

JIMMA UNIVERSITY INSTITUTE OF HEALTH



MAGNITUDE, OUTCOMES AND FACTORS ASSOCIATED WITH INDUCTION OF LABOR AMONG MOTHERS WHO GAVE BIRTH AT ATTAT PRIMARY HOSPITAL, GURAGE ZONE, SOUTH REGION, ETHIOPIA, 2017.

By: LEBESE TSEGA (BSC)

A RESEARCH THESIS SUBMITTED TO THE HEALTH RESEARCH AND GRADUATING STUDIES COORDINATING OFFICE, JIMMA UNIVERSITY MEDICAL CENTER INSTITUTE OF HEALTH; IN PARTIAL FULFILLMENT OF THE REQUIREMENT DEGREE OF MASTER IN INTEGRATED EMERGENCY SURGERY (OBSTETRICS, GYNECOLOGY AND GENERAL SURGERY)

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Advisor

1. Fanta Asefa (MD, Assistant professor and consultant in obstetrics and gynecology).
2. Yasin Negash (BSC, Assistant professor and Biostatistics).

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Abstract

Background: Induction of labor performed following an appropriate medical and obstetrical indication is potentially life-saving procedure. Induction is indicated when the benefits to either mother or fetus outweigh those of pregnancy continuation. Induction is expected not only to achieve vaginal delivery but also to improve both maternal and perinatal outcomes in comparison with permitting pregnancy to continue.

Objective: To determine the magnitude of induced labor and associated factors for success of induction among mothers gave birth at Attat primary hospital Gurage zone, Ethiopia from, 2017.

Methods: Institutional based Prospective Cross sectional study design was conducted on 110 pregnant mothers from January 1, 2017 to June 30, 2017 G.C at Attat primary Hospital. 6 data collectors and 2 supervisors were trained and involved in data collection process. Then data collected using structured questionnaire which was prepared in English and face to face interview was applied to collect the data. Data was checked and coded and analyzed using SPSS version 22. Descriptive statistics (frequency percentage, mean and standard deviation) was used to describe the study variables. An odds ratio (95% confidence intervals) and Logistic regression analysis was used to determine the association of different factors with success of induction of labor. A $P < 0.05$ was considered statistically significant in all tests of significance

Result: A total of 110 women were induced, 6.4% of women who undergone induction had failed induction. Oxytocin IV infusion was the most method used for the purpose of induction and premature rupture of labor was the leading indication for induction (44.5%). Bishop score, AOR=14.2 (3.1-64.5), gravidity, AOR=5.7(1.42-22.98), Mothers who had cervical ripening before induction AOR= (1.06-67.23), and induction by intravenous oxytocin, AOR=7.8(2.11-28.94) has been shown to be the main predictor of successful induction.

Conclusion and recommendation: The magnitude of induction of labor in this study was low and majority of the outcome is success. Bishop score, gravidity, cervical ripening and induction by intravenous oxytocin, fetal weight had association with success of induction and recommended to assess the cervix status (using the Bishop score), preinduction cervical ripening before induction is recommended for the success of induction.

Keywords: Induction of labor, Success of induction of labor, all delivered mother, Ethiopia

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ABBREVIATION

ANC	Antenatal Care
ARM	Artificial Rupture of the Membranes
BMI	Body Mass Index
BOH	Bad Obstetric History
CS/CD	Caesarean Section /Caesarean delivery
CPD	Cephalo-Pelvic Disproportion
HIC	High Income Countries
HDP	Hypertensive Disorder of Pregnancy
IOL	Induction of Labor
ICU	Intensive Care Unit
IUFD	Intrauterine Fetal Death
LMIC	Low and Middle Income Countries
MMR	Maternal Mortality Ratio
MDG	Millennium Development Goal
NRFHRP	None Reassuring Fetal Heart Rate pattern
OVD	Operative Vaginal delivery
PROM	Premature Rupture Of Membrane
SVD	Spontaneous Vaginal Delivery
SSA	Sub-Saharan Africa
SDG	Sustainable Development Goal
UK	United Kingdom
US	United State
WHO	World Health Organization

CHAPTER ONE- INTRODUCTION

1.1 BACKGROUND

Induction of labor refers to the iatrogenic stimulation of uterine contractions before the onset of spontaneous labor to accomplish vaginal delivery. Induction is indicated when the benefits to either mother or fetus outweigh those of pregnancy continuation(1).The more common indications include membrane rupture without labor, hypertension disorder of pregnancy, oligohydramnios, non-reassuring fetal status(NRFS), post term pregnancy, and various maternal medical conditions such as chronic hypertension and diabetes (2).Induction of labor for maternal request/social reasons alone should be strongly discouraged, however, under exceptional circumstances induction may be considered at or after 40 weeks. If a woman requests induction of labor (IOL) for social reasons then the midwife should fully inform the woman of the risk and disadvantages of IOL (3).

The World Health Organization (WHO) recommends induction should be performed with clear medical and obstetric indications when expected benefits outweigh potential harms (4). The major concerns associated with elective (“social”) induction of labor at term are the potential for increased rates of cesarean delivery, neonatal morbidity from prematurity or early term birth, and cost. Successful labor induction varies widely depending up on several factors (5).Variation exists in prevalence of the labor induction procedure across countries, with rates ranging from 1.4 percent to 35 percent (6). The rate of labor induction has increased significantly since the early 1990s and continues to involve a significant percentage of pregnancies, removing women from the advantageous natural process of labor (7).In developed countries, the proportion of infants delivered at term following induction of labor can be as high as one in four deliveries(8). Elective labor induction is an increasingly common practice not only in high-income countries, but also in many low-income and middle-income countries (9). Induction of labor (indicated and elective) is generally less common in lower- income than higher income countries, exceptions (such as Sri Lanka and India (10).

1.2 Statement of problem

The number of women and girls who died each year from complications of pregnancy and childbirth declined from 532,000 in 1990 to 303,000 in 2015. Still, over 830 women are dying each day from complications in pregnancy and childbirth. Almost all maternal deaths (99 %) occur in developing regions (11). Based on MMR estimates for 2015, we constructed projections to show the requirements for the Sustainable Development Goal (SDG) of less than 70 maternal deaths per 100,000 live births globally by 2030 (12). Maternal mortality remains unacceptably high in sub-Saharan-Africa. Almost all maternal deaths can be prevented, as evidenced by huge disparities found between richest and poorest countries (11). The required acceleration in reducing maternal mortality will not be possible without clinical and non-clinical interventions, as well as political and policy action (13).

An analysis of the WHO Global Survey on Maternal and Neonatal health dataset was used to try to understand the patterns and outcomes of IOL in Africa and Asia. The results suggested that IOL was generally less common in lower and middle income countries (LMIC) than in higher income countries (HIC). Japan, the highest income country, had an induction rate of 19.0 % (10). The problem was low rate of induction was present in Africa, even though rates of induction of labor were variable from country to country, 1.4% in Niger and 6.8% in Algeria, in Africa truly have the lowest rates of induction of labor (14). Ethiopia, including the study area, induction of labor is a commonly performed procedure but there is a limitation in under taking a study on the magnitude and factors associated with its failure (14). The outcomes of labor induction are multifactorial, involving the synergistic influences of the patient, provider, system, and the intervention itself (labor induction) (16).

Because of the risk of failed induction of labor, a variety of maternal and fetal factors as well as screening tests have been suggested to predict labor induction success. These include maternal factors such as parity, height, weight, body mass index (BMI), maternal age, Bishop Score and its individual components and fetal factors such as birth weight and gestational age (1). Induced labor has an impact on the birth experience of women. It may be less efficient and is generally more painful than spontaneous labor and always not end with vaginal delivery. The greatest maternal risk of induction of labor is the risk of morbidity associated with CS for failed induction and for other obstetric indications like non-progress of labor and fetal distress (16). Induction of

labor is a major intervention and best used only when medically indicated (17). Induction without any medical and obstetric indications were more likely than those who delivered spontaneously to require drugs to manage postpartum hemorrhage, be admitted to the intensive care unit, pain-relieving medications, procedures during labor including undergo hysterectomy and delay initiation of breast-feeding(18). Despite the fact that IOL plays a vital role in reduction of maternal perinatal mortality, the magnitude ,the success rate of induction, and associated factors that contributes to it is not studied in the study area. Therefore, this study will help to fill this gap by identifying factors related to health indications for labor induction, methods of induction, demographic factors and obstetric history.

1.3 Significance of study

The importance of this study was to evaluate the magnitude of labor induction, success and factors associated with successful IOL. To the best of researcher knowledge there is a paucity of such studies in literature in this country. This enables the institution and the health care providers to have data when counseling women for induction. It also helps in informing evidence-based protocols on induction of labor in a local setting. Therefore, knowledge of the determinants of IOL outcome in hospitals may be employed as a foundation for a database to monitor rates, and outcome of IOL in similar hospitals found in the country. It can also be used to improve future quality of care provided for woman who needs induction of labor in the hospital.

CHAPTER TWO: LITRATURE REVIEW

2.1 Prevalence of induction

Induction of labor with the goal of achieving vaginal delivery prior to spontaneous onset of labor is recommended when the benefits of delivery outweigh the risks of continuing the pregnancy (19). The reason for inducing labor may be due to maternal problems, fetal problems or sometimes because of social issues (20).

Induction of labor (IOL) is a common obstetric procedure: about 20% of pregnant women will have labor induced (21). According to WHO, up to 25% of all deliveries at term involve induction of labor in developed countries, but generally lower in developing countries. However, in some settings in developing countries induction of labor is as high as those observed in developed countries (4). According 2010 data from the National Vital Statistics System, in the United States, labor induction procedure was performed in 23.4 percent of all deliveries (22). In the United Kingdom, induction of labor was performed in approximately 22.1 percent of all deliveries in 2011-2012(23), while in Australia the procedure was performed in 25.4 percent of all deliveries (24).

WHO Global Survey dataset to describe the epidemiology and outcomes of labor induction in 192,538 deliveries in 253 facilities across 16 countries in Africa and Asia, Induction accounted for 4.4% (Africa) and 12.1% (Asia) of deliveries.

Elective induction account for 10-15% of all deliveries in the US (19). A Secondary Analysis of the WHO Global Survey on Maternal and Neonatal Health after IOL in Africa and Asia; Induction without medical indication accounted for less than 2% of deliveries in all countries, except for Sri Lanka (27.8%), Japan (8.5%), India (3.6%) and Thailand (3.5%)(10).

Study in Congo, among 3512 deliveries registered in our maternity during the period of the study 115 patients at term (3.2%) was concerned with induction of labor (25).

There is a study done in Ethiopia in 2004, According to this two years 'retrospective case-series from two teaching hospitals in Addis Ababa, the prevalence of induction at term and post-term was 4% in both institutions(26).

A study conducted about the prevalence and factors affecting success of induction of labor among women attended induction in army referral and teaching hospital Addis Ababa Jun 2015, of the included 347 women, 167(48.1%) undergone induction of labor for premature rupture of membranes (PROM), 122 (35.2%) for post-date, while 42(12.1%) for medical disorders with pregnancy. Out of the total 207 (59.7%) of the women delivered vaginally within 12 hour after induction was started, while 132 (37.8%) delivered by Cesarean section (CS); from this, 92 (26.5%) undergone CS due to failed induction of labor that means unable to deliver vaginally within 12 hour, 24 (6.9%) were due to fetal distress, while the rest were due to different reason like Cephalo-pelvic disproportion and malposition (27).

Study conducted in Hawasa, Reasons for cesarean section among women were: CPD 20(6.8%), fetal distress 42(14.3%) and failure of induction 51(17.3%), and the prevalence of failed induction of labor was 17.3%.The result showed that the predominant indications for induction of labor in the study area were premature rupture of membrane, Preeclampsia, Post term and Chorioamnionitis. The most commonly used methods of induction of labor in the study were oxytocin infusion (73.5%) and oral or vaginal misoprostol 26.5% (28).

Study conducted to analyze outcome of induction with oxytocin and associated factors among 280 mothers who delivered at term and post-term in Jimma University Specialized Hospital, 17(6.1%) was induced without reason. Indication for induction; PROM 102(36.4%), Hypertension 96(34.3%), Post-term 65(23.2%) (29).

2.2 Outcome and associated factors

WHO Global Survey in Latin America, of the 11 077 inductions registered in the database vaginal delivery was attained in 88.2% of all elective inductions, 1847(17%) Caesarean sections were performed in 11.8% of women with low-risk pregnancies who underwent elective labor induction and, Oxytocin administration was the single most frequently used induction method (65.9%), whereas misoprostol was used to induce only 8.9% of the deliveries Four women who had elective induction of labor had a hysterectomy; two of them were nulliparous and all had been induced with oxytocin (18).

Study in Stanford University, We found that overall expectant management of pregnancy was associated with an approximately 22% higher odds of cesarean delivery than elective induction of labor (30). A study conducted in Hospital Barcelona, Spain about failed IOL, concluded that cesarean section rates and assisted vaginal delivery rates are not increased by IOL at term when a medical indication exists. The rate of cesarean delivery was 1.0 percent in the women who were electively induced and 6.7% in those expectantly managed. Additionally, the authors found better neonatal outcomes in the induced group as well a lower rate of 5-minute Apgar scores 7 or less (3.7% versus 17.6%), lower overall neonatal morbidity (3.4% versus 7.0 %), and neonatal mortality (0.5% versus 1.7%)Cervical status, mainly measured by the Bishop score and parity, has been shown to be the main predictor of successful induction(31).

The cohort included 28 626 women with a singleton pregnancy, cephalic presentation at gestational age of 37⁺⁰ weeks or more, who gave birth in South Australia from January 2006 to December 2007, Women were least likely to achieve vaginal birth following both induction for recognized (66.62% SVD and 15.4% forceps/vacuum delivery) and non-recognized indication (58.89% SVD and 15.02% normal birth/vaginal delivery) when compared with SOL (73.17% SVD and 12.8% forceps/vacuum delivery). Conversely, women whose labor was induced for non-recognized indications had an increased risk of cesarean birth (SOL: 13.86, recognize IOL: 17.98% and non-recognized IOL; 26% of CD). Infant outcomes by onset of labor: Death, 0.14%, 0.14% and 0.41% for SOL, recognized IOL and unrecognized IOL respectively. 5 minute Apgar <7 was 0.93% , 1.02% and

1.24% while NICU admission 8.19% ,9.13% and 14.03% for SOL, recognized IOL and unrecognized IOL respectively(32).

Study done on factors associated with failed induction of labor in a secondary care hospital, in Pakistan women undergoing caesarean section were significantly more likely to have gestational age more than 40 weeks (47.7%) than women having vaginal delivery (36.7%) after IOL. It was also observed that women having failure of induction were 2.5 times more at odds of having macrocosmic babies (3.8%) than patients with successful inductions (1.5%) and in Pakistan reported that failed induction rate was 4.6 times higher in nulliparous patients compared to their multiparous counterparts(33).

On A hospital based prospective study done in Kathmandu Medical College Teaching Hospital, Nepal of the 156 cases who had IOL, 91 (58.33%) underwent vaginal deliveries and 11 (7.05%) had instrumental deliveries. Hence, 102 (65.38%) of the study group had successful induction while 54 cases from the study group required Caesarean sections giving a failure rate of 34.6% (33). Induction success (inductions resulting in a vaginal birth) was 83.4% in Africa and 81.6% in Asia. The most successful method was oxytocin only in Africa (86.1%) and oxytocin, misoprostol/other prostaglandin and a non-drug method in Asia (86.3%). Elective induction was not associated with increased odds of maternal, fetal or perinatal mortality, however one-third of elective inductions occurred at <39 weeks gestation. NICU admission in Africa and maternal ICU admission in Asia were significantly higher following elective induction which may have resource implications; however the risk of other adverse outcomes were not significantly higher (10). Maternal and perinatal outcomes of induction of labor at term in the university clinics of Kinshasa, DR Congo among 115 term pregnancy Vaginal delivery occurred in 78 (66.9%) women, and cesarean section in 34 (29.6%). As of indications of cesarean section, the leading cause was fetal distress (13/34 = 38.2%), followed by failure of induction in preeclampsia women (9/34 = 26.5%) and fetopelvic disproportion (6/34 = 17.6%). In these study Failure to induce uterine contraction at the first attempt was noted in 9/115 (7.8%) women. Apgar score < 7 at the first minute occurred in 29/115 (25.2%) children (25).

The study was conducted from January to December 2014 at Gondi Memorial Hospital and Felege Hiwot Referral Hospital, Among the 222 women enrolled, cervical ripening using Foley catheter was made for 111 and misoprostol was given for 111. In the Misoprostol group, there were 78 (72.2%) cases and 30 (27.8%) cases of vaginal and caesarean deliveries. The remaining 3 cases were complicated by uterine rupture. In the Foley catheter group, there were 94 (84.7%) cases and 17 (15.3%) cases of vaginal and caesarean deliveries respectively. Indication for caesarean section was NRFHRP for 6 (35.3%) cases and failed induction for 11 (64.7%) cases in the Foley catheter group. In the Misoprostol group, NRFHRP and failed induction accounted for 20 (66.7%) cases and 10 (33.3%) cases respectively (35).

Study conducted about Mode of delivery among women delivered after induction of labor in Hawasa public health facility; SVD 34.35%, operative vaginal delivery 27.21% and CD 38.44%. Factors affect success of IOL; the odds of failed induction were 3.11 times more likely in Primiparous mothers than multiparas one, 9.21 times more likely in mothers with age greater than 30 years than others; 4.54 times more likely in mothers with preinduction bishop score of less than five than bishop score of greater than five; 5.66 times more likely in mothers with premature rupture of membrane than others; 6.57 times more likely in mothers with greater for gestation than others, 4.52 times more likely in mothers with post term than others; 5.60 times more likely in mothers with previous obstetric complications were to have failed induction than those with no bad obstetric history(28) .

A study conducted in Jimma teaching hospital of the 280 women, 154(55%) had SVD, 96(34.2%) underwent CD and 30(10.7%) had OVD. Induction was successful in 184(65.7%) of the study subjects, while 60(21.4%) of the mothers experienced failed induction. 19 (6.8%) neonates were low birth weight (< 2500 gram) and 248 (88.6%) had normal birth weight (2500- 3999) (29).

2.3 Conceptual frame work

Based on the literature review revised, induction of labor could be affected by maternal demographic factors, methods of induction used, health indication for IOL and Obstetric history as shown here under.

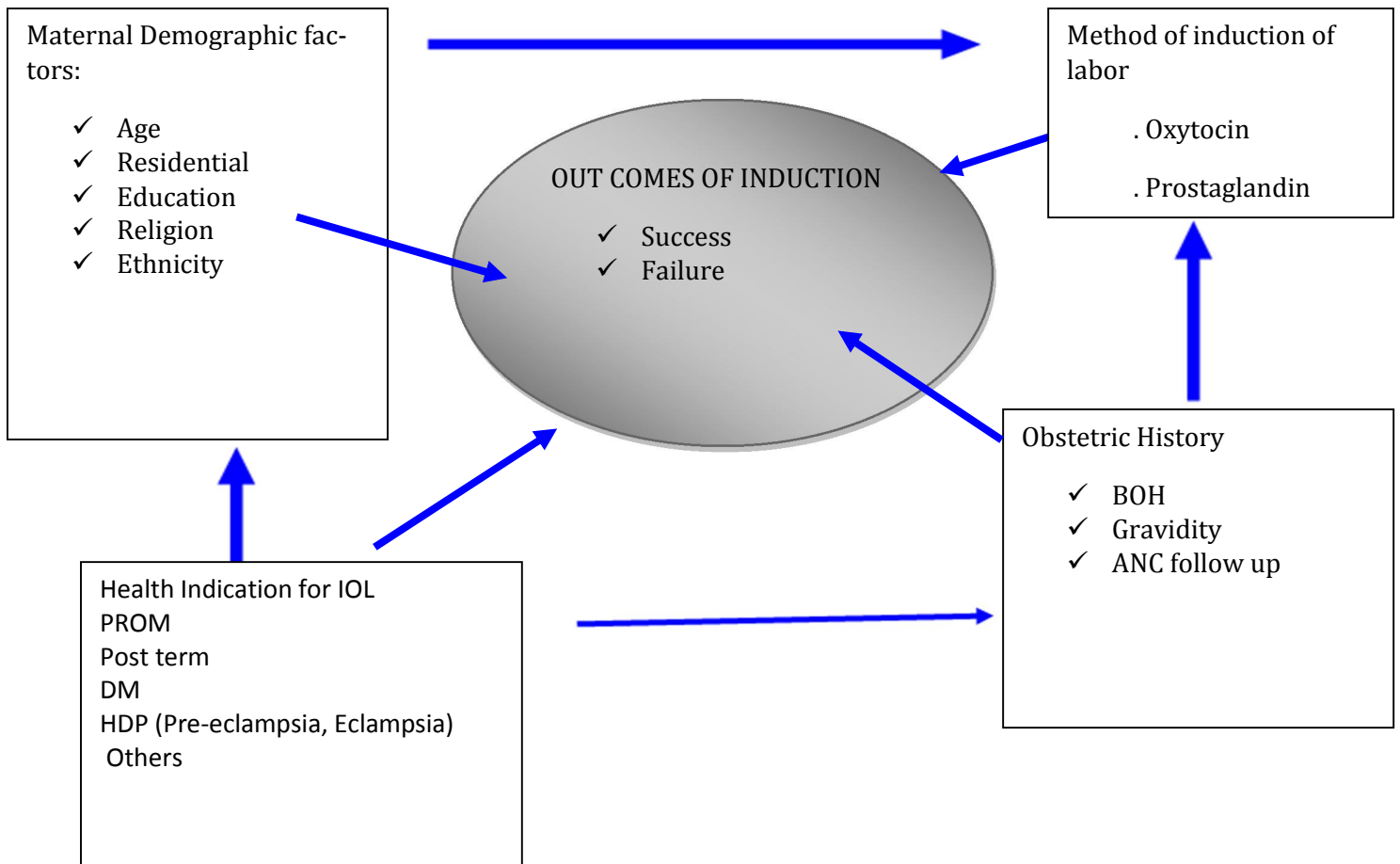


Figure 1: Conceptual frame work depicts association between factors and induction of labor (source reference 33)

CHAPTER THREE: OBJECTIVES

3.1 General objective

- ✚ To assess the magnitude, outcome and factors associated with success of induction of labor, among mothers undergone induction at Attat primary hospital Gurage Zone, 2017.

3.2 Specific objectives

1. To determine magnitude of induction of labor among mothers who gave birth at Atat primary hospital Gurage Zone, 2017.
2. To determine magnitude of success of induction of labor among mothers undergone induction at Atat primary hospital Gurage Zone, 2017.
3. To identify the determinants of induction of labor success among mothers undergone induction at Atat primary hospital Gurage Zone, 2017

CHAPTER FOUR: MATERIALS AND METHODS

4.1 Study Area and Period

The study was conducted at ATAT Primary Hospital Gurage Zone, SNNPR, Ethiopia, from January 1, 2017 to June 30, 2017 G.c, which is 175 kilometers from Addis Ababa and 410 kilometers from regional city, Hawasa. The climate is weyna dega; teff and inset is the main agricultural product. They also have rare domestic animals like cow and got.

The Hospital was established in 1961 E.C by Catholic Missionary and still now governed by them. The catchment population is 800,000, of which 51.2% females and 48.8% males. The Zone has 40 Health Centers and 2 newly established hospitals which are government owned, and all referred to this Hospital. It is one of affiliated hospital training for integrated emergency obstetric and surgery (IEOS) students in conjunction with Jimma University. It has 100 beds with delivery room, which give services for parturient mothers and other patients. The hospital has multidisciplinary staffs (Gynecologist, General Surgeon, emergency surgery students, Pharmacist, Lab. Technologist, midwives and clinical nurses.)

4.2 Study Design

Institutional based Prospective cross-sectional study design was conducted.

4.3 Population

4.3.1 Source Population

All pregnant women who gave birth and all mother undergone induction after 28 weeks of gestation at Attat primary Hospital, 2017.

4.3.2 Study population

All pregnant women who were induced and gave birth after 28 weeks of gestation in the Attat primary Hospital.

4.4 Inclusion and exclusion criteria

4.4.1 Inclusion criteria

All women who had singleton, alive fetus with cephalic presentation and no previous scars at gestational age of 28 weeks and above.

4.4.2 Exclusion criteria

-Previous scar, twin pregnancy and IUFD before induction.

4.5 Sample size determination and sampling technique:

4.5.1 Sample size

The sample size of this study was all women for whom induction of labor was done from January 1-June 30, 2017.

4.5.2 Sampling technique

A consecutive sampling procedure was used to choose the study participants. All women with induction of labor in Attat primary Hospital was selected starting from January 1, to June 30, 2017.

4.6 Study Variables

4.6.1 Dependent variables

The outcome of induction of labor.

4.6.2 Independent variables

- Maternal demographic factors (age, Residential, Ethnicity, occupation, religion)
- Methods of induction used (Amniotomy, Intravenous oxytocin drip, Misoprostol)
- Health indication for IOL (PROM, DM, post term, and preeclampsia) and Obstetric history (parity, Gravidity, ANC follow-up) taken as independent variable.

4.7 Data Collection Method and Data Collectors

Data collectors have been selected from IESO (2) and midwifery (6) working in health institutions and oriented to the data collection format. Then data collected using structured questionnaire organized from different literatures and journals which was prepared in English and face to face interview method was used to collect data.

4.8 DATA QUALITY ASSURANCE

To ensure the quality of data to be gathered from the study subjects, a range of mechanisms would be employed in order to address major areas of bias introduction during the data collection process. A one day training had given for data collectors and supervisors on the objective and relevance of the study, how to gather the appropriate information, procedures of data collection techniques and the whole contents of the questionnaire. The questionnaire had been pre-tested in Attat hospital before study period and necessary modification in the questionnaire was done based on the nature of gaps identified. Data was checked, cleaned and explored for outliers, missed values and any inconsistencies.

4.9 Data Analysis

Data was first checked manually for completeness, coded and entered into SPSS version 22 for analysis. Some of variables were categorized for analysis purpose. Descriptive statistics (frequency, percentages mean and standard deviation) had been used to describe the study variables. Logistic regression analysis had employed to assess the relative effect of determinants. Bivariate logistic regression was used to analyze the data and tested in multivariate statistical regression such as Odds ratios (95% confidence intervals) and $p < 0.05$ consider as significant association.

4.10 Ethical consideration

Ethical clearance was obtained from institutional review board of Jimma University medical center institute of health and letter of cooperation was obtained from Jimma university medical center administrative office. Permission had been sought from the hospital authorities for data col-

lection. Verbal informed consent was obtained from patients and all information obtained from patients was anonymous and the patient's name was not included in the Checklist.

4.11 Dissemination plan

The findings will be presented to Jimma University medical center institute of health. The findings will also be communicated to local health planners and other relevant stake holders; the area to enable them takes recommendations in to consideration during their planning process. Publication in peer reviewed, national or international journal will also be considered.

4.12 Operational definitions

Induction of labor: initiation of uterine contractions prior to its spontaneous onset of labor after 28 weeks of gestation.

Failed induction of labor: failure to achieve a vaginal delivery within 12 hours after induction of labor was commenced.

Success of induction of labor: - when a woman had achieved vaginal birth within 12 hours after induction of labor was started.

Non-reassuring Fetal heart rate: Fetal heart beat either below or above normal range (base line) following induction of labor.

Bishop score: A group of measurements made at internal examination, used to determine whether the cervix is favorable or not. The score is based on the station of presenting part, dilation, effacement (or length), position and consistency of the cervix. A score of 9 or more generally indicates that the cervix is favorable, if a score is from 5 to 8 intermediate and a score 4 and below is unfavorable cervix.

Bad obstetric history: one known cause or two unknown cause of perinatal death.

Perinatal death: It includes still birth and neonatal loss until the mother discharge.

CHAPTER FIVE: RESULT

5.1 Socio-Demographic Characteristics

A total of 110 women were induced with 100% response rate at Attat primary hospital from January, 1 to June 30, 2017. Most of the women 72.8% admitted to the hospital were age less than 30 years and the average age of participants was 26.2 years with $SD \pm 5.1$ (4.5-5.7). Majorities, 60% of the women were Orthodox Christian and (85.5%) of the participants belong to south nation nationalities. Nearly all 97.3% of the study participants were married. About half, 50.9% of the participants live in rural but 32.7% between grade 1 to 8 followed by 25.5% were from grade 9 to 12. Majority of them 60% were house wife (table-2).

5.2 Obstetrical History

A total of 1873 mothers were delivered during study period, of which, 1560(83.3%) women were with cephalic presentation and singleton pregnancy. From those presented with singleton cephalic presentation, 7.1% were induced, of which 84.5% of mother had started emergency induction and 15.5% were elective induction. Almost all mother 95.5% had at least one ANC follow up during their pregnancy. More than half 52.7% the study subjects were Multigravida. Regarding gestational age, majority of the women 70% were term pregnancy followed by 16.4% were post term and 13.6% were preterm. Premature rupture of membranes (PROM) was the most common indication for induction, 44.5%, followed by hypertensive disorder of pregnancy 22.7% and for post term pregnancy 16.4%.

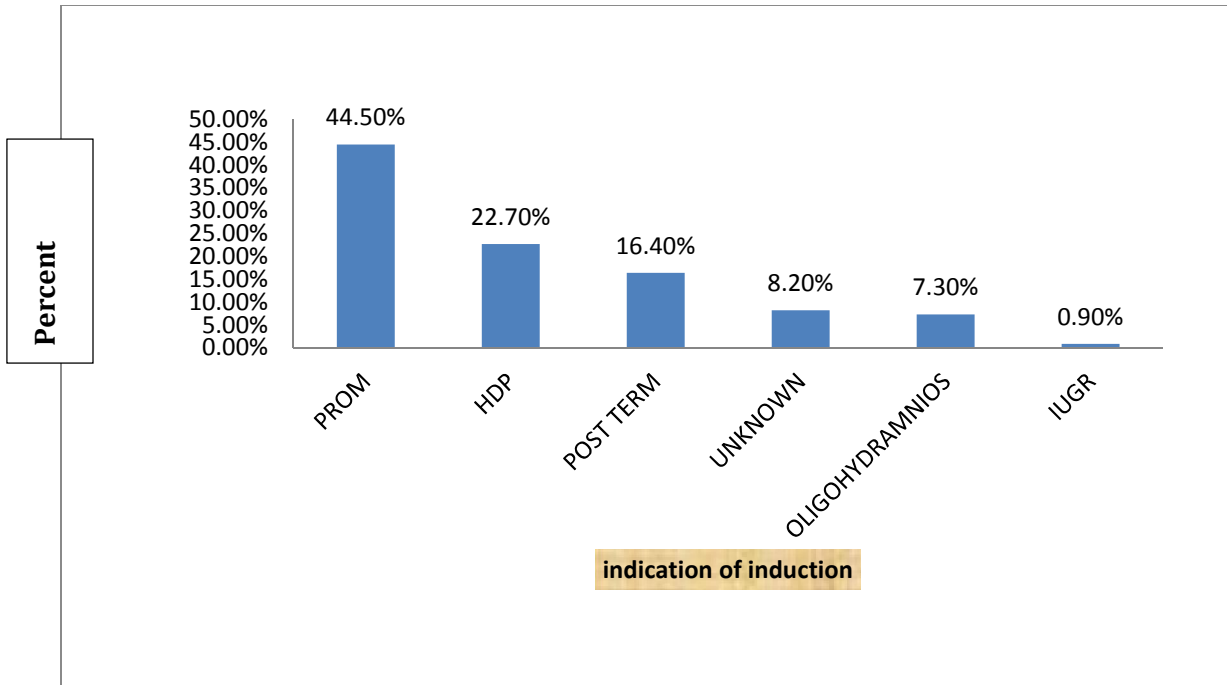


Figure 2: Indication of induction of labor in Attat primary Hospital, Ethiopia, 2017

Regarding Bishop Score (cervical status), 55.5% were having unfavorable score, 40.9% had intermediate score and 3.6% had favorable cervix. During induction process, cervical ripening was done in 79.1% with different techniques, of which majority, 77.3% was with misoprostol. 25.5% of women were induced by misoprostol and 70.9% by oxytocin.

5.3 Outcome of induction of labor

Out of the total induced labor, 75.5%, delivered vaginally within 12 hours of induction, of which (9.6%) were vacuum deliveries while 24.5% delivered by Cesarean section (CS). None reassuring fetal heart beat pattern (NRFHBP) was the most common reason 10.9% for C/S followed by CPD 8.3% and 6.4% failed induction of labor.

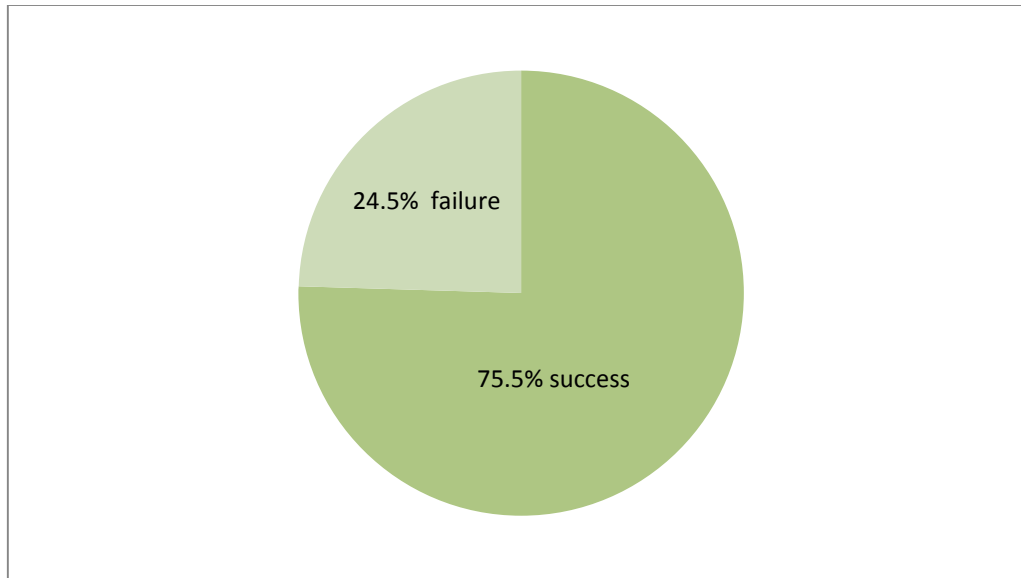


Figure 3: The outcome of induction among induced mothers at Attat Hospital, 2017.

Among induced mother, 8.2% were unknown indication, of whom 33.3% were C/D which was high compare to with recognized indication 23.8%. During induction process 2.7% mothers were complicated with uterine ruptured and 0.9% maternal death. Regarding fetal outcome, (94.5%) of newborn were born alive, (Majority of neonate 80% had Apgar score of above 7 in the first minute and 9.1% of neonate were admitted in NICU. Nearly 82.7% new born weighs were between 2500gram and 4000gm (table 1).

Table1: Maternal and neonatal outcome of induction of labor in Attat primary hospital, 2017.

Variables		Frequency	Percentage
maternal complication	Uterine rupture	3	2.7
	Infection	1	0.9
	PPH	3	2.7
	dead	1	0.9
	total	8	7.3
New born status	alive	104	94.50
	dead	6	5.50
	total	110	100.00
APGAR 1st min	0	6	5.50
	1-7	16	14.5
	Seven and above7	88	80.00
	total	110	100
5thmin	0	6	5.50
	1-7	3	2.70
	Seven and above7	101	91.80

	total	110	100
Admission to NICU	yes	10	9.10
	no	100	90.90
	total	110	100
Reason for admission	MAS*/Asphyxia	3	2.70
	low birth wt.	5	4.50
	neonatal sepsis	2	1.80
	total	10	9.10
Perinatal death	yes	7	6.40
	no	103	93.60
	total	110	100
weigh of the baby(KG)	below 2.5	16	14.54
	2.5-4	91	82.72
	above 4	3	2.72
	total	110	100

MAS*=meconium aspiration syndrome

5.4 Factors associated with Outcome of Induction of Labor

The associations of success of induced labor to different socio-geographic variables: On bivariate analysis residency and educational level had no statically association with success of induction (COR=0.78, (0.33-1.87) and (COR=1.52(0.42-5.48) in 95% CI) respectively but the other socio demographic variables (Religion, Ethnicity Marital status and Occupation) couldn't test by bivariate regression due to cell value of less than 5(table 2).

Table 2: The relationship between outcome of induction and socio-geographic variables in Attat primary hospital, 2017.

variable		Outcome of induction			COR
		success	failure	total	
Age	<30	59(73.8%)	21(26.2%)	80	1.42(0.54-3.96)
	>=30	24(80%)	6(20%)	30	
	total	83(75.5%)	27(24.5%)	110	1*
Religion	orthodox	47(71.2%)	19(28.8%)	66	
	Muslim	32(80%)	8(20%)	40	
	Protestant	4(100%)	0	4	
	total	83	27	110	
Ethnicity	SNNPRS	73(77.7%)	21(22.3%)	94	
	Amhara	6(60%)	4(40%)	10	
	Oromo	3(60%)	2(40%)	5	

	Tigre	1	0	1	
	Total	83	27	110	
Marital status	married	81(75.7%)	26(24.3%)	107	
	unmarried	2(66.7%)	1(33.3%)	3	
	Total	83	27	110	
Education	illiterate	15(68.2%)	7(31.8%)	22	1*
	Grade1-8	29(80.6%)	7(19.4%)	36	1.77(.47-6.72)
	Grade 9-12	20(71.4%)	8(28.6%)	28	.92(0.25-3.32)
	Diploma and above	19(79.2%)	5(20.8%)	24	1.52(0.42-5.48)
	Total	83	27	110	
Residence	urban	42(77.8%)	12(22.2%)	54	.78(.33-1.87)
	Rural	41(73.2%)	15(23.8%)	56	1*
	total	83	27	110	
Occupation	housewife	50(75.8%)	16(24.2%)	66	
	Gov'tal worker	17(77.3%)	5(22.7%)	22	
	Merchant	14(73.8%)	5(26.2%)	19	
	Others	2(66.7%)	1	3	
	total	83	27	110	

The impact of obstetrical characteristics to the outcomes of induced labor was investigated using bivariate logistic regression analysis. In bivariate logistic regression analysis test; multigravidas with COR=3.59; 95% CI (1.41-9.17), Bishop Score \geq 5COR= 16.3; 95% CI (3.6-73.5), mothers who had done cervical ripening COR=9.38; 95% CI (1.2-73.27), mothers induced by oxytocin COR=6.1; 95% CI (2.38-15.62) and cervical ripening by misoprostol COR=4.8; 95% CI (1.05-21.87 showed significant association to the success of induced labor(table 3).

Table 3: Bivariate logistics analysis for factors associated with outcomes of induced labor in At-tat primary hospital july-2017

Variables	outcome of induction		COR in 95% CI	
	success	failure		
Gestational age (weeks)	1,<42wk	71(77.2%)	21(22.8%)	0.59(0.19-1.77)
	2. \geq 42wks	12(66.7%)	6(33.3%)	
Bishop	1,<5	36(59%)	25(41%)	1*
	2, \geq 5	47(95.9%)	2(4.1%)	16.3(3.6-73.5)*
Known indication	1,yes	77(76.2%)	24(23.8%)	0.62(0.2-2.7)
	2,no	6(66.7%)	3(33.3%)	1*
cervical ripening	1,yes	61(70.1%)	26(29.9%)	9.38(1.2-73.27)*
	2,no	22(95.7%)	1(4.3%)	1*
Misoprostol used	1,yes	60(70.6%)	25(29.4%)	4.8(1.05-21.87)*
	2,no	23(92%)	2(8%)	1*
Oxytocin used	1,yes	67(85.9%)	11(14.1%)	6.1(2.38-15.62)*
	2,no	16(50%)	16(50%)	1*

Gravidity	1,primigravida	33(63.5%)	19(36.5%)	1*
	2,multigravida	50(86.2%)	8(13.8%)	3.59(1.41-9.17)*
Newborn status	1,alive	78(75%)	26(25%)	1*
	2,dead	5(83.3%)	1(17.7%)	1.67(0.19-14.9)
ABGAR score 1^min	1,<7	14(63.6%)	8(36.4%)	1*
	2,≥ 7	69(80.2%)	19(19.8%)	2.08(0.76-5.68)
ANC follow up	1, yes	80(76.2%)	25(23.8%)	
	2,no	3(60%)	2(40%)	0.47(0.07-2.97)
PROM	1,yes	40(81.6%)	9(18.4%)	1.86(0.75-4.62)
	2,no	43(70.5%)	18(29.5%)	1*
Time of IOL	1,emergency	72(77.4%)	21(22.6%)	1*
	planned	11(64.7%)	6(35.3%)	0.54(0.18-1.62)

On multivariate analysis bishop score, women who done cervical ripening, gravidity and women induced by oxytocin had significant association. Women who had bishop score of greater than 5 were about 14.2 times more likely to have successful induction AOR=14.2 (3.1-64.5). The analysis indicated that laboring mother who had cervical ripening had 8.4 times success rate than not done cervical ripening, AOR=8.4(1.06-67.23). On the other hand, the likelihood of success in induced labor was higher 3.6 times in multigravida compare to primigravida with AOR=5.7(1.42-22.98) and again the likely hood of successful induction was approximately 7.8 times more prevalent among those women's induced with oxytocin compare to others (AOR=7.8(2.11- 28.94)) (Table 4).

Table 4: Multivariate analysis for factors associated with outcomes of induced labor in Attat primary hospital, 2017

Variables	Outcome of induction		COR in 95% CI	AOR in 95% CI
	success	failure		
Bishop score	1,<5	36(59%)	25(41%)	
	2,≥5	47(95.9%)	2(4.1%)	16.3(3.6-73.5)*
cervical ripening	1,yes	61(70.1%)	26(29.9%)	
	2,no	22(95.7%)	1(4.3%)	9.38(1.2-73.27)*
Misoprostol used	1,yes	60(70.6%)	25(29.4%)	
	2,no	23(92%)	2(8%)	4.8(1.05-21.87)*
Oxytocin used	1,yes	67(85.9%)	11(14.1%)	6.1(2.38-15.62)*
	2,no	16(50%)	16(50%)	1*
Gravidity	1,primigravida	33(63.5%)	19(36.5%)	1*
	2,multigravida	50(86.2%)	8(13.8%)	3.59(1.41-9.17)*
ABGAR score 1^min	1,<7	14(63.6%)	8(36.4%)	1*

	2,>=7	69(80.2%)	19(19.8%)	2.08(0.76-5.68)	2.3(0.72-7.34)
ANC follow up	1, yes	80(76.2%)	25(23.8%)		
	2,no	3(60%)	2(40%)	0.47(0.07-2.97)	0.44(0.07-2.83)
PROM	1,yes	40(81.6%)	9(18.4%)	1.86(0.75-4.62)	0.62(0.22-1.79)
	2,no	43(70.5%)	18(29.5%)		1*
Time of IOL	1,emergency	72(77.4%)	21(22.6%)		
	2, planned	11(64.7%)	6(35.3%)	0.54(0.18-1.62)	0.5(0.15-1.85)

CHAPTER SIX- DISCUSSION

The magnitude of induced labor among women delivered in Attat primary Hospital was found to be 7.1%. In this study out of four women who undergone induction about three women had successful induction. About 20% of pregnant women will have labor induced in the world (21), in 25% of all deliveries at term induced in developed countries (4). The magnitude of IOL in US 23.4%, UK 22.1%, Latin America 11.4% and, Asia 12.1% (4, 10 21, 22, 23). When we compared this study to world and developed countries prevalence IOL, It was very low prevalence. The possible reason for this high difference may be :elective IOL was high in developed countries ,low awareness for IOL ,low resources(both human and economic resources scarcity in this hospital) and difference in indication and method of induction . But compared this finding to, Africa prevalence was 4.4% (10) and Ethiopia 4% (26), this finding had improvement; this may be due to induction without indication was high in this study that was 8.2% which was similar to Jimma University Specialized Hospital, 6.1% (29). But in Africa and Asia; Induction without medical indication accounted for less than 2% of deliveries in all countries (10),in US it account for 10-15% of all deliveries (19).

According to this study the primary reason for induction of labor was premature rupture of membranes (PROM) 44.5%, followed by HDP 22.7% while in army referral and teaching hospital Addis Ababa, the first reason for induction 48.1% undergone induction of labor for premature rupture of membranes (PROM), and next to it 35.2% for post term pregnancy (27). But the indication of this study was nearly same to Jimma University Specialized Hospital that was PROM (36.4), Hypertension (34.3), and Post-term 23.2% (29). It also comparable to a study in Hawassa Public Health Facilities, in which the predominant indications for induction of labor were premature rupture of membrane, Preeclampsia, Post term and Chorioamnionitis (30).

In this study the success rate of induction was 75.5%. This is nearly comparable in a study done in Africa 83.4%, Asia 81.6% (11), Jimma University specialized Hospital 78.6%(29) but this result was better when it compared to the study in Congo 66.9%(25), Hawasa 61.6%(28); and in Nepal 65.4%(34). The possible reason could be: preinduction cervical ripening, the duration for deciding failed induction, oxytocin changing interval and cold chain of oxytocin storage might be cause of variation.

In this study, on multivariate analysis women who had bishop score of ≥ 5 were about 14.2 times more likely to have success of induction AOR=14.2;95%CI (3.1-64.5.); this is similar with a study done in Army Referral and Teaching Hospital Addis Ababa, Hawasa Health Facilities; and Jimma University Specialized Hospital (27,28,29).

According to this study the multivariate analysis indicated that mothers who had preinduction cervical ripening had 8.4 times success rate than who had no cervical ripening, AOR=8.4 (1.06-67.23) and the likelihood of success of induction was 5.7 times in multigravida mothers as compared to primigravida. This is similar to a study in Pakistan and Jimma Specialized Hospital (28, 29).

In this study 70.9% were induced by intravenous Pitocin infusion and the remaining 25.5% were by misoprostol, which is similar to the study in Hawasa, oxytocin infusion (73.5%) and misoprostol 26.5%(28) but in Africa 86.1% with only oxytocin and in Asia 86.3% by oxytocin, misoprostol/other prostaglandin and a non-drug method (10). In Latin America Oxytocin was the single most frequently used induction method 65.9%, whereas misoprostol was used to induce only 8.9% of the deliveries (18).

According to this study 24.5% study cases were delivered by Cesarean section (C/S) which is similar to Congo cesarean section in 29.6% (25), and at Gandhi Memorial Hospital and Felege Hiwot Referral Hospital, 21.2% was caesarean deliveries (35) but in Hawasa cesarean delivery rate was 38.44 %(28) and in Jimma teaching hospital 34.2% underwent C/S (29).

The leading indication for C/S for this study was (10.9%) due to NRFHBP next 8.3% were due to CPD and 6.4% failed induction of labor. In the university clinics of Kinshasa, DR Congo, the indications of cesarean section, the leading cause was fetal distress 11.3% followed by failure of induction 7.8% and CPD 5.2% (25). At Gondi Memorial Hospital and Felege Hiwot Referral Hospital, indication for C/S was NRFHBP 11.7% and failure of induction 9.5% and 2.7% (35) which is nearly similar to this study 2.7%. Hawasa, Reasons for cesarean section among induced women were: CPD 6.8%, fetal distress 14.3% and failure of induction 17.3% (28). This may be due to continuously usage of CTG leads NRFHBP, decision for diagnosis of CPD

CHAPTER SEVEN: CONCLUSION AND RECOMMENDATION

7.1 Conclusion

- ❖ The magnitude of induction of labor in this study was low and majority of the outcome is success.
- ❖ The most common indication of induction in this study was premature rupture of membrane followed by hypertensive disorder of pregnancy.
- ❖ Intravenous Pitocin infusion was main method of induction.
- ❖ Bishop score, gravidity, cervical ripening and induction by intravenous oxytocin, had association with success of induction.

7.2 Recommendation

- Health care providers should assess the cervix (the Bishop score) to determine the likelihood of success.
- Further research should be conducted in multi-center study to provide to national monitoring and evaluation of this intervention.
- Pre induction cervical ripening before induction is recommended for the success of induction.

Limitation and strength of the study

Limitation of the study

1. The study was conducted in small population in Attat primary hospital which might not be representative of whole population.
2. Personal bias may not have been completely eliminated but proper training may minimize it.
3. Sampling technique was restricted by period which was only six month.
4. Most of socio demographic variables were not analysis by regression except educational level and residence due to they have cells below 5.

Strength

1. The study was conducted by using primary data that was prospective study.
2. The data collected by trained midwives and IESO students

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ANNEX I QUESTIONNAIRE

Jimma University institute of Health, department of Integrated Emergency Surgery and Obstetrics. Questioners prepared to collect variables to study prevalence and associated factors of induction of labor at Attat hospital Gurage Zone, SNNPR, Ethiopia, 2017.

I am Lebesse Tsega a final year IESO student in master's program at Jimma University.

Please circle or enter the answer in the appropriate space.

Participant ID # _____ Date: _____

Part 1 Socio-Demographic and baseline health information

No	variable	Code/categories	remark
1	Age	1,18- 23 3,30-35 2,24-29 4,36-40	
2	Religion	1,orthodox 2,muslim 3 protestant 4,other	
3	Ethnicity	1,SNNRP 2,Amhara 3,Oromo 4,Tigre 5 others	
4	Marital status	1,single 2,married divorced 4,widowed 5,other	
5	Educational level	1,illiterate 2,grade1-8 3,grade9-12 4,diploma and above	
6	Residential Address:	1 Urban 2 Rural	
7	occupation	1,house wife 2,gov [^] tal worker 3 merchant 4, other	
Part2 Obstetric history			
8	ANC	1,yes 2 no	
9	gravidity	1,primigravida 2,multigravida	
10	BOH	1,yes 2, no	
Part3 Induction and outcome			
11	Time of induction	1, emergency 2,planned	

12	Indication of induction	1,postterm 2,PROM 3,HDP 4,IUJR ,5 oligohydramnios 6,unknown indication	
13	GA	1,<37weeks 2 37-42wks 3 ,>42wks	
14	chorioamnionitis	1,yes 2,no	
15	Bishops' score	1,unfavorable 2,intermediate 3,favorable	
16	Cervical ripening	1 yes 2,no	
17	Method of ripening	1,misoprostol 2,folley catheter 3,stripping 4 other	
18	Method of induction	1,amniotomy 2,oxytocin 3prostaglandin 4,other	
19	Dose of misoprostol(microgram)	1, 50 2,100 3, 150 4 ,200 5,>200	
20	Mode of delivery	1,SVD 2 ,OVD 3, C/D	
21	Indication for C/D	1,failed induction 2,NRFHBP 3,CPD 4,other	
22	complication	1,uterine rupture 2,infection 3.PPH, 4 dead ,5 no complication	
23	Management for ruptured uterus	1, hysterectomy, 2 repaired 3,	
24	Neonatal status	1 alive 2,still birth	
25	APGAR score(first min) Fifth min	1,>7 2=,<7 1,>7 2,=<7	
26	NICU admission	1,yes 2 ,no	
27	Reason for admission	1,low birth weight 2,neonatal sepsis 3, MAS*(asphyxia) 4, other	
28	Perinatal death	1,yes 2, no	
29	Weight of baby(KG)	1,<2.5 2, 2.5-4 ,3 >4.2	

MAS*=meconium aspiration syndrome

DECLARATION

I, the undersigned, declared that the thesis is my original work, and hasn't been presented for a degree in any other university and that all sources of material used for this thesis have been duly acknowledged.

Declared by, candidate

Name: Lebesse Tsega

Signature: _____

Date: _____

This thesis has been declared for final submission with my internal examiner and advisers

Approval as university,

Name of internal examiner-----

Signature-----

Date-----

Confirmed by, advisers

1. Dr.Fanta Asefa (MD, Assistant professor and consultant in obstetrics and gynecology.

Signature-----

Date-----

2. Mr.Yasin Negash (Assistant professor and Biostatics).

Signature -----

Date -----