated by this study. Larger survey-based studies are needed to understand how pervasive these barriers are across the broader of the country. An institutional framework that includes continuous professional education (CPD) and supply of required equipment will help care providers to bridge the gap between provision of pain relief services in labor and their knowledge, attitude, and skill. There is need for team work by all the stakeholders in the health sector and the government to achieve these. There is also need for ongoing research and appraisal of the forms and use of obstetric analgesia in the country with a view to ensuring that it is not only readily available, but that ultimately, the standard achieved meets the internationally accepted standards.

REFERENCES

1) Ogboli E, Adaji SE, Bature SB and Shittu OS. Pain relief in labor: a survey of awareness, attitude, and practice of health care providers in Zaria, Nigeria. J Pain Res. 2011. 4: 227–232.
2) Braveman FR, Scavone BM, Wong CA and Santos AC. Obstetrical Anesthesia. In: Barash PG, et al. 6th ed. Clinical Anesthesia. *Philadelphia: Lippincott Williams & Wilkins*, 2009: 1138-72.
3) Reynolds F. The effects of maternal labour analgesia on the fetus. *Best Practice & Research Clinical Obstetrics & Gynaecology*. 2010. *24*(3): 289-302.
4) Vallejo MC, Firestone LL, Mandell GL, et al. Effect of epidural analgesia with ambulation on labor duration. *The Journal of the American Society of Anesthesiologists*. 2001. *95*(4): 857-861.
5) Lowe NK. The nature of labor pain. *Am J Obstet*. 2002. 186: 16–24.
6) Tournaire M, Theau YA. Complementary and alternative approaches to pain relief during labor. *Evidence Based Complement Alternat Med*. 2007. 4 (4): 409–418.
7) Practice Guidelines for Obstetric Anaesthesia. An updated report by the American Society of Anesthesiologists task force on obstetric anesthesia. *Anesthesiology*. 2007. 106: 843–63.
8) ACOG Practice Bulletin № 36. Obstetric Analgesia and Anesthesia. 2002.
9) ACOG Committee Opinion№ 295. Pain relief during labor. *Obstet Gynecol*. 2004. 104:213.
10) United Nations. The Millenium Development Goals Report. United Nations Department of Economic and Social Affairs. June 2010.
11) Kuti O, Faponle AF, Adeyemi AB, Owolabi AT. Pain Relief in labour: A randomized controlled trial comparing pentazocine with Tramadol. *NJOG*. 2008. 3: 14–8.
12) Olayemi O, Aimakhu CO, Udoh ES. Attitudes of patients to obstetric analgesia at the University College Hospital, Ibadan, Nigeria. *J Obstet Gynecol*. 2003. 23: 38–40.
13) NICE clinical Guideline 55. Intrapartum care. Care of healthy women and their babies during child birth (Coping with pain in labor: non-epidural and pain relief in labor: regional analgesia): Guidance 1.4-1.5; 2009. http://publications.nice.org.uk/intrapartum-care-cg55/guidance.

14) Fairlie FM, Marshall L, Walker JJ, & Elbourne D. Intramuscular opioids for maternal pain relief in labour: a randomized controlled trial comparing pethidine with diamorphine. *BJOG: an international journal of obstetrics & gynecology*. 1999. *106*(11): 1181-1187.
15) Tveit TO, Halvorsen A, and Rosland JH. Analgesia for labour: a survey of Norwegian practice with a focus on parenteral opioids. *Acta Anaesthesiologica Scandinavica*. 2009. 53(6): 794-799.
16) Elbourne D and Wiseman RA. Types of intramuscular opioids for maternal pain relief in labour (Cochrane Review). In: Cochrane Library. *Update Software, Oxford* 4 2000.
17) Rebecca FA, Briggs LP, and. Carey MF. Epidural analgesia practices for labour: results of a 2005 national survey in Ireland. *European Journal of Anaesthesiology (EJA)*. 2009. 26(3): 235-244.
18) Astrid N, Edvardsson D, and Willman A. Epidural analgesia for pain relief in labour and childbirth: A review with a systematic approach. *Journal of Clinical Nursing*. 2004. 13(4): 455-466.
19) Keskin EA, Onur O, Keskin HL, et al. Transcutaneous electrical nerve stimulation improves low back pain during pregnancy. *Gynecologic and obstetric investigation*. 2012. *74*(1): 76-83.
20) Pitangui, Ana Carolina Rodarti, et al. High-frequency TENS in post-episiotomy pain relief in primiparous puerpere: A randomized, controlled trial. *Journal of Obstetrics and Gynaecology Research*. 2012. 38(7): 980-987.
21) Cyna AM, McAuliffe GL, and Andrew MI. Hypnosis for pain relief in labour and childbirth: a systematic review. *British Journal of Anaesthesia*. 2004. 93(4): 505-511.
22) Lee, Hyangsook, and Edzard Ernst. Acupuncture for labor pain management: a systematic review. *American journal of obstetrics and gynecology.* 2004. 191(5): 1573-1579.
23) Kvorning Ternov N, et al. Acupuncture for pain relief during childbirth. *Acupunct Electrother Res.* 1998. 23:19-26.
24) Howell CJ, et al. A randomised controlled trial of epidural compared with non-epidural analgesia in labour. *BJOG: An International Journal of Obstetrics & Gynaecology.* 2001. 108(1)): 27-33.
25) Fyneface-Ogan SCM, Mato N, and Anya SE. Epidural anesthesia: Views and outcomes of women in labor in a Nigerian hospital. *Annals of African medicine.* 2009. 8(4): 250-256.

26) El-Wahab, Niveen, and Neville Robinson. Analgesia and anaesthesia in labour. *Obstetrics, Gynaecology & Reproductive Medicine.* 2011. 21(5): 137-141.

27) Ullman R., Smith LA, Burns E., et al. Parenteral opioids for maternal pain management in labour. *The Cochrane Library*. (2010).

28) Anderson, D. A review of systemic opioids commonly used for labor pain relief. *Journal of Midwifery & Women's Health*. 2011. *56*(3): 222-239.

29) Bricker, Leanne, and Tina Lavender. Parenteral opioids for labor pain relief: a systematic review. *American journal of obstetrics and gynecology*. 2002. 186(5): S94-S109.

30) Cho, SH., Lee H., and Ernst E. Acupuncture for pain relief in labour: a systematic review and meta-analysis. *BJOG: An International Journal of Obstetrics & Gynaecology*. 2010. 117(8): 907-920.

31) Huntley, Alyson L., Joanna Thompson Coon, and Edzard Ernst. "Complementary and alternative medicine for labor pain: a systematic review." *American Journal of Obstetrics and Gynecology*. 2004. 191(1): 36-44.

32) Trout, Kimberly K. The neuromatrix theory of pain: Implications for selected non-pharmacologic methods of pain relief for labor. *Journal of midwifery & Women's Health.* 2004. 49(6): 482-488.

33) Fogarty, Vikki. Intradermal sterile water injections for the relief of low back pain in labour: A systematic review of the literature. *Women and birth*. 2008. 21(4): 157-163.

34) Simkin, Penny P., and MaryAnn O'Hara. Nonpharmacologic relief of pain during labor: systematic reviews of five methods. *American Journal of Obstetrics and Gynecology.* 2002. 186(5): S131-S159.

35) Hawkins JL. Epidural analgesia for labor and delivery. *N Engl J Med*. 2010; 362:1503–1510.

36) Hiltunen, Pauliina, et al. Does pain relief during delivery decrease the risk of postnatal depression? *Acta obstetricia et gynecologica Scandinavica*. 2004. 83(3): 257-261.

37) Soet, Johanna E., Gregory A. Brack, and Colleen DiIorio. Prevalence and predictors of women's experience of psychological trauma during childbirth. *Birth*. 2003. 30(1): 36-46.

38) Federal Ministry of Health (FMOH). Standard of midwifery care practice in Ethiopia. Addis Ababa (Ethiopia): 2013 Aug. 64p (*clinical standard; no. 1*).

39) Hodnett ED. Pain and women's satisfaction with the experience of childbirth: a systematic review. Am J Obstet Gynecol. 2002. 186: S160-S172.

40) Kannan S, Jamison RN, Datta S. Maternal satisfaction and pain control in women electing natural childbirth. *Reg Anesth Pain Med.* 2001. 26:468-72.

41) Jones, Leanne. Pain management for women in labour: an overview of systematic reviews. *Journal of Evidence-Based Medicine*. 2012. 5(2): 101-102.

42) Klomp T., van Poppel M., Jones L., et al. Inhaled analgesia for pain management in labour. *Cochrane Database Syst Rev*, *9*. (2012).

43) Veilleux JC, Colvin PJ, Anderson J, et al. A review of opioid dependence treatment: pharmacological and psychosocial interventions to treat opioid addiction. *Clinical Psychology Revie.* 2010. *30*(2): 155-166.

44) Anim-Somuah, Millicent RM, Smyth, and Jones L. Epidural versus non-epidural or no analgesia in labour. *Cochrane Database Syst Rev,* 12. (2011).

45) Howell CJ, et al. A randomized controlled trial of epidural compared with non-epidural analgesia in labour. *BJOG: An International Journal of Obstetrics & Gynaecology.* 2001. 108(1): 27-33.

46) Khor LJ, et al. National obstetric anaesthetic practice in the UK 1997/1998. *Anaesthesia*. 2000. 55(12): 1168-1172.

47) Baraz R, & Collis RE. The management of accidental dural puncture during labour epidural analgesia: a survey of UK practice. *Anaesthesia*. 2005. *60*(7): 673-679.

48) Veilleux, Jennifer C., et al. A review of opioid dependence treatment: pharmacological and psychosocial interventions to treat opioid addiction. *Clinical Psychology Review*. 2010. 30(2): 155-166.

49) Othman, Mohammad, Leanne Jones, and Neilson JP. Non-opioid drugs for pain management in labour. *The Cochrane Library.* (2012).

50) Evron, Shmuel, and Tiberiu Ezri. Options for systemic labor analgesia. *Current Opinion in Anesthesiology*. 2007. 20(3): 181-185.

51) Declercq, Eugene R., et al. Listening to Mothers II: Report of the Second National US Survey of Women's Childbearing Experiences: Conducted January–February 2006 for Childbirth Connection by Harris Interactive® in partnership with Lamaze International. *The Journal of perinatal education.* 2007. 16(4): 9.

52) Chuntharapat, Songporn, Wongchan Petpichetchian, and Urai Hatthakit. Yoga during pregnancy: effects on maternal comfort, labor pain and birth outcomes. *Complementary therapies in clinical practice.* 2008. 14(2): 105-115.

53) Phumdoung, Sasitorn, and Marion Good. "Music reduces sensation and distress of labor pain." *Pain Management Nursing*. 2003. 4(2): 54-61.

54) Måtensson, Lena, and Gunnar Wallin. Labour pain treated with cutaneous injections of sterile water: a randomized controlled trial. *BJOG: An International Journal of Obstetrics & Gynaecology*. 1999. 106(7): 633-637.

55) Eckert, Kerena, Deborah Turnbull, and Alastair MacLennan. "Immersion in water in the first stage of labor: a randomized controlled trial. *Birth*. 2001. 28(2): 84-93.

56) Davis MW, et al. Current practice of epidural analgesia during normal labour: A survey of maternity units in the United Kingdom. *Anaesthesia.*1993. 48: 63-65.

57) Jacek Furmanik. Labour epidural analgesia in Poland in 2009: a survey. *Anesthesiology Intensive Therapy*. 2013. 45(3): 149–152.

58) Hughes D, Simmons SW, Brown J, Cyna AM. Combined spinal- epidural versus epidural analgesia in labour. Cochrane Database Syst Rev. 2003. (4): CD003401.

59) Hepner DL, Gaiser RR, Cheek TG, Gutsche BB. Comparison of combined spinal-epidural and low dose epidural for labour analgesia. *Can J Anaesth*. 2000; 47:232–6.

60) Gambling, Berkowitz J, Farrell TR, et al. A Randomized Controlled Comparison of Epidural Analgesia and Combined Spinal-Epidural Analgesia in a Private Practice Setting: Pain Scores During First and Second Stages of Labor and at Delivery. *Anesth Analg*. 2013. 116(3):636–43.

61) Solek-Pastuszka J, Zagrodnik-Ulan E, Bohatyrewicz R and Celewicz3 Z. Remifentanil for labour pain relief. *Anaesthesiology Intensive Therapy*. 2015. 47 (1): 82–86.

62) Lawani, Lucky O, et al. Obstetric analgesia for vaginal birth in contemporary obstetrics: a survey of the practice of obstetricians in Nigeria. *BMC pregnancy and childbirth*. 2014. 14(1): 140.

63) Quality Plan for the Spanish National Healthcare System of the Spanish Ministry for Health. Clinical practice guideline on care in normal childbirth. Madrid (Spain): Basque Office for Health Technology Assessment, Osteba; 2010 Oct 1. 316 p. (*Clinical Practice Guidelines* in the Spanish National Healthcare System: Osteba; no. 2009/01).

64) National Collaborating Centre for Women's and Children's Health. Intrapartum care: care of healthy women and their babies during childbirth. London (UK): National Institute for Health and Care Excellence (NICE); 2014 Dec. 108 p. (*Clinical guideline*; no. 190).
65) Jacob Martin G. et al. Labour epidural analgesia audit in a tertiary state hospital in South Africa. *Southern African Journal Anaesthesia and Analgesia.* 2014. 20(4):174–178.
66) Imarengiaye CO. Trends in pain relief in labor: Implications for obstetric analgesia services in Nigeria. Niger Postgrad Med. 2005. 12(3):193–202.
67) Cynthia AW. Advances in labor analgesia. Int J Womens Health. 2009. 1:139–154.

ANNEX

I. INFORMATION SHEET

Hello,

My name is Hailemariam Mulugeta. I have been attending postgraduate program in Anesthesia at Addis Ababa University. I am going to conduct research on the practice of labour analgesia among health care providers working in public hospitals of Addis Ababa from Feb 1 to 30, 2016. The information which is going to be gathered will hopefully help policy makers, healthcare providers and other responsible bodies to improve quality of the service for better maternal and foetal outcome during labor and delivery. Your genuine response is very helpful for the success of this study. Your participation in filling the questionnaire is completely voluntary. All your responses will be completely confidential. Your name will not be mentioned or be attached to anything that you say and all of your responses we get here is for research purposes only.

Are you willing to continue? yes_____ No_____ (Thank you very much for your help!)

Name and contact address of invesigator:

Hailemariam Mulugeta

e-mail hmerry1990@gmail.com

Cell phone +251 923 68 07 14 or +251 970 41 52 08

A.A, Ethiopia

Part I: Socio-demographic characteristics of respondents (Mark √ in the boxes provided in front of your answer)

1. Sex: male□ female□
2. Age (years): ≤30□ 31-40□ 41-50□ 51-60□ ≥61□
3. Profession: Obstetrician/Gynecologist□ Midwife□ Anesthesiologist□ Anesthetist □
4. Duration of practice (years): ≤5□ 6-10□ 11-15 □ 16-20□ ≥21□
5. Hospital of practice: federal state□ Addis Ababa city administration□

Part II: pattern of use and type of labour analgesia offered among maternal healthcare providers who provided obstetric analgesia. (Mark √ in the boxes provided in front of your answer)

1. Pattern of use: Routinely□ Sometimes□ on maternal request□ never used□
2. Which types of obstetric analgesia do you have offered for normal vaginal delivery?

2.1 Opioid:

pethidine□ Others(specify_____

morphine□ _____

fentanyl□ _____)

remifentanil□

2.2 Non-opioid: paracetamol □ aspirin□ Diclofenac□

2.3 Entonoux (nitrous oxide, N_2O inhalation) □

2.4 Regional analgesia:

spinal□ Other nerve block technique used(specify:_____

Epidural□ _____

Combined spinal epidural□ _____)

2.5 Nonpharmacologic:

Biofeedback□ Subcutaneous water injection□

Music therapy□ Water immersion □

yoga□ Psychological support□

Acupuncture/pressure□ Others (specify:_____)

Part III: Challenges and reasons for not administering obstetric analgesia among maternal healthcare providers who have not provided obstetric analgesia routinely or not at all. (Mark √ in the boxes provided in front of your answer)

1. No reason□
2. Non-availability of drugs and equipments (e.g. epidural analgesia kit) □
3. Fear of fetal distress □
4. Fear of adverse maternal effect□
5. Late presentation in labour□
6. Fear of prolonged 2nd stage of labour□
7. Belief that labour is natural (supporter of natural child birth) □
8. Providers think it's not necessary □
9. Decline by patient □
10. Shortage of skilled man power (e.g. to practice regional analgesia technique) □
11. lack of emphasis towards labor pain management by health service management system. □
12. Others (specify: _____)

Part IV: Respondents opinion on whether obstetric analgesia could offer a better birth experience. (Mark √ in the boxes provided in front of your answer)

1) Does labour analgesia offer a better birth experience? Yes□ Not sure□ No□

PART V: Respondents opinion on healthcare providers' preservice and inservice education on the provision of labour analgesia for normal vaginal delivery in Ethiopia.

1) Has the curricullum incorporated provision of labour analgesia for normal vaginal delivery as one of the core competencies in your previous inservice and preservice education ? Yes□ I don't remember□ No□

Name of data collector _____signature _____date _____

Name of supervisor _____signature _____date _____

Thank you.

II. DECLARATION

I undersigned declare that this student research paper is my original work and all the materials used for this study have been duly acknowledged. With this topic; no research has been done in this and another universities of Ethiopia by any one.

Name of principal investigator: Mr. Hailemariam Mulugeta (BSc)

Date _____ Signature _____

This student research paper has been submitted for examination with my approval, university advisor.

Name of advisor: Ms. Misrak Weldeyohannes (BSc, MSc)

Date _____ Signature _____