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# Outcome of Labor Induction and Associative Factors Among Mothers Managed In Bahir Dar City Public Health Institutions, North West, Ethiopia

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**BAHIR DAR UNIVERSITY**  
**COLLEGE OF MEDICINE AND HEALTH SCIENCE**  
**DEPARTMENT OF INTEGRATED EMERGENCY SURGERY**  
**OUTCOME OF LABOR INDUCTION AND ASSOCIATIVE**  
**FACTORS AMONG MOTHERS MANAGED IN BAHIR DAR**  
**CITY PUBLIC HEALTH INSTITUTIONS, NORTH WEST,**  
**ETHIOPIA**

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**A RESEARCH THESIS REPORT SUBMITTED TO DEPARTMENT OF  
INTEGRATED EMERGENCY SURGERY, COLLEGE OF MEDICINE  
AND HEALTH SCIENCES, BAHIR DAR UNIVERSITY IN THE PARTIAL  
FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF  
MASTER IN INTEGRATED EMERGENCY SURGERY**

**JULY, 2021**

**BAHIR DAR, ETHIOPIA**

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**ETHIOPIA, 2021**

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**BAHIR DAR UNIVERSITY COLLEGE OF MEDICINE AND HEALTH  
SCIENCE DEPARTMENT OF INTEGRATED EMERGENCY SURGERY  
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## Acronyms and Abbreviations

ANC	Antenatal Care
ARM	Artificial Rupture of Membrane
AOR	Adjusted Odds Ratio
BMI	Body Mass Index
C/S (C/D)	Cesarean Section/Delivery
CPD	Cephalo pelvic Disproportion
DM	Diabetes Mellitus
BDU	Bahir Dar University
EDHS	Ethiopian Demographic and Health Survey
IOL	Induction of Labor
IUFD	Intra Uterine Fetal Death
IUGR	Intrauterine Growth Restriction
IV	Intra Venues
PIH	Pregnancy Induced Hypertension
PPH	Post-Partum Hemorrhage

PPROM	Premature Preterm Rupture of Membrane
SDGs	Sustainable Development Goals
SPSS	Statistical package for social science
UN	United Nation
WHO	World Health Organization
PGE2	Prostaglandin E2

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## Abstract

**Background:** There are several complications of pregnancy that result in significant ongoing risk to the mother or to the fetus. For this conditions labor induction is an artificial termination of pregnancy utilized as a therapeutic option to decrease both maternal and neonatal morbidity and mortality. The process of labor induction is not risk free and not always have successful outcome but also may end up with failure of induction.

**Objective:** The aim of this study was to assess outcome of labor induction and its associated factors among mothers managed at Bahir Dar City public health institutions, Northwest Ethiopia, 2021.

**Methods:** An institution based cross-sectional study was conducted among mothers who were managed to labor ward for labor induction at Bahir Dar city public health institutions from March 1 to June 30, 2021. Four hundred thirteen selected mothers using systematic random sampling technique method from admitted mothers during the study period were included in the study. Data was collected using a structured interviewer administered questionnaire. Data was entered using Epi-Data Version 4.6 and analyzed using SPSS Version 25. Binary logistic regression model was used to find the factors affecting outcome of labor induction. Those variables having P-values less than 0.25 in the bivariable analysis were entered the multivariable analysis. Adjusted odds ratios with 95% CI were used to assess the strength and significance association between independent and outcome variables. Those variables having P-values less than 0.05 were considered as statistically significant factors.

**Result:** The result of the study revealed that out of total case of labor induction, 325 (78.7%) with 95% CI (75, 83) of them achieved success labor induction. In logistic regression analysis favorable Bishop Score (AOR:4.455 (95% CI (2.392, 8.299))), Multipara (AOR:3.214 (95% CI(1.399,7.386))), Rural resident (AOR:3.833 (95%CI (1.866,7.872))), induction by oxytocin with cervical ripening (AOR: 2.905 (95% CI (1.645,5.132))) and BMI<25kg/m<sup>2</sup> (AOR: 4.066 (95% CI: 1.828, 9.047)) were significantly associated with success of labor induction.

**Conclusion:** The finding indicated that the prevalence of success induction in study area was about 78.7%. In this study the main determinant of success of labor induction were Bishop Score, Multiparity, Induction by oxytocin with cervical ripening, Rural residency and BMI. The result was higher than that of most areas in Ethiopia but still needs improvements of care with respect to the standard.

**Key words:** Labor induction, Success of labor induction, Bishop score, oxytocin.

# 1. INTRODUCTION

## 1.1. Background

There are several complications of pregnancy that result in significant ongoing risk to the mother or fetus. Including preeclampsia, preterm premature rupture of the membranes (PPROM); intrauterine growth restriction (IUGR); and post term pregnancy. One of the most common interventions utilized in obstetrics to prevent risks related to such problems and helps to improve the maternal and neonatal outcome, is induction of labor (IOL). Induction of labor refers to artificial termination of pregnancy by iatrogenic initiation of uterine contractions after the fetus has reached viability (after the 28th week of gestation in Ethiopia context ) and before the onset of spontaneous labor with or without ruptured membranes to accomplish vaginal delivery not only to achieve vaginal delivery but also to improve both maternal and perinatal outcomes in comparison with permitting pregnancy to continue ([1-4](#))

Induction of labor is one of the most frequent procedures in pregnant women in both developing and developed countries. The aim of labor induction is to start uterine contractions by an artificial method that booster for normal vaginal delivery. The decision to induce labor is taken when the risk of continuing with the pregnancy outweighs the benefits to the woman and the fetus ([1, 5-7](#)).

Major indications for induction of labor include maternal, fetal, social or a combination of these factors. These indications can be either elective or emergency. Elective induction is usually done with prior planning by the health provider and the mother when continuing the pregnancy beyond certain weeks has risk for the mother or the fetus, like that of, premature rupture of membrane(PROM), Diabetes Mellitus(DM), moderate hypertension, post term pregnancy, small for date baby. Emergency induction done when there is an emergency maternal and fetal condition that necessities induction of labor immediately after the occurrence of prolonged PROM, severe IUGR, intra-uterine infection, intra-uterine fetal death(IUFD), severe abruptio placenta, congenital anomaly, post term pregnancy (pregnancy beyond 42 week of gestation), and pre-eclampsia and eclampsia([6, 8, 9](#)).

Induction can be done through surgical and medical or pharmacological. The surgical methods of induction include artificial rupture of membranes, ballooned catheter and laminaria and medical or pharmacological induction methods are oxytocin and prostaglandins such as misoprostol (10).

According to the World health Organization (WHO) recommendation, the general principles related to the practice of induction of labor should be performed only when there is a clear medical indication for it, and the expected benefits outweigh its potential harms (11).

Induction of labor will be either success or failure. But no consensus has been reached regarding the diagnosis of failed and success induction; these two terms would seem contradictory: if IOL succeeds, it certainly has not failed. Even from this point of view, there is no complete uniformity in the literatures. In fact, for induction success, some mean obtaining a vaginal birth, others add not complicated, Vaginal delivery within 24 hours from the beginning of the induction, or reaching the active phase of labor. In general, the success of IOL should be represented by the achievement of a vaginal birth, even if it is operative, without a defined time limit. Whereas failed induction is a variety of endpoints have been suggested including cesarean delivery, not achieving vaginal delivery within a specified time, not achieving active labor within a specified time, or failure to achieve the active phase of labor may use to diagnose failed inductions(12-14).

Other studies define successful induction if a woman delivered vaginally after adequate uterine contraction with or without aid of instrument after induction. Failed induction if a woman deliver by C/S due to failure to acquire either adequate uterine contraction ( $\geq 3$  contractions and duration lasting  $\geq 40$  seconds in ten minutes period) or failed to show favorable cervical changes (reach at least 4cm in dilatation and fully effaced) despite being on oxytocin drip for at least six to eight hours (1, 15)



## 1.2. Statement of the problem

Induction of labor is the initiation of contractions of the uterus in an effort to have a vaginal birth, for babies who are physically ready to enter the world. Labor induction may be recommended if the health of the mother or fetus is at risk and may be induced for nonmedical reasons, such as living far away from the hospital. Induction of labor (IOL) is a critical life-saving intervention that reduces adverse outcomes, but it is a risk to the mother or fetus, this intervention may result in an expected effect(13).

Globally maternal mortality ratio (MMR) declined by 38 per cent – from 342 deaths to 211 deaths per 100,000 live births from 2000 to 2017. In Sub-Saharan Africans suffer from the highest maternal mortality ratio – 533 maternal deaths per 100,000 live births, or 200,000 maternal deaths a year(16).

According to World Health Organization (WHO) estimates, the magnitude of MMR in Ethiopia decline from 1250 in 1990 to 353 in 2015(17). But according to 2016 EDHS from 871 deaths per 100,000 live births in the 2000 EDHS to 412 deaths per 100,000 live births (18).

As one of the objective to reduce or to prevent maternal mortality, ending preventable maternal mortality; target 3.1 of Sustainable Development Goals (SDGs) 3 is to reduce the global MMR to less than 70 per 100 000 live births by 2030(19, 20).

In order to overcome the morbidity and mortality of the mother and the infant, induction of labor (IOL) is the most essential process to initiate labor by artificial means from 28 weeks of gestation. It is one of the modern obstetrics practice now a days to decrease the risk of maternal and neonatal morbidity and mortality by ending the pregnancy in presence of many obstetrics and medical conditions (prolonged pregnancy, hypertensive disorders, and etc.) that threaten the continuing of pregnancy (6).

Induced labor also has an impact on the birth experience of women. It may be less efficient and is generally more painful than spontaneous labor. It is more likely to require epidural analgesia and assisted birth(21).

On the other hand, even if induction of labor is very important it has the major risks associated with it include: increased cesarean delivery (C/D)(more on nulliparous) and operative vaginal delivery rate with the risk of traumatic birth, post-partum hemorrhage (PPH due to atony), chorioamnionitis,tachysystole with abnormal fetal heart rate patterns, increased cost, rarely uterine rupture, maternal water intoxication, delivery of preterm infant due to incorrect estimation of dates, and possibly cord prolapse. ([1](#), [13](#), [22](#)).

Always induction of labor may not be successful, It can be failed and end up with adverse perinatal and maternal outcomes due to prolonged labor inductions, economic burden (costs in terms of staff, medication and hospitalization) and health system quality perception (maternal discomfort) may occurred([14](#)).

Whatever the outcome of induction of labor the rates of induction of labor vary from region to region. According to WHO reports there are increasing in the number of pregnant women who underwent induction of labor (artificially initiated labor) in developing countries with overall rates exceeding 20% of all births ([22](#)).Whereas in developed countries, up to 25% of all deliveries at term now involve induction of labor ([11](#)).

The current data show that induction of labor reached up to 35.5% in Sri Lanka, 24.5% in the United States, and from 6.8 to 33% in Europe([12](#)).In United kingdom about 23%of all deliveries are by induction of labor while 11.4% was reported in Latin America([9](#)). Induction accounted for 4.4% (Africa) and 12.1% (Asia) of deliveries. Rate of induction labor are also low in some Africa region evidenced by in Nigeria, the magnitude of induction of labor was 6.5% and in DR. Congo which was 3.2% ([2](#), [9](#), [23](#)).

In Ethiopia, induction of labor is practiced widely in all hospitals. The study conducted in south west Shewa shows that the prevalence of induction in Woliso St. Catholic hospital was 22.4% and Northern Ethiopia at Woldia General Hospital 24.4%([6](#), [9](#)).

During the process of induction, inductions of labor end up with either success or risk of failed induction of labor. Because of the fear of risk of failed induction of labor, a variety of maternal and fetal factors have been detected before the starting of induction to predict labor induction success. These include maternal factors such as parity, maternal age, Bishop Score and its individual components, fetal factors such as presentation, birth weight and gestational age([1](#)).The

study conducted in Ethiopia shows that the prevalence of success and failed induction ranges from 57.89% to 65.7% and 21.4% up to 42.11% respectively(1, 6, 9).

Despite these challenges and risks related to the use of induction to initiate labor with clear indication by appropriate methods for the purpose of getting healthy neonate and mother, like many other countries the national rate of outcome of induction of labor and associated factors were not studied in Ethiopian especially in the study area. So this study tried to fill the gap in lack of sufficient evidence in magnitude of outcome of induction of labor and its associated factors which helps to improve the quality of IOL, to decrease its risks, and unnecessary indication of the procedure in the study area by determining the magnitude of outcome of induction of labor and identifying its associated factors among mothers who could be managed at Bahir Dar city public health institutions, North West, Ethiopia.

### **1.3. Justification of the Study**

Induction of labor now a day becomes a common practice in the modern obstetrics care; the procedure may not have always good outcome and not always bad outcome to achieve a safe vaginal delivery, in bad outcome not only end up with C/S but also other complications like PPH, chorioamnionitis, uterine atony and imminent uterine rupture . So in order to know both the success rate and failure rate with its complications of induction of labor this research will be done due to the absence of other study similar to this title at Amhara Region specifically in Bahir Dar city but the study done at Jimma University Specialized Hospital only study outcome of induction for term and post term of pregnancy, at Woldyia General hospital study prevalence and failure rate of induction of labor concluded by only 89 cases ,another study was conducted in Army Hospital Addis Ababa done on prevalence and associated factors of success of induction of labor and the study done at Wolliso St. Luke, Catholic Hospital, South West Shewa in Oromia is closely related to my title but its location of study different from this title study area and conclude prevalence and success/failure rate by only 76 cases . And also all the study listed in the above done by secondary data from card review (1, 6, 9, 37). But this study will be done by using primary data with 413 cases, levels of health personnel (worker) and level of health institutions (referral hospitals or primary hospitals or health centers) include as additional two independent variables.

#### **1.4. Significance of the Study**

It will have relevant for different stake holders, first for the mothers including their fetus and health care providers in study area and other part of the country to know the outcome of induction of labor. Secondly, it will provide information for Bahir Dar city health department office, each health institutions, for other zonal health office, Regional health Bureau and minister of health and other stakeholder's to revise clinical guideline and working conditions for induction of labor across the country. Finally, this study will used as base line for researchers and academic institutions to do further studies on induction of labor.

## 2 Literature Review

### 2.1 Prevalence of outcome of labor induction

Even if the general aim of induction is to achieve vaginal delivery and to decrease the number of caesarean deliveries next to safeguarding the health of the mother and the fetus, caesarean section is increasing in worldwide due to un successful induction of labor (24). The study conducted at King Khalid University Hospital in Saudi University the prevalence rate of failure of IOL was 16% delivered by caesarean section(25). Related finding found at Tribhuvan University, Kathmandu, in Nepal the rate of vaginal delivery after induction of labor was found to be 64.9%(22). Another study done at Baltimore in Maryland the failed labor induction and delivered by C/S was estimated to be approximately 20%(26). In addition to the study conducted in Pakistan 18.1% had failed induction(27). Also the study in Africa and Asia the success rates of induction of labor were generally over 80% (23). In a study done in Nigeria the success rate for induction of labor with outcomes of vaginal delivery was 82.2% while 17.8% ended as caesarean sections (28). The study carried out at university clinics of Kinshasa in Democratic Republic of Congo cesarean section were 29.6% of the induction(3). An institutional based cross sectional study conducted at Kenyatta national hospital, Nairobi on Outcomes of induction of labor in women who delivered at Kenyatta national hospital shows that 62% of women have successfully induced (29). In Ethiopia A hospital based cross sectional study conducted at public hospitals of Mekelle town on Prevalence, outcomes and associated factors of labor induction showed that out of 346 induced mothers , induction was successful in 76% while the failure rate was 7.2% (30). According to institution based cross sectional study done at Wolayita Sodo, South Ethiopia on Success of labor induction shows, 26.5% of them have undergone CS due to failed induction of labor (31).

At Jimma University Specialized Hospital the prevalence of failed induction was diagnosed in 21.4% of the mothers (1).Also the study conducted at Wolisso St. Luke, Catholic Hospital, and South West Shewa in Oromia women undergone induction of labor with a success rate of 57.89% (9).According to Institutional based case control study conducted at Mettu Karl Hospital 2018, Oromia Regional state, south west Ethiopia on determinant of failed induction of labor shows that 33.3% and 66.7% of them have failed and successful induction of labor respectively.(32)A institution based cross sectional study done at Hawassa public health

facilities, SNNPR, Ethiopia on prevalence of failed induction of labor and its associated factors shows that prevalence of failed induction of labor was 17.3%[\(33\)](#).

Another study in Ethiopia at Lemlem Karl Hospital in Tigray region study done after induction 26.2% delivered by caesarean section [\(2\)](#). The result of the study revealed in Ethiopia at Woldyia general hospital, induction of labor was done with 37.4% of them had failed induction of labor and the proportion of failed induction of labor was 19.7 % in Dessie Referral Hospital [\(6, 13\)](#).

## **2.2 Factors associated with outcome of labor induction**

### **2.2.1 Socio-demographic factors**

A study conducted at Aga Khan University Hospital, Karachi in Pakistan shows failed induction rate was more common in nulliparous patients (25.3%) as compared to their multiparous (6.8%). Similarly 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 having macrocosmic babies (3.8%) than patients with successful inductions (1.5%) [\(27\)](#)

A study conducted from the Departments of Obstetrics and Gynecology, University of California and University of New Mexico Medical center lower maternal BMI, “elective” induction of labor, tall maternal stature, multiparous and neonatal birth weight less than 4,000gm were associated independently with an increased likelihood of successful induction of labor. It was also shows that women having failure of induction were having macrocosmic babies (3.8%) than patients with successful inductions (1.5%) [\(34\)](#)

A study conducted at King Khalid University Hospital, Riyadh and Kingdom of Saudi Arabia shows that the most common indication for IOL was post-term pregnancy (31%) cases followed by gestational and preexisting diabetes mellitus (23.2%) of the participants. The third most common indication for IOL was PROM (15%) of the cases. The study also indicate that multiparity and lower maternal BMI were associated independently with an increased likelihood of successful induction of labor, and nulliparous women were more likely to undergo CS due to failed induction. Although it is not statistically significant, gestational age > 37 weeks had raised odds of vaginal birth compared to with gestational age less than 37. [\(25\)](#).

The success or failure of induction was more likely to occur in association with maternal weight and somewhat birth weight. Risk for cesarean section was increased in association with induction of labor in cases of high maternal weight, and somewhat of high birth weight; study conducted at university clinics of Kinshasa, in Democratic Republic Congo(3).

The study conducted in Kenyatta national hospital, Nairobi, revealed that women with age of 30 and below are almost 2 times more likely to be successfully induced to that of above age of 30. But according to this study parity, gestation age, religion, is not statically significantly associated in determining the success of induction of labor. (29)

The study carried out in Ethiopia at Hawassa Public health facilities showed that the odds of failed induction were 3.11 times more likely in Primipara mothers than multiparous one; failed induction were 9.21 times more likely in mothers with age greater than 30 years than others(35).

The study done at Jimma University Specialized Hospital primigravida women was 2.3 times more likely to have failed induction as compared to multigravida mothers(1).

A study conducted in Wolayita Sodo University teaching referral hospital shows that women whose age  $\leq 24$  years were positively associated with successful induction of labor (36).

The study done Dessie Referral Hospital revealed that failed induction were 4.171 times more likely in women lives in rural area than women who live in urban area and were 1.720 times more likely in primipara than women who were multipara(13).

### **2.2.2 Obstetrics factors**

A study conducted at Aga Kahan University in Pakistan Failed induction rate was 4.6 times more likely occurred in nulliparous patients (25.3%) compared to multiparous women (6.8%).

At the same time cesarean section was done more likely after induction of labor in women having gestational age of more than 40 week. It was also detected that women having failed of induction labor were 2.5 times having macrosomic babies (3.8%) than mothers with successful inductions of labor (1.5%).

And Also according to this study failed induction was more likely with bishop score of 5 or less(84%) than with favorable bishop score(18%)(27).

Looking at the outcome of induction of labor according to parity, the nulliparous women have highest failure rates achieved in 63.5% of them. Multigravida had higher rates of vaginal delivery at Jos University teaching, hospital, Jos, in Nigeria(28).

A study conducted at Mekele town public hospitals Bishops score after cervical ripening is found to be the only predictor of successful induction of labor and it is eight times more likely to succeed if the Bishop's score is favorable.(30)

A study at Hawassa Public health facilities; failed induction were 4.54 times more likely in mothers with pre- induction bishop score of less than five than those with pre-induction bishop score of greater than five; the failed induction were 5.66 times more likely in mothers with premature rapture of membrane than others; the failed induction were 6.57 times more likely in mothers with greater for gestation than others, the failed induction were 4.52 times more likely in mothers with post term than others(35).

The study conducted at Army Hospital in Addis Ababa ,Ethiopia revealed that age of women(<24yr), bishop score>5, Apgar score and fetal heart beat at the beginning of induction were significantly associated with success of induction of labor. (37).

The study conducted at Wolliso St. Luke, Catholic Hospital, South West Shewa, Oromia Bishop score >5 , fetus who have no fetal heart beat abnormality , gestational age (<42 weeks) ,membrane rupture before induction of labor, mother who have ANC follow up more likely successful compared with bishop score <5,fetus with fetal heart beat abnormality,gestational age >42 ,mother without ruptured membrane before induction of labor , without ANC follow up respectively.(38)

Study done at Jimma University Specialized Hospital, women who had unfavorable Bishop Score at admission were 5.3 times more likely to have failed induction as compared to women with favorable Bishop Score, moreover, those women with intermediate Bishop Score at admission were 4.3 times more likely to have failed induction compared to those women with favorable Bishop Score at admission(1).

The study in Woldyia general Hospital revealed that parity, indication and bishop score before induction shows significant association. However only parity and bishop score show significant



relation at multivariate logistic analysis with prime Para and bishop score of less than six have significant association with failed induction(6).

Another study at Wolayita Sodo University teaching referral hospital; Significant association between women's bishop score and success of labor induction was observed, in which women with bishop score greater than 5 were about 7 times more likely to have successful induction when compared to those with less than or equal to 5(36).

A study was conducted in four selected hospitals in Ethiopia bishop score, emergency induction, performing artificial rupture of membrane and delivery to non-macrosomic fetus were positive determinants of successful induction. (39)

The failed induction of labor were 0.147 times more likely in women whose Bishop score is unfavorable than women whose Bishop Score is favorable one in Dessie Referral Hospital(13).

### **2.2.3 Methods for the outcome of induction of labor**

Study in Nepal revealed that vaginal delivery within 12 hours was seen in 18.4% of the patients given with misoprostol and 43.5% in oxytocin group(22). The findings in Latin America success rate of vaginal delivery was very similar for oxytocin (69.9%) and misoprostol (74.8%), with an overall success rate of 70.4%(40).

Study carried out at University of Michigan, in USA Prostaglandin E2 (PGE2) and vaginal misoprostol were more effective than oxytocin in bringing about vaginal delivery within 24 hours of induction of labor(41).

The study in Africa and Asia shows most successful method was oxytocin only in Africa (86.1%) and oxytocin, misoprostol/other prostaglandin and a non-drug method in Asia (86.3%)(23).

The study at university clinics of Kinshasa in Democratic republic of Congo of (29.6%) cesarean sections due to failed induction were because of oxytocin (23.5%), misoprostol (8.8%), Foley catheter (8.8%), and with amniotomy (5.8%)(3).

In Ethiopia the study done in Woldyia, among women induced by IV infusion of oxytocin only had higher successful rate (73.2%) than women induced by others methods(6).

### 3. Conceptual framework

Based on review of literatures done in different part of Ethiopia outcome of induction of labor can be affected by maternal demographic factors, method of induction used indication for induction of labor and obstetric history as shown in fig. 1.

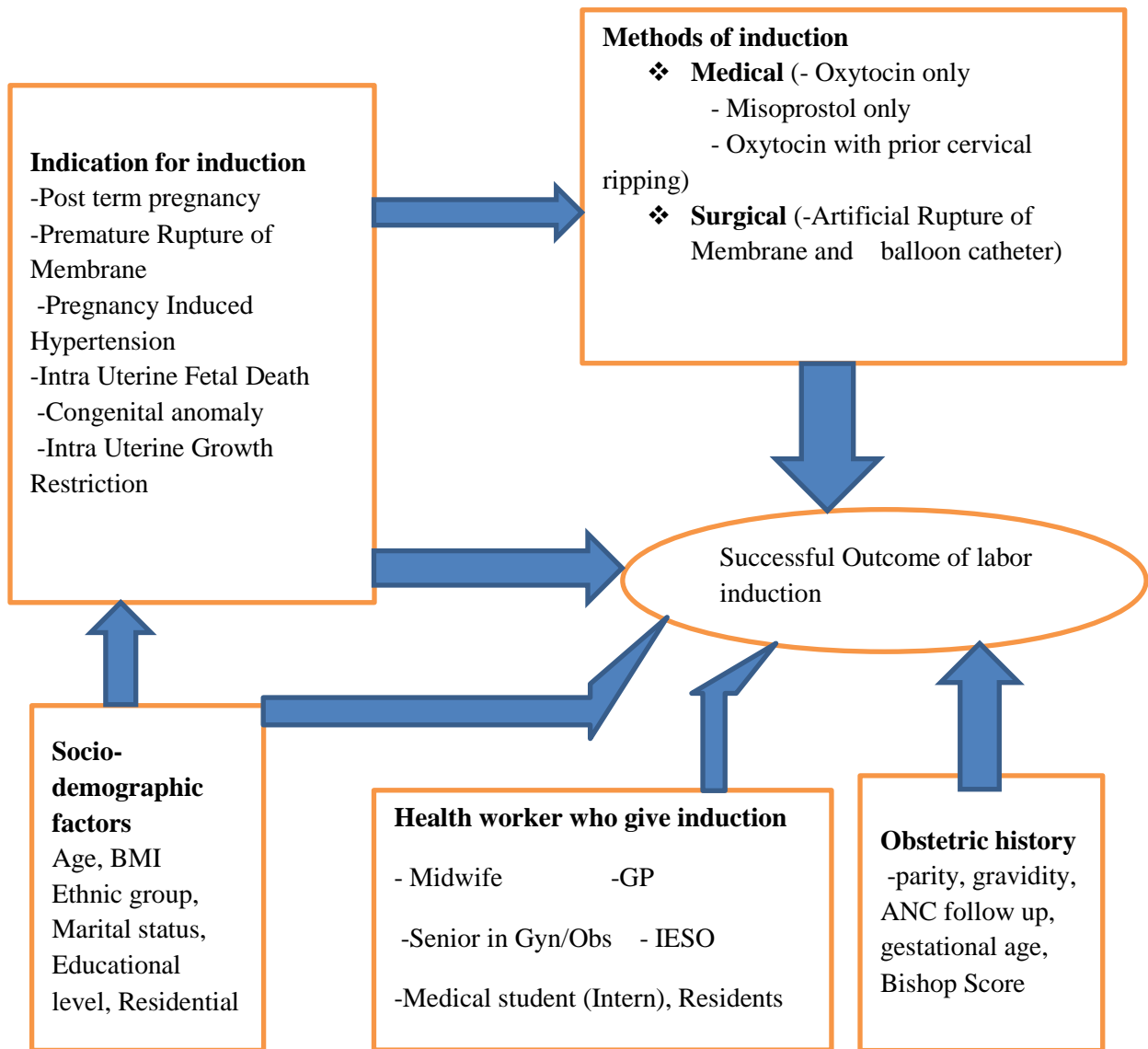


Figure 1: Conceptual framework for factors affecting outcome of induction of labor is adapted from other related literatures (6, 37).

## **4. OBJECTIVES**

### **4.1. General objective**

- To assess outcome of labor induction and its associative factors among mothers managed in Bahir Dar city public health institutions, North West, Ethiopia, 2021

### **4.2. Specific objectives**

- 1 To determine the magnitude of success outcome of labor induction among mothers managed in Bahir Dar city public health institutions.
- 2 To identify factors associated with success outcome of labor induction among mothers managed in Bahir Dar city public health institutions.

## **5. METHOD**

### **5.1. Study area**

The study was conducted at Bahir Dar city. Bahir Dar city is the capital city of Amhara National Regional State in the federal democratic Republic of Ethiopia. According to Amhara bureau of finance and economic development (BOFED) The population of Bahir Dar city was estimated to be 339, 683. Among this 176,376 (46%) of them are females. The city has one specialized, one referral , one primary governmental hospital ( Tibebe-Ghion , Felege- Hiwot, Addiss- Alem) respectively, 11 health center (including one private health center), 10 health post, one family guidance association clinic, 4 private general hospital and 35 medium private clinic. Among these health facility The 3 public hospitals and only one public health center which are owned by the government named Tibebe-Ghion, Felege -Hiwot, Adiss- Alem hospital and Han Health center provide almost every Emergency Obstetric and new born cares service including basic obstetric procedure as like that of induction of labor(42)

### **5.2. Study design and period**

Institutional based cross-sectional study was conducted from March 1 to June 30, 2021.

### **5.3. Population**

#### **5.3.1. Source population**

All pregnant women who were admitted for induction of labor in Bahir Dar city public health institutions.

#### **5.3.2. Study Population**

All pregnant women who were admitted for induction of labor during the study period in Bahir Dar city public health institutions.

### **5.4. Eligibility criteria**

#### **5.4.1. Inclusion criteria**

All pregnant mothers who had had induction of labor at maternity ward were included during the study period.

#### **5.4.2. Exclusion criteria**

Pregnant mothers who had induction of labor and who could not respond during interview till the time of discharge due to psychiatric cases and critical illness.

## 5.5. Sample size determination

Single population proportion formula will be used for the first specific objective

$$n = \frac{(Z_{\alpha/2})^2 * (P) (1-p)}{d^2}$$

Where: n = minimum sample size required

p= Prevalence of success of labor induction (57.8%)(30).

d=maximum tolerable error which is=0.05

Z (α/2) =value of standard normal distribution at 95% confidence level which is 1.96

$$n = \frac{(1.96)^2 * (P) (1-p)}{(0.05)^2} = (1.96)^2 * (0.57) (1-0.57) = 376$$

For the second objective the sample size calculated by using Epi-info version: 7.2.2.6 in different factors

**Table 1: sample size determination using Epi info v7.2.2.6, BDU, Ethiopia, 2021**

Factors for outcome of induction	%outcome in unexposed group	%outcome in exposed group	Ratio(unexposed: exposed)	OR	Sample size using 95% CI&power 80%	Reference
Gestational age	47.6%	68.7%	1	2.4	188	(9)
Gravidity	66.9%	82.5%	1	2.33	268	(1)

---

From the above table, sample size is obtained by taking the greatest one from the three alternatives which is 268, but it is smaller than from the first objective (376). So, the first objective should be taken as the final sample size for this study after adding non-response rate. Then, after adding 10% of none response rate, the final sample size for this study will be 413.

### 5.6. Sampling technique and procedure

A total of three public hospitals and one public health center which provide induction service found in Bahir Dar city, the expected average numbers of admissions for induction per month were 211 and a total sample size of 413 mothers were selected from the three hospitals and one health center for four consecutive months. The total average number of pregnant mothers admitted for induction of labor for four months were 839 because for one or two month admitted cases were not enough to fulfill the calculated sample size (413) by systematic random sampling probability method.

All pregnant mothers from the three public hospitals and one public health center that were admitted during the study period considered for the study was 844. Then the sample size was proportionally allocated to each health facility, in subsequent, systematic random sampling technique was used by taking K- interval,  $K = \frac{N}{n}$ , where: N = Total population, n=Total sample size, but calculating K-value for each hospital is necessary by using  $K1 = \frac{N1}{n1}$ ,  $K2 = \frac{N2}{n2}$ ..... (K= 2.0 ..... every 2 admission was taken for each health institutions and after the first case selected randomly between 1 and K).

In ordered to obtain the number of cases in each health institutions Proportional allocation formula was used to get the sample size for each hospital:  $n_i = \frac{n \times N_i}{N}$ ,

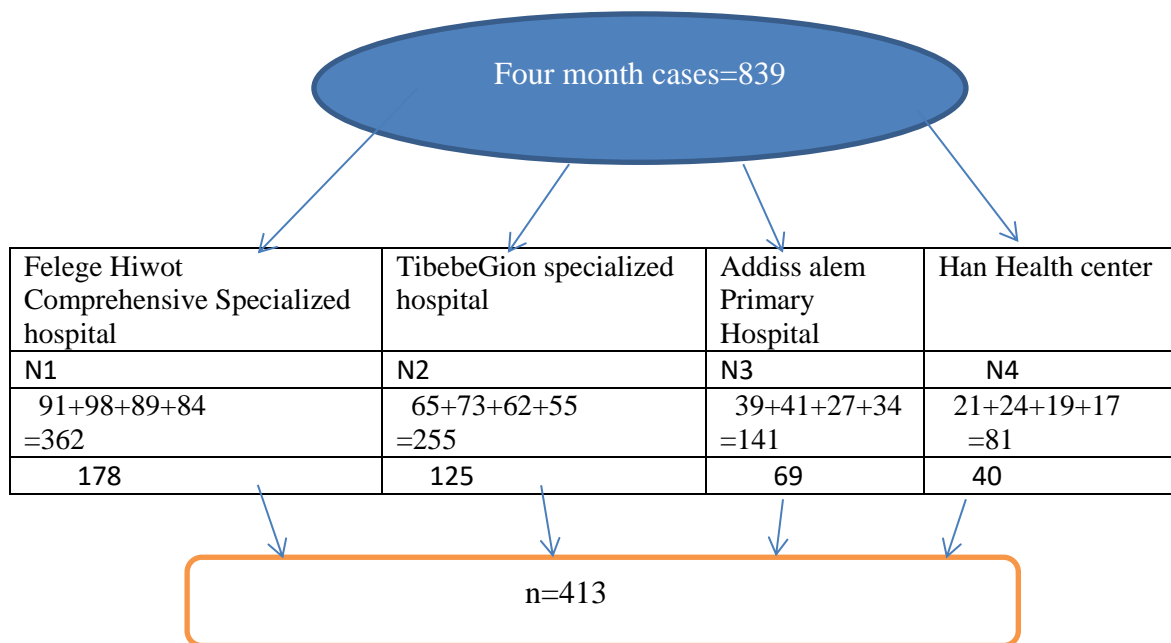
Where: n= Total sample size

$n_i$  = is the sample sizes of  $i^{\text{th}}$  hospital or health center

$N_i$  = is the population size of  $i^{\text{th}}$  hospital or health center

N= Total population or total pregnant mother admission to labor ward for induction per month in all health institution.  $N = N1+N2+N3+N4$ .

The total populations admitted for labor induction in four month for all three hospitals and one health center were 839,  $N=362+255+141+81 =839$  , because one month or two month cases were not enough to fulfill the required samples.



**Figure 2: Representation of sampling procedure, BDU, Ethiopia, 2021**

## 5.7. Study variables

### 5.7.1. Dependent Variable

Successful labor induction (YES/NO)

### 5.7.2. Independent variables

- ✓ **Socio demographic factors** (Age, ethnic group , marital status, educational level, Residential)
- ✓ **Obstetric history** (parity, gravidity, cases ANC follow up, gestational age, Bishop score)

- ✓ **Indications of induction** (post-term pregnancy, pregnancy-induced hypertension, PROM, IUFD and others )
- ✓ **Methods of induction** (oxytocin only, oxytocin with prior cervical ripping, misoprostol only, artificial rupture of membrane and Foley balloon catheter )
- ✓ **Health worker who give induction** (Midwife, Medical student (Intern), GP (General Practitioner), IESO/ Senior in Gyn/Obs), GYNY/OBS Resident.
- ✓ **Public Health Institution** (referral hospital, primary hospital and health centers)

## 5.8. Operational Definitions

**Outcome of labor induction:** The result of induction of labor either success of induction of labor or failure of induction of labor during induction procedure for any indication by any method of induction

**Successful induction:** The ability of achieving good uterine contraction; 3-5 contraction per 10 minute which lasts 45-60 seconds and result in cervical dilatation and descent of the presenting part after 6 to 8 hours of oxytocin administration and use of the maximum dose for at least one hour for aim of a women to deliver fetus vaginally with or without aid of instrument after induction of labor. (10)

**Failed induction:** Failed induction is failure to initiate good uterine contraction. It is diagnosed if adequate uterine contractions are not achieved after 6 to 8 hours of oxytocin administration and use of the maximum dose for at least one hour(10)

**The Bishop Score:** predicts the likelihood of vaginal delivery after induction with Oxytocin. This indicates the status of the cervix by the five parameters like Dilation, Effacement, Station, Consistency and Position of the cervix. It can be favourable or unfavourable.

Score  $\geq 6$  is **Favourable**, Cervical condition and induction is likely to succeed. There is no need cervical ripening and induction using oxytocin can be planned.



Score  $\leq 5$  is **Unfavourable**, Cervix is unlikely to yield for induction; cervical ripening is needed for success with induction ; postpone induction for next week if possible or use cervical ripening and plan induction for next day (10).

## **5.9. Data collection tool and procedure**

The data were collected using an interviewer administered structured and pre-tested questionnaire from the mothers and bishop score the only data could not be obtained directly from the respondents so that; they were collected from their documents. The questionnaire were developed by reviewing different literatures, which have been conducted in Ethiopia so far.

The questionnaire were containing the following items: socio-demographic features, obstetrics history and characteristics, details of induction of labor and outcome of it (indication, method, mode of delivery). Four trained BSc midwives who are currently not employed were recruited as data collectors. Mothers were interviewed when the induction started and the final outcome was recorded at the end of induction.

## **5.10. Data quality control**

To assure data quality, the questionnaire were prepared in English and they were translated to Amharic and back to English by language experts who are linguist (preparatory English teacher). Besides, a one day training and clear orientation about the tool of this study was given for data collectors and supervisor. Furthermore, before the actual data collection, pretest was done by taking 5% of the study population at Debre tabor Referral Hospital and necessary modification was made. This was done before two weeks the actual data collection. Finally, the data was collected under close supervision and the completeness of each questionnaire was checked before data entry.

## **5.11. Data processing and analysis**

After data collection, data were entered using Epi-Data Version 4.6. Data was analyzed using SPSS Version 25 statistical. Descriptive statistics for continues variables were summarized using mean and the descriptive results for categorical variables were presented using proportions, frequency tables. Then, binary logistic regression was used to identify significant factors. In the bivariable analysis, variables with p-values less than 0.25 were entered into the multivariable

analysis. In the multivariable analysis, variables with p-values less than 0.05 were considered as statistically significant factors. Adjusted odds ratios with its 95% CIs were used to interpret the associations. The model fitness was checked using Hosmer and Lemeshow goodness of fit test.

### **5.12. Ethical considerations**

Ethical clearance was obtained from an institutional Review committee of Bahir Dar University, College of Medicine and Health Science. Besides, a formal letter was secured from the medical director of each study hospital. Furthermore, the purpose of this study was explained to all mothers who were involved and informed or verbal consent was obtained from all mothers before the beginning of interview. Finally, the confidentiality of all data was maintained during storage and management of data.

## 6. RESULT

### 6.1 Socio-demographic factors of respondents

A total of 413 mothers participated in the study, giving a response rate of 100%. Majority (83%) of the respondents were found within the age group of 20-34 years. About 40% and 32.7% of the mothers have BMI with a range of 25-29.9kg/m and >30kg/m<sup>2</sup> respectively. Majority of (90.1%) of the women were Orthodox religion followers and almost all mothers (99.2%) were Amhara by ethnicity. Majority of (98.7%) mothers were married and about 71.9% of the mothers were from urban areas. About 45.8% of the respondents were can read and write and about 41.2% of the respondents were housewife in occupation.

**Table 2: Socio-demographic characteristics of the mothers who under gone induction of labor in Bahirdar city public health institutions, Amhara region Ethiopia, 2021.**

Variables	Categories	Frequency (N)	Percentage (%)
Age of the mother	≤19	13	3.1
	20-34	344	83.3
	>34	56	13.6
BM	<25	236	57.4
	25-29.9	168	40.9
	≥30	7	1.7
Religion	Orthodox	372	90.1
	Muslim	22	5.3
	Protestant	19	4.6
Ethnicity	Amhara	410	99.2

	Tigrie	3	0.72
Marital status	Maried	408	98.7
	Single	5	1.2
Resident	Urban	297	71.9
	Rural	116	28.1
Maternal educational status	Can not read and write	60	14.5
	Can read and write	189	45.8
	Grade1-8	23	5.56
	Grade9-12	34	8.23
	Diploma and above	107	25.9
Occupation	Farmer	35	8.5
	Merchant	76	18.4
	House wife	170	41.2
	Governt employe	108	26.2
	Other	24	5.8
	Other = no work		

## 6.2 Obstetric characteristics and indication for induction

Nearly half (50.6%) of the respondents were multigravida and about 78.7% of the respondents were primipara. about 31.9% of the mothers had term pregnancy. This study also revealed that about 68.7% of the participants had at least one ANC follow-up during the current pregnancy. Regarding indication for induction, nearly half (47%) of the mothers were indicated due to PIH followed by POST TERM and PROM 24.7%) & (11.4%) respectively. About (54%) of the respondents had ruptured membrane before induction commenced. Nearly half (50.5%) of the women induced by oxytocin with cervical ripening method and majority of the inductions were

given by midwives (63.2%). more than the half of the respondents (55.7%) and (44.3%) had unfavorable and favorable bishop score respectively.

**Table 3 Obstetrics and induction characteristics of women who under gone induction of labor in Bahirdar city public health institutions, Ethiopia, 2021.**

Variables	Category	Frequency	Percentage (%)
Gravidity	Primigravida	204	49.4
	Multigravida	209	50.6
Parity	Primipara	325	78.7
	Multipara	88	21.3
Gestaional age	<37week	148	35.8
	37wk-41week	132	31.9
	≥42 weeks	75	18.2
	Unknown LNMP	58	14
ANC	YES	284	68.7
	NO	129	31.2
Indication for induction	Post term	102	24.7
	PROM	47	11.4
	IUFD	16	3.9
	PIH	194	47
	OTHERS	54	13.1
Membrane rupture before induction	YES	54	13.8
	NO	359	86.2
Method of Induction	Oxytocin only	198	47.9
	Oxytocin with cervical ripening	215	50.5
Bishop score	≥ 6	183	44.3
	≤ 5	230	55.7
Induction given by	Midwives	261	63.2
	Medical student (intern)	87	21
	Resident	65	15.7

Other= oligohydraminous, Mild abruption
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### 6.3 Outcomes of labor induction

The study revealed that from all mothers undergone induction of labor, About (78.7%) labor induction achieved adequate uterine contraction (successful outcome). More than two-thirds in the case of mode of delivery, about (72.9%) of the women delivered through the vagina. The most common (78.7%) indication for C/s was failed induction followed by fetal distress.

**Table 4 Outcomes of labor induction among women delivered in Bahirdar city public health institution, Ethiopia, 2021.**

Variables	Categories	Frequency	Percentage (%)
Successful outcome of labor induction	YES	325	78.7
	NO	88	21.3
Mode of delivery	Vaginal	301	72.9
	C/S	112	27.1
If delivery was by C/S Indication for C/S	Failed induction	87	21.1
	NRFHRP	18	4.4
	CPD	8	1.9
	OTHERS	1	0.2
Complication due to induction	NRFHRP	28	6.8
	Utrine hyperstimulation	11	2.6
	PPH	8	1.9
	Utrine rupture	1	0.24

	No complication	365	88.3
	Other*=cervical arrest,G3MSAF.		

**6.4. Bivariable and multivariable regression analysis**

In the bivariable logistic regression analysis, bishop score, residency, gravidity, parity, membrane rupture before induction, method of induction, and BMI were eligible for multivariable analysis with p-value <0.25. At the final model, bishop score, parity, induction by oxytocin with cervical ripening, resident and BMI of the respondent were significantly associated with the successful outcome of labor induction.

The odds of successful labor induction among mothers who had favorable bishop score were 4.45 times more likely to have successful of labor induction as compared to mothers who had unfavorable bishop score ( AOR:4.45,95% CI(2.392, 8.299)). Mothers who were multiparous had 3.26 more likely success of induction as compared to primiparous mothers (AOR: 3.21, 95% CI(1.399,7.386)).

Mother who live in rural area were 3.8 more likely to have success of labor induction compared to mothers who had urban residency( AOR:3.83,95%CI(1.866,7.872)).Mothers who were induced by oxytocin with cervical ripening almost three times more likely success of induction than that of induced by oxytocin only (AOR:2.9, 95% CI(1.645,5.132)). Finally, women with BMI of <25kg/m2 were 4 times likely success of labor induction as compared to BMI >30kg/m2 (AOR: 4.066, 95% CI (1.828, 9.047)).

**Table 5 Factors associated with outcome of induction of labor among women who undergone induction of labor in Bahir dar city public health institutions, Ethiopia, 2021.**

Variable	Category	outcome of labor induction		COR(95%CI)	AOR(95%CI)
		Successful N= 325	Failed N=88		
Bishop	≥6 (favorable)	167(91.3%)	16(8.7%)	4.756(2.653, 8.527)	4.455(2.39, 8.29)*
	≤5 (Unfavorable)	158(68.7%)	72(31.3%)	1**	1**
Gravidity	Multigravida	172(82.3%)	37(17.7%)	1.55(0.963, 2.494)	1.66(0.943, 2.923)
	Primigravida	153(75%)	51(25%)	1**	1**
Parity	Multipara	80(90.9%)	8(9.1%)	3.265(1.513, 7.048)	3.214(1.399, 7.386)*
	Primipara	245(75.4%)	80(24.6%)	1**	1**
Resident	Rural	104 (89.7%)	12(10.3%)	2.98(1.553, 5.72)	3.833(1.866, 7.872)*
	Urban	221(74.4%)	76(25.6%)	1**	1**
MOI	Oxytocin with Cervical ripening	183(85.1%)	32(14.9%)	2.255(1.386, 3.668)	2.905(1.645, 5.132)*
	Oxytocin only	142(71.7%)	56(28.3%)	1**	1**
BMI	<25	103 (91.2%)	10 (8.8%)	3.889(1.835, 8.243)	4.066(1.828, 9.047)*
	25-29.9	124(75.2%)	41 (24.8%)	1.142(0.681, 1.916)	1.026(0.563, 1.869)
	>30	98(72.6 %)	37(27.4%)	1**	1**
Membrane	yes	50(87.7%)	7(12.3%)	2.104(0.918, 4.819)	1.182(0.464, 3.013)
Rupture	NO	275(77.2%)	81(22.8%)	1**	1**
Before Induction					

Note \*\* =reference, \* =significantly associated.



## 7. DISCUSSION

This study found that the magnitude of success of labor induction in Bahir dar city public health institution was 78.7% with 95% CI (75, 83). The finding of this study is in line with studies done in Jimma University Specialized Hospital (78.6%)(1), public hospitals of Mekelle Town(76%)(30) and Nepal (76.5%)(22). This might be the three most common indication of induction was the same as this study which were PIH, Post term pregnancy and PROM. And also at the Catholic Maternity Hospital (CMH) in Ogoja, Cross- River State, South-South, Nigeria (75.9%)(43); it in line with this study it could be because it was done in a Health Resource Poor Setting like that of Ethiopia. However, this finding is higher than the findings reported from Woldia General Hospital (62.2%), Lemlem Karl hospital, Miachew Town (54.5%), Wolliso St. Luke, Catholic hospital (57.89%), and Army Referral hospital in Addis Ababa, Wolaita Sodo (59.7% )(2, 6, 9, 36, 37). This variation might be due to increment in of quality of care as well as increasing the number of health care professionals such as Gynecologists/obstetricians and midwives in each hospital and the availability of cardiotocography(CTG) for fetal monitoring during induction. The finding of this study is higher than that of study done in university clinics of Kinshasa, DR Congo (70.1%) ((39) It could be the reason of the procedure of induction conducted in Congo by using direct oxytocin IV infusion without cervical ripening.

The study indicated that the success of induction lower than the study done in Hawassa Public Health Facilities (82.7%)(35). This discrepancy may be, the most common reason of induction for this study was PIH but in the study in Hawassa Public Health Facilities most indication of induction was PROM, it increase success of induction. Compared to another study this study success of induction was lower than the study conducted in Jos University teaching, hospital, Jos, Nigeria (82.2%) (28) This difference might be induction conducted by membrane rupture done at the same time induction commenced with oxytocin IV infusion which increases success

of induction. The success of induction was lower than that of done in King Khalid University Hospital, of Saudi Arabia (84%) (25). This is could be because of the use of PGE2 in King Khalid University Hospital which has higher effect for cervical ripening. It had also lower proportion of success of induction compared to the study done in Aga Khan Hospital, Karimabad, Pakistan (81.9%) (27) because after 10-12 hours of Foley's catheter insertion, Prostaglandin E2 (PGE2) 3mg was inserted vaginally, and the dose was repeated after six hours, this leads the increase success of induction.

The most frequent indication of induction in this study was PIH, which is supported with the study done in Amhara region referral hospital on outcome and factor associated with induction of labor, Lemlem Karl hospital, Miachew town (44), (2, 9, 23) and the same with study done in King Khalid University Hospital, of Saudi Arabia and Tribhuvan University, Kathmandu, Nepal (22), 25) The maximum amount of induction in the study carried out in the gestational age of between 37 and 41 which is the same as the study done in Africa: secondary analysis from the 2004-2005 WHO Global Maternal and Perinatal Health Survey and Lemlem Karl hospital, Miachew town (2, 45). The study revealed that majority of the induction practiced in primigravida which is the same as study done in Southwest Nigeria (46) and Paropakar Maternity and Women's Hospital, Nepal (22).

Those mothers who reside from rural area the chance of success of labor induction is more likely by 3.8 times (AOR= 3.833, 95%CI (1.866, 7.872)) as compared to mothers from urban residence. The possible reason of this ,the living standard of the urban resident is better or luxurious than rural residents due to this the weight of urban more higher or obese than rural resident, this leads to higher BMI measurement and the respondent who had higher BMI induction mostly end up with failed. Favorable Bishop Score was associated with success of induction by 4.45 times (AOR= 4.45, 95%CI(2.392, 8.299)) than unfavorable bishop score. This study supported by study done in Aga Khan University Hospital, Karachi in Pakistan ,Hawassa Public Health Facilities, Ethiopia and Jimma University Specialized Hospital(1, 27, 35) because if the cervix not ripen, the enfacement of the cervix is not changed by only using oxytocin which is applied at the fundus of the uterus only not on the cervix, so the failure of induction increased without ripening of the cervix. And induction by oxytocin with cervical ripening method almost 3 times

(AOR= 2.9, 95% CI (1.645, 5.132)) success of induction as compared to induction by oxytocin only due to as explained above.

Again in this study those mothers who were multipara had the chance of 3.2 times more likely success of labor induction as compared to primipara with AOR=3.214 ,95%CI(1.399, 7.386). This study was in line with the study done at Dessie referral hospital king Saudi university, the study done at mekele town public health institution, at Aga Khan University Hospital, Karachi in Pakistan (13), (25) (30), (27).

In this study those mothers whose BMI was normal or below 25kg/m<sup>2</sup>, the chance of success of labor induction was more likely by 4 times (AOR=4.066,95%CI(1.828, 9.047)) as compared to obese mothers (BMI≥30kg/m<sup>2</sup>). This is supported by the study done at Shrewsbury and Telford hospital on maternal obesity and its association with the mode of delivery and the neonatal outcome in induced labor: Implications for midwifery practice (47), it also in lines with the study done in king Saudi university on factors associated with success of labor induction (25),(48),(49). The reason that has been postulated for decreased success of induction in mothers with larger BMI is that due to adipose tissue being hormonally active may predispose women to a reduced response of oxytocin during induction labor because of altered metabolic status in obesity women. A recent meta-analysis has shown that structured physical exercise during pregnancy can increase success of induction by reducing the risk of a CS indicated by failed induction by almost 15%, probably through a significant reduction in overall weight gain in pregnancy(47)

## **8. Conclusion and Recommendation**

### **8.1. Conclusion**

This study revealed that the success of induction of labor were 78.7% with the frequent use of oxytocin with cervical ripening method and PIH was most indication for majority of primigravida women in Bahir Dar public Hospitals, Amhara Region, Ethiopia, 2021. The success of induction affected by favorable Bishop Score, parity, oxytocin with cervical ripening used, rural resident and BMI of the respondents.

### **8.2. Recommendation**

#### **For health care provider & managers**

- It is better to give more emphasis on Bishop Score before induction to identify the candidate of oxytocin IV induction to increase success of induction.
- Health care providers better to undertake prevention of failed induction by providing cervical ripening methods if not favorable Bishop score.
- A health professional should focus on structured physical exercise during pregnancy can reduce the risk of failed induction through a significant reduction of obesity and excessive weight gain during pregnancy
- The hospital clinical manager better to fulfill the facilities which needed to cascade the procedure of induction, like speculum, lamp (light) and sufficient couches for balloon insertion.

#### **For researchers**

- Further study should be made with large sample size to investigate predictors of successful labor induction.

#### **For Amhara regional health beaurea & Bahir Dar City Zonal health department**

- Better to encourage or initiate clinical manager and department heads to do mentoring and coaching to improve the quality of obstetric care and availability of materials and drugs necessary for induction of labor in each hospital consistently.

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## 10. Annex I. Consent Form

Hello!! Dear participants, this questionnaire is prepared by Amare Desta Masters of science student in Bahir Dar university in the field of Medicine and Health Science in the Department Of Integrated Emergency to assess the outcomes and associated factors of labor induction among mothers managed at Bahir Dar city Public health institutions, North West, Ethiopia from March1 to June 30/2021.

The aim of this study is to determine the outcome of labor induction and to identify the possible associated risk factors for outcome of labor induction in Bahir Dar city Public health institutions , North West Ethiopia that will provide base line data to find possible solutions. During the study your response will be kept confidentially, there is no name identified or anonymous will be kept and there will be no any visible risk with you. There is no payment for your participation but we greatly thank for your participation and you have the right to refuse from participation at any time. Are you voluntary to participate?

1. Yes

Signature ----- Date-----

Data collector's signature----- Date -----

2. No if not voluntary please stop here.

If you are voluntary to participate in the study; we kindly request you to provide your genuine response for the interview. Thank you for your volunteer participation!!!

## 10.1 Annex II. Checklist

### 10.2.1. English version questioner

Checklist for collecting data on induction of labor

Participant ID ----- Date: -----

Name of the health facility: -----

Checked by supervisor for completeness; Signature-----

Please encircle or enter in the appropriate space.

#### Part 1: Socio-Demographic characteristics/information

NO	Question	Answer and code	Go to
1	Maternal age	-----in yrs	
2	Length of the mother	-----in meter	
3	Weight of mother	-----in KG	
4	BMI	-----in kg/m <sup>2</sup>	
5	Religion	1=orthodox 2=muslim 3=protestant 4=other (specify)	
6	Ethnicity	1=amhara 2=Tigray 3=oromo	
7	Marital status	1=married 2=single 3=other(Divorced, widowed)	
8	Resident	1=urban 2 rural	
9	Educational level of mother	1=cant read and write 2=read and write 3=G1-8 4=G9-12	

		5=Diploma and above	
10	Occupation	1. Farmer 2. Merchant 3. Housewife 4. Government employed 5. If Other specify-----	
11	Level of health institution which induction takes place	1=Referral hospital 2=Primary hospital 3=Health center	

### PART 2: Obstetrics characteristics

12	Gravidity	1=Primigravida 2=Multigravida	
13	Parity	1=primipara 2=multipara	
14	GESTATIONAL AGE	1-<37wk 2 - 37wk-41wk+6days 3 -≥42wk	
15	ANC follow up	1=yes 2=no	
16	Indication for Induction	1=post term pregnancy 2=prom 3=IUFD 4=PIH 5 Others(specify)	
17	Was membrane rupture before induction	1=yes 2=no	
18	METHOD OF INDUCTION (MOI)	1=oxytocin only 2=oxytocin with cervical ripening 3=misoprostol only	
19	Bishop score	1 ≥6 2 ≤5	

20	Induction given by	1=Midwives 2=medical student 3=Resident 4=IESO 5=GYN/OBS seniors	
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Part 3: outcome of labor induction

21	Does adequate contraction achieved	1=yes 2=no	
22	If oxytocin is used for induction in which phase	1=at first dose 2=at second dose 3=at third dose 4 =at maintaince dose	
23	Time and date of outcome /result of induction	Time----- Date-----	
24	Mode of delivery	1=vaginal 2=cesarean delivery	
25	If delivery is by C/s what was the indication	1=failed induction 2=NRFHPR 3=CPD 4=OTHER	
26	Complication due to induction	1=Utrine hyperstimulation 2=NRFHR 3=PPH 4=utrine rupture 5=other	

### 10.3 Consent Form

ጤና ይስጥልኝ ! ዉድ ተሳታፊዎች ይህ መጠይቅ የተዘጋጀዉ በ ህክምናና ጣና ሳይንስ ትምህርት ክፍል

በድንገተኛ ቀዶ ህክምና ሙያ ተመራቂ ማስተርስ ተማሪ በሆኑት በአቶ ሲሆን ጥናቱም በባህር ዳር ከተማ

በሚገኙ የመንግስት ሆስፒታሎች ምጥ ለማስጀመር መዳኒት የተሰጡ ነፍሰጡር እናቶች ዉጤትና

የሚያጋልጡ ተዛማጅ ምክንያቶችን MEGABIT 1 እስከ SENE 30 /2013 ዓ.ም ለማጥናት ነው።

በዚህ ጥናት ላይ በመሳተፍዎም የተዘጋጀ ክፍያ የለም ነገር ግን ከዚህ ጥናት የሚገኘው መረጃ የምጥ ማምጫ ለሚሰጡ ነፍሰጡር እናቶች ጤና ደህንነት እና እንክብካቤ ለመስጠት እንዲሁም ከተጠበቀዉ የተለየ ዉጤት እንዳይመጣ ልዩ ትኩረት ለመስጠት እና ከመጣም ለችግሩ የመፍትሄ እርምጃ ለመዉሰድ ለሚሹ ባለሙያና ለባለድርሻ አካላት ትልቅ አስተዋጽኦ አለዉ። በመጠይቁ ላይ ስምዎትን አይጠየቁም ። እንዲሁም መልሶቻችሁ በምስጢር ስለሚያዙ በምንም አይነት መንገድ ጉዳዩ ለማይመለከታችዉ አካላት አይገለጹም በዚህ ጥናት በመሳተፍዉ በእርስዉ ላይ የሚደርስ ጉዳት የለም። የእርስዎ በዚህ ጥናት ላይ መሳተፍ በፍላጎትዎ ላይ የተመሰረተ ነው። መጠይቁን ሙሉ ለሙሉ ያለመመለስ ወይንም የማቋረጥ መብትዎም የተጠበቀ ነዉ።

በጥናቱ ዉስጥ ለመሳተፍ ፈቃደኛ ነዎት?

1. አዎ            ፊርማ ----- ቀን -----

የመጠይቁ ሰብሳቢ ፊርማ----- ቀን-----

2. አይደለሁም ---- እባክዎን እዚህ ጋር ይቁሙ

በጥናቱ ዉስጥ ለመሳተፍ ፈቃደኛ ከሆኑ ትክክለኛ የሆነ መልስ እንዲሰጡን በትህትና እንጠይቃለን።

ስለትብብርዎ በቅድሚያ እናመሰግናለን !!

7.2.2.1. አማርኛ መጠይቅ

በመረጃ የተሳተፈች እናት መለያ ቁጥር ----- ቀን: -----

መረጃውን የሰበሰበው ፊርማ----- ቀን-----

የጤና ተቋም/ሆስፒታል ስም-----

የተቆጣጣሪው ፊርማ ----- ቀን-----

**ክፍል 1: የእናት ግላዊና ማህበራዊ ገጽታ**

ተ. ቁ	ጥያቄዎች	ለምርጫ የቀረቡ ምላሾች	መለያ
1	እድሜ	1-----አመት	
2	ቁመት	1-----ሜ	
3	ክብደት	1-----ኪ.ግ	
4	BMI	1-----ኪ.ግ/ሜ <sup>2</sup>	
5	ሃይማኖት	1. ኦርቶዶክስ 2. ሙስሊም 3. ፕሮቴስታንት 4. ሌላ ካለ ይጠቀስ	
6	ብሄር	1. አማራ 2. ኦሮሞ 3. ትግሬ 4. ሌላ ካለ ይጠቀስ	
7	የጋብቻ ሁኔታ	1. ያገባች 2. ያላገባች	

		3.ያገባች ነገር ግን ተለያይተው የሚኖሩ 4. የተፋታች 5.የሞተባት	
8	መኖሪያ	1.ገጠር 2.ከተማ	
9	የትምህርት ደረጃ	1. ማንበብ እና መጻፍ የማትችል 2. ማንበብ እና መጻፍ የምትችል 3.ከ1-8ኛ ክፍል 4.ከ9-12ኛ ክፍል 5.ድፕሎማና ከዛ በላይ	
10	ስራ	1. አርሶ አደር 2. ነጋዴ 3. የቤት እመቤት 4. የመንግስት ሰራተኛ 5. ሌላ ካለ ይጠቀስ---	
11	የምጥ ማስጀመሪያ የተሰጠበት የጤና ተቋም ደረጃ	1. ሪፈራል ሆስፒታል 2. የመጀመሪያ ደረጃ ሆስፒታል 3. ጤና ጣቢያ	

**ክፍል 2:ስለ ጽንሰ እና ማህጸን ሁኔታዎች**

ተ.ቁ	ጥያቄዎች	ምርጫ የቀረቡ ምላሾች	መለያ
12	ስንተኛ እርግዝናሽ ነው?	1.የመጀመሪያ 2.ሁለተኛዬ እና ከዛ በላይ	



13	ስንተኛ ልጅሽ ነዉ?	1.የመጀመሪያ 2.ሁለተኛዬ ከዛያ በላይ	
14	እርግዝናሽ ምን ያክል ጊዜ ሁኖታል(በሳምንት)?	1. < 37 ሳምንት. 2. 37-41ሳምንት 3. ≥42 ሳምንት 4.እርግዝናዉ የቀረበት ቀን አይታዎቅም	
15	የርግዝና ክትትል ነበረሽ?	1.አዎ 2.የለኝም	

**ክፍል 3:ስለምጥ የማስጀመር ሁኔታዎች**

16	ምጥን ለማስጀመር ምክንያት/ቶች	1.መዎለድ ካለበት ቀን ስላለፈ 2.የእንሽርት ዉሃዉ ቀድሞ ስለፈሰሰ 3.ጽንሱ በማህጸኑ ስለጠፋ 4.በርግዝና ጊዜ የሚከሰት ግፊት ስለተከሰተ 5.ሌላ ካለ ይጠቀስ-----	
17	የምጥ ማስጀመሪያዉ ከመሰጠቱ በፊት የእንሽርት ዉሃዉ ፈሶ ነበር?	1.አዎ 2.የለም	
18	ምጥ የማስጀመሪያ መንገዶች	1.አክስቶሲን ብቻ 2.ሚሶፕሮስቶል ብቻ 3. አክስቶሲን የማህጸን ጫፍ	

		ከሚያበስለ ጋር 4.የእንሽርት ውሃውን በማፍሰስ	
19	የባይሾፕ ውጤት	1≥6 2≤5	
20	የምጥ ማስጀመሪያውን የሚሰጠው ባለሙያ	1.ሚድዋይዳ 2.የህክምና ተማሪ 3.ጠቅላላ ሀኪም 4.አይስዎ(IESO)/ 5=የፅንሰና የማህፀን ሀኪም 5=RESIDENT	

**ክፍል 4: የምጥ ውጤት የምጥ ማስጀመሪያ ከተሰጠ በኋላ**

ተ.ቁ	ጥያቄዎች	ምርጫ የቀረቡ ምላሾች	መለያ
21	የምጥ ማስጀመሪያው ከተሰጠ በኋላ በቂ እና ተመጣጣኝ ምጥ ጀመረሽ?	1.አዎ 2.የለም	(የለም ከሆነ ወደ 405ኛው ጥያቄ ይለፉ
22	የምጥ ማስጀመሪያው አክሲዮን ከሆነ ምጡ ምን ጊዜ ጀመረሽ?	1.በመጀመሪያው ዙር 2.በሁለተኛው ዙር 3.በሦስተኛው ዙር 4.አልጀመራትም	

23	የምጥ ማስጀመሪያዉ ያመጣዉ ዉጤት ቀን እና ስዓት	1.ስዓት----- 2.ቀን-----/-----/-	
24	የወለድሽበት ዘዴ ወይም ስልት ምን ነበር?	1.አምጠሽ በትክክለዉ ዘዴ ማለትም በማህጸንሽ 2.በቀዶ ጥገና	
25	የወለድሽዉ በቀዶ ጥገና ከሆነ ምክንያቱ ምን ነበር?	1.የምጥ ማስጀመሪያ የተሰጠዉ ሳይሳካ ቀርቶ 2.ልጁ(ሽሉ) ታፍኖ 3.የሽሉ እና ናትዮዋ የዳሌ አጥንት አለመመጣጠን 4.ሌላ ካለ ይጠቀስ----- ---	
26	ከምጥ ማስጀመሪያዉ ጋር ተያይዞ(ምክንያት) የመጣ ችግር አለ?	1.ምጡ ከሚፈለገዉ በላይ ደጋግሞ መምጣት ወይም ምጡ መጡ ከሚፈለገዉ ጊዜ በላይ መቆየት 2.ልጁ(ሽሉ) መታፈን 3.ከወለደች በኋላ ደም መብዛት 4.የማህጸን መፈንዳተ(መተርተር) 5.ሌላ ካለ ይጠቀስ-----	

**ስለትብብረዎ እናመሰግናል!!!**