ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCES

SCHOOL OF NURSING AND MIDWIFERY

PREVALENCE AND FAILURE RATE OF INDUCTION OF LABOUR WITH THEIR ASSOCIATED FACTOR AMONG WOMEN DELIVERED IN WOLDIA GENERAL HOSPITAL, NORTHERN ETHIOPIA, 2018

BY: MULUGETA WODAJE (BSC)

A THESIS SUBMITTED TO ADDIS ABABA UNIVERSITY, COLLEGE OF HEALTH SCIENCES, SCHOOL OF NURSING AND MIDWIFERY, AS PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN MATERNITY AND REPRODUCTIVE HEALTH NURSING

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ADDIS ABABA ETHIOPIA

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STATEMENT OF THE AUTHOR

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LIST OF ACRONYMS AND ABBREVIATION

APGAR: Appearance, Pulse, Grace, Activity, Reflex

CEMOC: Comprehensive emergency obstetric care

CS: Caesarean Section

ICU: Intensive care unit

IOL: Induction of labour

IUFD: Intra uterine fetal death

IUGR: Intrauterine growth restriction

NICU: Neonatal intensive care unit

PG: Prostaglandin

PIH: Pregnancy induced hypertension

PPH: Postpartum haemorrhage

PPROM: Pre term premature rupture of the membranes

PROM: Premature rupture of the membranes

SDG: Sustainable Development Goal

SPSS: Statistical package for social science

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ABSTRACT

Despite its great significant, to prevent neonatal and maternal mortality and morbidity induction of labour has a potential of failure to progress leading to caesarean birth and its complication. Due to this World Health Organization (WHO) recommends induction to be performed only with a clear medical indication when expected benefits outweigh potential harms. The objective of the study was to assess the prevalence and failure rate of induction of labour with associated factors among mothers delivered at Woldia General Hospital Northern Ethiopia from 2013 to 2017. The study was conducted using institutional based retrospective cross sectional study on 380 study samples selected by systematic random sampling method among all mothers delivered at Woldia general hospital from 2013 to 2018. Data entered and coded using Epi data 4.2 and analyzed using SPSS version 20.0. Bivariate and multivariate logistic regression analysis carried out to determine the association of different potential factors with prevalence and outcome of induction of labour. Independent predictors were determined using adjusted odds ratio with 95% confidence interval and at p-value of < 0.05 in multivariate regression analysis. The result of the study revealed that out of total delivery induction of labour was done in 89(24.4%) with 37.4% of them had failed induction of labour. The study also found out that Parity, gestational age and diastolic blood pressure of the mother have significant association with induction of labour with AOR of 3.1, 3.8 and 4.8 respectively. Furthermore, Bishop Score of less than six and primi Para were found with a significantly higher rates of caesarean section at AOR of4.11(95% CI: 1.31, 12.86) and 3.48(95% CI: 1.15, 10.55) respectively. As conclusion the prevalence of induction of labour in Woldia general hospital was relatively high with a higher risk of caesarean delivery. Therefore, the minister of health and the hospital should give greater emphasis for improving the induction of labour service. Further studies also needed on this field to investigate predictors of failed induction of labour.

Key words: prevalence of induction of labour; labour outcome; failed induction; Woldia;

CHAPTER.1. INTRODUCTION

1.1. Background

There are a number of complications of pregnancy that present 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 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 labour (IOL)(1).

Induction of labour is stimulation of uterine contraction artificially after the fetus has reached viability (after the 28th week of gestation) and before the spontaneous onset of labour for accomplishing vaginal delivery. It is common obstetric procedure primarily employed when the benefits of delivery outweigh the risks of continuing the pregnancy (2, 3). Induction of labour can be elective (planned) 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 in case of, PROM, DM, moderate hypertension, postdate pregnancy, small or large for date baby. Emergency induction done when there is an emergency maternal and fetal condition that necessities induction of labour immediately such as; prolonged PROM, severe IUGR, intra-uterine infection, pregnancy beyond 42 week, and pre-eclampsia and eclampsia(4).

Despite its undisputed importance for ending risky pregnancy, compared with spontaneous onset of labour it has a potential risk of increased rate of caesarean birth and different maternal and neonatal complications (5, 6). Due to this World Health Organization (WHO) recommends induction to be performed only with a clear medical indication when expected benefits outweigh potential harms (2).

1.2. Statement of the problem

Globally 216 mothers die per 100,000live birth related to pregnancy and delivery.

Significantly, high numbers of neonates are also dying in the world. As per the 2016 estimate by UNICEF 19 neonates die for each 1000 live birth(7, 8) . The data is more severe in developing countries specially in sub-Saharan Africa including Ethiopia where, there was 412 maternal death per100,000 live birth and death of 48 neonates per 1000 live birth from 2011 to 2016(9).

Thus innovative and strategic interventions should be designed and implemented in order to alleviate this gross rooted problem in maternal and child health and accelerate performance progress toward meeting maternal and child health sustainable development goal (SDG) targets. One of the options is increasing and improving the availability and quality of comprehensive emergency obstetric care (CEMOC) services(10, 11).

Induction of labour is one component of these comprehensive obstetrics care services that is increasing employed in modern day obstetrics 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 (12, 13). In Ethiopia, induction of labour is practicing widely from district to referral hospitals. One study done in south west Shewa shows that the prevalence of induction in Woliso St. Catholic hospital was 22.4%(5).

However, even if it is increasingly practicing in preventing neonatal and maternal mortality and morbidity induction of labour by itself has a potential of failure rate leading to, caesarean birth and its complications (2, 5, 14). A study done in Jima specialized hospital shouth-west Ethiopia reported that the prevalence of failed induction of labor was 34.2% with more occurance in primi para mothers and womens with age group of 31-35 years old (14). In addition, induction of labour is strongly associated with poor maternal and neonatal outcomes compared to spontaneous labour(15, 16). These complications and risks put a huge challenge for practicing induction of labour for managing complications of pregnancy and risks associated with continuing of the pregnancy.

Despite these challenges related to the use of induction to initiate to labour, like many other *sub-Saharan* countries the national rate of induction of labour and its failure rate and associated factors were not adequately studied in Ethiopian especially of the study area. So,

this study aims to fill the gap in lack of sufficient evidence in prevalence of induction and its labour outcome in the study area, by identifying the prevalence and failure rate of induction of labour and their associated factors among mothers delivered in Woldia general hospital northern, Ethiopia.

1.3. Significance of the study

The World Health Organization (WHO) considers induction of labour as a first-line topic of investigation and proposes the use of basic markers such as induction of labour incidence and percentage of caesarean sections in inductions. Different studies and organizations including society of obstetrics and gynaecology Canada (SOGC) also recommend indications for induced labour should be based on scientific evidence, with no increase in unnecessary obstetric interventions and with evaluation of the risk/benefit for the mother and fetus.

However, like many other sub-Saharan countries, the national rate and pattern of IOL in Ethiopia is not adequately studied. To the best of our knowledge there is no any study done on prevalence, labour in Woldia general hospital. Therefore, the main aim of this study was to evaluate the prevalence and failure rate of induction labour with their associated factors in Woldia general hospital. New data on the prevalence and failure rate labour outcome of induction and their associated factors may therefore be made available.

Hence, it will have significant for different stake holders, first for the health institutions and health care providers in local setting and other part of the country to have evidence-based protocols on induction of labour. Second, it will provide information for minister of health and other stakeholder's works in obstetrics to develop uniform clinical guideline for induction of labour across the country. Third it will enable woman who needs induction of labour to get improved quality of care in the hospitals. Finally, since there is no sufficient studies exist on this increasingly standard practice, the data will also help for researchers and academic institutions to do further studies on induction of labour in Ethiopia and abroad.

CHAPTER2. LITERATURE REVIEW

2.1. Prevalence of Induction of labour

Induction of labour is defined as the process of artificially stimulating the uterus for the purpose of achieving vaginal birth before the labour starts spontaneously(3). It usually performed by administering oxytocin or prostaglandins to the pregnant woman or by manually rupturing the amniotic membranes(17).

It is one of the medical procedures that are increasingly being practiced around the world, according to WHO, up to 25% of all deliveries at term involve induction of labour in developed countries(2). Dublin et al., 2014, reported that in the United States labour induction accounts for 29 %of deliveries(18), while 35% of deliveries attended by induction in Spain(19).

However, studies from developing countries show facilities in African countries tended to have lower rates of induction of labour. One systematic study shows that the average induction rate was 4.4% in Africa compared with 12.1% and 11.4% in Asian and Latin American countries respectively (7, 16). A study done by Abisowo, O., et al, in Lagos State University Teaching Hospital found that out of total delivery 16.49 % were induced(11). Another study done in Democratic Congo reported that only 3.2% of labour was started by induction (20).

In Ethiopia, a study done at Woliso St. Luke, Catholic Hospital, South West Shewa, Oromia in 2016reported that the prevalence of labour induction was 22.4%(5).

This suggests that even if induction of labour is practicing widely in the field of obstetrics, it has variation from setting to setting.

2.1.1. Indications for induction

The decision to induce labour is a matter of a complex clinical judgment. It usually constitutes a choice between three options: allowing the pregnancy to continue, inducing labour or performing elective Caesarean section. The decision takes into account a number of factors (21). These factors include; the condition of the baby, gestational age and level of certainty about the baby's age, previous Caesarean section, the preference of the mother and the likelihood that induction of labour will be efficient and vaginal delivery successful. The last

factor is in part dependent on the state of the uterine cervix, which is related to the imminence of spontaneous labour(3, 21).

Taking in to account the above conditions there are various indications, which might be maternal or fetal, that necessity induction of labour. Maternal indications include; medical conditions that caused or aggravated by pregnancy (like hypertensive disorders of pregnancy, diabetes mellitus, placental abruption and certain respiratory, hepatic and cardiac disorders), and discomfort such as from multiple pregnancy, poly-hydramnios. In addition, induction can be done for allowing essential treatment to be commenced, such as for cervical cancer; relieving emotional distress after intrauterine death; or alleviating anxiety about the baby's well-being. Fetal indications include prolonged pregnancy, suboptimal intrauterine growth, chorioamnionitis, prelabour ruptured membranes, rhesus immunization, fetal compromise and cholestasis of pregnancy. In addition, although currently available guidelines do not recommend this, induction of labour is being used more and more at the request of pregnant women to shorten the duration of pregnancy or to time the birth of the baby according to the convenience of the mother and/or health-care workers (3, 21-23).

According to a study done in Latin America Premature rupture of membranes was the single most frequent medical indication accounting for 25.3% of the indications and post-term pregnancy was the second (8.8%) while chorioamnionitis was the list (1%) (24). Another systematic study done in Asia and Africa shows, in Asia elective was the most common indication (47.2%); while in Africa, 27.3% of indication was PROM(25).

In a study done in Saudi Arabia, the most common indication for IOL was post-term pregnancy accounting for (31%) cases followed by gestational and pre-existing diabetes mellitus, together 23.2%. The third most common indication for IOL was PROM accounting for 15% (26).

The top three indications for induction in a study done in Jima referral hospital, Ethiopia were PROM (36.4%), PIH (34.3%) and Post-term pregnancy (23.2%) (27). Similarly, a study done in western Shewa shows, PROM takes the largest reasons for induction of labour about 35.5% followed by post-term, pregnancy-induced hypertension (PIH) and IUFD at a rate of 27.6%, 21.0% and 15.8% respectively (5).

In generally the most common indications for induction of labour in different studies are almost similar. Which are related to the post-term pregnancy, PROM and medical condition of pregnancy.

2.1.2. Methods of induction of labour

Induction of labour can be done using variety of methods including pharmacological and non-pharmacological methods. Non-pharmacological methods include digital stretching of the cervix using catheters, sweeping and rupturing of the membranes, whereas pharmacological methods include intravenous oxytocin titration, prostaglandin (PG) analogues and misoprostol(17).

Hurissa BF 2015, reported that the most commonly used methods of induction of labour in Hawassa health facilities were oxytocin infusion (73.5%) followed by oral or vaginal misoprostol (26.5%)(27). Whereas in Nobel Medical College Teaching Hospital, Biratnagar, Nepal 98.2% of induction done only by misoprostol(28).

2.2. Associated factors for induction of labour

Several studies show as there are many factors that affect the prevalence of induction of labour such as; socio-demographic factors, obstetric history, gestational age, parity and other several conditions. A study done in Nepal reported primi gravida mothers accounts the highest number of induction, with 61.9% of induction done in prim gravid mother followed by (29.3%), (7.3%) and (1.5%) second, third and fourth gravida, respectively (29). In addition, one in India, the gestational age week at which most of the inductions (84.5%) conducted were from 39-42 weeks(30).

In Latin Guerra et al., 2009 reported that induced incidence of labour was 20–40% lower for women who were under 20 years of age, those with no partner, women who had more than three previous deliveries, those whose previous pregnancy had resulted in caesarean section, and women who had attended a greater number of prenatal visits. On the other hand, the induction rate was four times higher in those with a gestational age of >42 weeks (OR 3.85; 99% CI 2.39– 6.22). It was also higher in women of 35 years of age or over, those having their first child, and in those giving birth in a social security hospital (24).

Similarly, in Pavia, Italy, the induced labour group had a significantly older maternal age (31.8

versus 30.4 years, p¼0.01) (31). Another study done at New South Wales, Australia, also show multiparous women at 39–40 weeks' gestation with a singleton cephalic birth were the greatest contributors to the overall IOL rate (23.5% and 20.2% of all IOL respectively) (32).
In Ethiopia, a study done in Woliso reported there was a statistically significant association between the ANC follow-up and induction of labour (X2=20.36; P=0.000) with higher rate of induced labour among labouring mother who had not ANC follow-up compared to the other counterpart. In addition, higher rate of induced labour (14.41%) was observed in women whose gestational age were less than or equal to 42 weeks. Similarly, fetal heart rate abnormality and change of me-conium colour were reported having a significant association to the induction of labour with chi-square and a p-value of (X2=84.33; P=0.000) and (X2=6.46; P=0.011) respectively (5).

2.3. Labour outcome of induction of labour

In practicing induction of labour one of the major concerns is the potential for failure of induction. The definition of successful and failed induction differs from study to study, in some study induction considered as the ability to achieve adequate uterine contraction after induction according to the protocol of the institution whereas failed induction of labour defined as the inability to achieve adequate uterine contraction(30). Other studies define successful induction as the ability to accomplish spontaneous vaginal delivery and failed induction if the labour ends up with caesarean delivery(12, 14). Since the general aim of induction is to achieve spontaneous vaginal delivery and minimize the number of caesarean deliveries, this study considers successful induction as the ability to achieve spontaneous vaginal delivery with or without the aid of instrument.

Even if labour induction represents an attempt to reduce the prevalence rate of caesarean sections, whose rates are increasing worldwide, several studies have related an increase of operative deliveries and caesarean sections in an induction of labour compared to spontaneous onsets of labour(33).

A study conducted in Aga Khan Hospital, Pakistan, revealed that 19.1% of women undergo induction of labour delivered by caesarean section(33). In addition, another study done in King Khalid University Hospital Saudi Arabia shows 16% of induction end up with caesarean

section (26). Related finding found in Spain with 61.4% of women achieved normal deliveries after induction of labour, 25.3% delivered by caesarean sections and 13.3%, by instrumental delivery(19).

In a study done in India higher percentage (50.5%) of caesarean section was reported. In that study the major reasons for caesarean were failure of labour to progress, fetal distress, CPD and meconium staining liquor(30). In addition one prospective study done in Nepal reported the overall success rate of caesarean section was 32.3%. The study also reported that the common indication for caesarean section were failed induction (44%) (56), fetal distress (29%) and meconium stained liquor in early stage of labour (17%)(28). Similarly having cephalopelvic disproportion (48.6% and fetal distress (40%) as the most common indications the overall failed rate of induction of labour in study done in Nigeria was 32.3%(11).

In Ethiopia Girma, W., et al. (2016) have shown that among women delivered in Jima referral hospital south-west Ethiopia, 34.2% underwent caesarean section while 65.7% and 10.7% achieved spontaneous and instrumental vaginal delivery respectively(14).

2.3.1. Factors associated with labour outcome

There are many risk factors considered as a risk for hindering to achieve vaginal delivery after induction of labour. The factors can be grouped as socio demographic (age, marital status, residence), obstetrics condition and indication and methods of induction.

One of the known obstetrics factors for the failure rate of induced labour is the status of the cervix at the start of induction with higher caesarean section rates in those with an unfavourable cervix. Due to its association a cervical exam is performed before induction started to assess the condition of the cervix and a score is assigned out of 13 based on the criteria called bishop score which consist of cervical dilatation, consistency, effacement and position, and decent of the presenting part. If the cervix is favourable (has a score of 6 or more), labour is usually successfully induced. If the cervix is unfavourable (has a score of 5 or less), the ripening of the cervix can be done before induction using vaginal prostaglandin E2 (PGE2) that placed high in the posterior fornix of the vagina and may be repeated after six hours if required, or with an insertion of a Foley catheter(22).

In addition to an unfavourable cervix, other factors that contribute towards increasing the risks

of a caesarean section following labour induction include null parity, obesity, mother's age above 30 years, fetal macrosomia, and use of epidural anesthesia, duration of induction method and indications for induction. The effect of individual physician decision making also adds significantly to the caesarean delivery risk (33-35).

In Study done in secondary care hospital in Pakistan, indicated nulliparity, gestational age of more than 40 weeks, Bishop score of 5 or less and ruptured membranes were associated with higher rate of failed induction(33). In addition a study done in Saudi-Arabia indicated that nulliparity and increased BMI, a birth weight of 4 kg or more, and gestation age of less than 37 weeks were independently predictors of CS(26). Moreover one comparative study done in Nepal reported that more incidences of caesarean section were encountered with women induced by oxytocin than with misoprstol(29).

A finding found in Spain also reported that the rate of caesarean-sections were increased in the group of women who had hypertensive states of pregnancy (29.8%) and in women whose pregnancies were prolonged (27.3%) compared to among women whose indication for labour induction was PROM (21.1%)(19).

In Ethiopia Girma, W., et al. (2016) have shown that gravidity of the women and Bishop Score at admission were predictors of outcome of induction, with prim gravid women, have 2.3 times more chance of failed induction as compared to multigravida mothers (AOR = 2.298, 95 % CI. 1.109,4.763). And those women who had unfavorable Bishop Score at admission have a 5.3 times more likelihood to have failed induction as compared to those women with favorable Bishop score (AOR= 5.275, 95 % CI.2.005,13.878) (14). In accordance with this bishop score, less than six was found to have 4.1 times more risk than six and above for failed induction in Woliso St. Luke, Catholic Hospital(5). Moreover, a study in Hawassa health facilities revealed that primi par women have 3.11 more risk of going to caesarean delivery than multipara (AOR= 3.11,95% CI. 1.01,9.62) (27).

2.4. Conceptual framework

The conceptual framework for prevalence and outcome of labour is adapted from other similar study done at St. Luke hospital Woliso, and Addis Ababa, Ethiopia(27, 36).

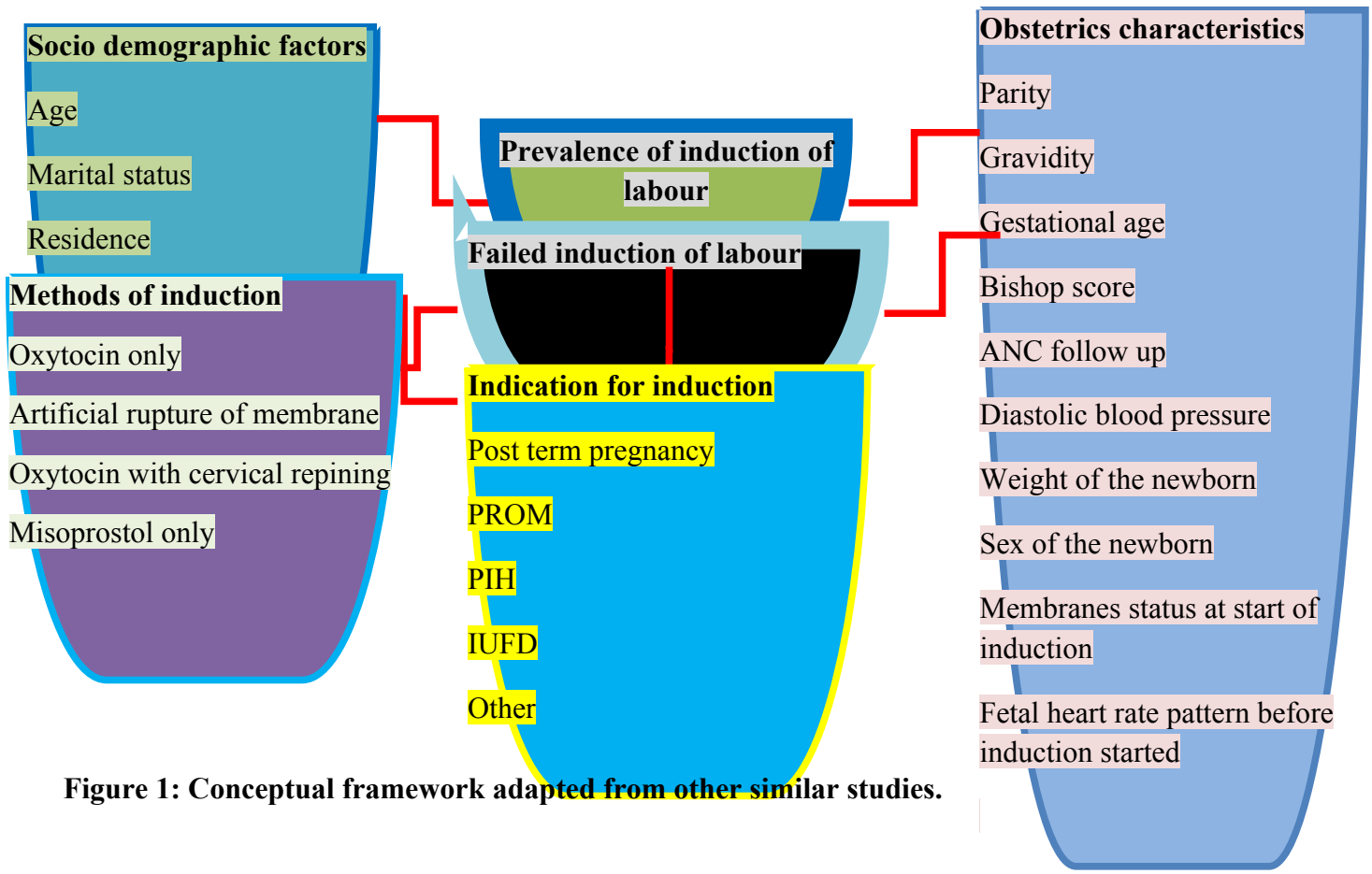

Figure 1: Conceptual framework adapted from other similar studies.

CHAPTER 3. OBJECTIVE

3.1 General objective

To assess the prevalence and failure rate of induction of labour with their associated factors among mothers delivered at Woldia General Hospital Northern Ethiopia from March 01, to April 01, 2017.

3.2 Specific objectives

- To determine prevalence of induction of labour.
- To asses' failure rate of induction of labour.
- To investigate factors associated with induction of labour, and its failure rate.

CHAPTER 4. METHOD

4.1. Study area

The study was conducted in Woldia general hospital Woldia town, the capital city of North Wollo zone. Woldia is Located north of Dessie and southeast of Lalibela 358 km from Bahrdar, the capital city of Amhara Region, and 503 km from Addis Ababa. The town has a latitude and longitude of 11°50′N 39°36′E /11.833°N 39.600°E and an elevation of 2,112 meters above sea level. Woldia town has a total population of 46,139 and 13,007 reproductive age group women (37). The city has two-health enter and one General hospital.

Woldia general hospital provides healthcare services for outpatients and in-patients. All kinds of maternal and child health services including labour and Delivery are given in the hospital by 2 obstetricians, 1 emergency surgeon, 2 Head nurse, and 23 midwives, in 7 rooms and 35 Beds. According to data from the hospital human resource management, more than 10,110 women delivered in the past five years in the hospital.

4.2. Study design

A retrospective cross sectional study was employed

4.3. Population

4.3.1. Source population

The source population of the study was all women who had given birth at Woldia general hospital from 2013 to 2017.

4.3.2. Study population:

The study population was all selected women by systematic sampling method who had given birth at Woldia general hospital.

4.3.3. Study unit

The study units were all selected women who had given birth at Woldia general hospital who fulfils the inclusion criteria.

4.4. Eligibility criteria

4.4.1. Inclusion criteria

- All registered women who had delivered at Woldia general hospital maternity wards,

- Women of all parity's,

4.4.2. Exclusion criteria

- Lost card
- Incomplete registry
- Delivery before 28 weeks of gestation

4.5. Sample size determination

The sample size was determined using the formula for single population proportion;

$$n = \frac{\left(Z\frac{\alpha}{2}\right)^2 p(1-p)}{d^2} \qquad n = \frac{Z^2 p(1-p)}{d^2}$$

Where: n = sample size, Z = standard normal distribution corresponding to significance level at α = 0.05, p =population proportion.

Since the main outcome variables were the prevalence of induction of labour and failed induction of labour (caesarean delivery) the sample size was calculated for each outcome based on the proportion found in other study and later the largest sample size take to increase representativeness.

For the prevalence of induction, 22.4% found in a study done at St. Luke, Catholic Hospital, Southwest Shewa, Ethiopia was taken (5).

$$= \frac{1.96^2 X(0.224(1-0.224)}{0.05^2} = 267$$

For the prevalence of failed induction, 34.2% which was found in a study conducted in Jima University Specialized Hospital, Southwest Ethiopia were taken (14).

For proportion of failed induction $\frac{1.96^2 X(0.342(1-0.342)}{0.05^2} = 345$

Based on this the sample size become 345 and by adding 10% for incomplete data the final sample size become 345+35 = 380

4.6. Sampling technique

A systematic random sampling procedure was used to choose the study participants using delivery registration book from 2013 to 2017 as a sampling frame.

By using the formula $k = \frac{N}{n} = \frac{10{,}110}{380} = 27$

Where: k= length of interval from the first selected sample to the next to be selected in registration book, N= total population, n= sample size.

So, the sample was picked every 27 women from registration book. When there was missing chart for the selected sample, we picked the next. Lottery method was used to select the first sample from the first 27.

4.7. Study Variables

4.7.1. Dependent variable:

- Prevalence of induction of labour,
- The failure rate of induction of labour,

4.7.2. Independent variables:

- Women socio-demographic factors (Age, marital status, residence and the source of referral),
- obstetric characteristics (ANC follow up, parity, gestational age, Bishop score, diastolic blood pressure, weight and sex of the newborn,)
- Indications of induction (post-term pregnancy, pregnancy-induced hypertension, PROM, IUFD and other)
- methods of induction (oxytocin only, oxytocin with prior cervical ripping, misoprostol only, artificial rupture of membrane)

4.8. Operational definitions

Induction of labour: artificial initiation of uterine contractions prior to its spontaneous onset after 28 weeks of gestation

Pattern of labour outcome of induction: success or failed induction of labour

Failed induction of labour: - when a woman delivered by caesarean section due to failure to acquire either adequate uterine contraction (≥3 contractions in ten minutes' period lasting ≥40 seconds) despite being on oxytocin drip for at least six hours or diagnosed as prolonged labour by the treating residence.

Successful induction of labour: - when a woman had achieved vaginal birth (either spontaneous or assisted by instrumental delivery) after labour was induced.

Non-reassuring fetal heart rate: Feta heartbeat of either below 120 beat per minute or above 160 beat per minute following induction of labour.

Adverse neonatal outcome: when one or more of the following occurred after induction of labour commenced; still birth, low APGAR score, neonatal intensive care unit admission, birth injury or perinatal death.

Low appearance, pulse, grimace, activity and reflex (APGAR) score: Apgar score of less than seven for the first five minutes.

Stillbirth: death of the fetus during intra-partum period (after induction started and before delivery)

Adverse Maternal outcome: when one or more of the following occurred after induction of labour commenced; postpartum haemorrhage, third or fourth degree perineal tear, uterine rupture, postpartum sepsis or wound infection and maternal death.

4.9. Data Collection

Information regarding demographic features, obstetrics history and characteristics, details of induction of labour (indication, method, mode of delivery, maternal, and neonatal conditions) was collected from the induction register and medical record files and entered in a predesigned checklist. Since there is no similar research done in the study area the questionnaire was adapted from the 2004 WHO global survey for maternal and perinatal health mode of delivery and pregnancy outcomes forms, and previous researches done in St. Luke hospital Woliso and Army Referral hospital, Addis Ababa, Ethiopia. Some modification was made in order to incorporate all objective (5, 36, 38).

Four midwifes who were working in the other unit during investigation collected the data form women's record by using the predesigned checklist.

4.9.1. Data Quality Control

To ensure the quality of data to be gathered, a range of mechanisms was employed. A two days training was being given for data collectors and supervisor 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 checklist was collected from data collectors each day by principal investigator and checked for any error. Then appropriate measure was taken accordingly.

The checklist was pre- tested by taking 5 percent of the sample size in delivery from 2012-2013 in the same Hospital and necessary modification in the checklist was made based on the nature of gaps identified.

4.9.2. Data Analysis

Data entered to Epi data4.2 and data was cleaned and entered into SPSS version 20.0 to be analyzed. Bivariate analysis was carried out to determine the association of different potential factors (demographic and obstetrics characteristics, indication and method of induction) with prevalence and failure rate of induction of labour and p-value of less than or equal to 0.25 taken as a cut-off point to select candidate variables for the final multivarite logistic regression models. Independent predictors were determined using adjusted odds ratio with 95% confidence interval in multivarite regression analysis at p-value < 0.05. Result presented using tables, graphs and charts. Frequencies, percentages and median ± SD were also used whenever appropriate.

4.11. Ethical Consideration

Ethical clearance to conduct the study obtained from Addis Ababa University, health Science College, school of Nursing and Midwifery and letter of approval obtained from AAU research review board permission to conduct the study in Woldia hospital secured from the hospital ethical review board. The confidentiality of information was insured by not recording the name of the respondent or other identifiers.

4.12. Dissemination Plan

The findings will be presented to the Addis Ababa University scientific community and submitted to the college of health science school of Nursing and Midwifery. The findings will also be communicated to local health planners and other relevant stakeholders to enable them take recommendations in to consideration during their planning process. Publication in peer reviewed, national or international journals will also be considered. All efforts will be done to

present the study results to available forums, workshops and conferences.

CHAPTER 5. RESULT

5.1. Characteristics of the study participant

A total of 365 women's document was reviewed during the study period and 15 charts were discarded due to incomplete data making the incomplete rate 3.94%. From the total participant 305(83.6%) were in the age group of 20-34 years with a median age of 26 (5.45) years. In addition, greater proportion of (89.6%) the women had partner and 253 (69.6%) lives in urban. Moreover, most of the women (58.1%) comes with self-referral followed by referred from health centre 141(38.6%). **(Table 1)**

Table 1: Socio demographic characteristics women who gave birth in Woldia General Hospital from 2013 to 2018(n=365).

Variable	Frequency (n)	Percentage (%)
Age		
<20	17	11.8
20-34	305	83.6
>34	43	4.7
Residence		
Urban	254	69.6
Rural	111	30.4
Marital status		
With partner	327	89.6
Without partner	38	10.4
Source of referral		
Health centre	141	38.6
Hospital	12	3.3
Self	212	58.1

5.2. Obstetric characteristics of the study participant

The following table shows that from the total participant 225(61.5%) of the women were multi Para and 206 (56.4%) were in gestational age group of 37_42 weeks based on their LNMP. The study also revealed that 285(78.1%) of the participant have at least one ANC follow up during pregnancy and 313(85.5%) of the participant have diastolic blood pressure of 80-90mmHg at admission.

Table 2: Obstetrics characteristics of women who gave birth in Woldia General Hospital from 2013 to 2018(n=365).

Variable	Frequency(n)	Percentage (%)
Diastolic blood pressure		
<60mmHg	36	4.4
60_80mmHg	313	85.8
>80 mmHg	16	9.9
Parity		
Prime	140	38.4
Multi	225	61.6
ANC follow up		
No	80	21. 9
Yes	285	78.1
Tone of pregnancy		
Single tone	352	96.4
Multiple	13	3.6
Gestational age		
<37wk	29	7.9
37-42wk	206	56.4
Unknown LNMP	69	18.9
>42wk	61	16.7
Sex of the newborn		
Male	42	47.2
Female	47	52.8
Weight of the newborn in gram		
<2500	7	7.9
2500-4000	72	80.9
>4000	10	11.2

5.3 Induction of labour

Figure 22: Prevalence of induction of labour among women who gave birth in Woldia General Hospital from 2013 to 2018 (n=365).

As it is illustrated in figure 2 the study found out that out of the total 365 participants delivered in Woldia hospital in the study period 89(24.3%) of the women undergo induction of labour making its prevalence rate 24.4%.

5.3.1 Obstetric conditions before and after induction started

The finding found that at time of induction 50(56.2%) of the women has modified bishop score of greater than or equal to six, and membrane was ruptured in 39(43.8%) with liquor smelling in 4(10.3%) of the women.

The study also shows that from the total 81 fetuses that have regular fetal heartbeat pattern before induction 21(25.9%) develops none reassuring fetal heart beat pattern. In addition, out of 83 neonates that had positive fetal heartbeat at the start of induction 16(19.3%) of them develop adverse newborn outcome with, 7(43.8%) and 5(31.3%) of them having low Apgar score and still birth respectively. **(Table 3)**

Table 3: Obstetric conditions before and after induction started in women who undergo induction of labour in Woldia General Hospital from 2013 to 2018(n=89).

Variable	Frequency(n)	Percentage (%)
Membrane status		
Ruptured	39	43.8
Intact	50	56.2
Liquor foul smelling (n=39)		
Yes	4	10.3
No	35	89.7
Bishop score		
≤ 5	39	43.8
> 5	50	56.2
Fetal heart beat pattern before induction started		
Regular FHB	81	91.0
NNRFHB	2	2.2
Negative	6	6.7

None reassuring fetal heart beat occurred following induction(n=81)		
Yes	21	25.9
No	60	74.1
Change of me-conium (n=83)		
Yes	18	21.7
No	65	78.3
New born status at birth		
Alive	78	87.6
Fresh still birth	6	6.7
Macerated still birth	5	5.6
Adverse newborn outcome (n=83)		
Yes	16	19.3
No	67	80.7
APGAR score (n=78)		
7 and above	71	91.0
Less than 7	7	9.0
Adverse maternal outcome occurred (n=89)		
Yes	12	13.5
No	77	76.5

5.3.1 Indications and methods for induction of labour

Figure 33: Indications for induction of labour in mothers undergo induction of labour in Woldia General Hospital from 2013 to 2018(n=89).

As described in figure 3 there were different indications for induction of labour in this study, from this PROM takes the largest account 32(36.0%) followed by hypertensive disorder of pregnancy 24(27.0%).

Related to the method of induction the most commonly used method of induction was IV infusion of oxytocin (86.7%) either with prior cervical ripening (55.1%) or alone (31.5%) followed by artificial rupture of membrane (9%).**(Table 4)**

Table 4: Methods for induction of labour in mothers undergo induction of labour in Woldia General Hospital from 2013 to 2018(n=89).

Variables	Frequency (n)	Percentage (%)
Methods of induction		
Oxytocin only	28	31.5
Oxytocin with prior cervical repining	49	55.1
ARM	8	9.0
misoprostol	4	4.5

5.4 Labour outcome of induction of labour

From the total of women under go induction of labour the study shows 33(37.1%) were delivered by caesarean section while 56 (62.9%) achieved vaginal delivery. Since the main aim of induction was to achieve vaginal delivery in this study all women delivered by caesarean section were considered as failed induction that makes its prevalence 37.1%. Regarding to this the main indication for caesarean section was failure to achieve adequate contraction 14(43.8%) followed by fetal distress 8(25.0%) and prolonged labour 5(15.6%), while CPD and other indications takes the rest

Table 5: Labour outcome of induction among women who gave birth in Woldia General Hospital from 2013 to 2018(n=89).

Outcome	Frequency(n)	Percentage (%)
Adequate contraction achieved after induction commenced		
No	14	15.7
Yes	75	84.3
Phase when adequate contraction achieved in oxytocin infusion(n=62)		
First phase	10	14.1
Second phase	21	33.9
Third phase	31	50.0
Hyper stimulation of uterus occurred(n=75)		
Yes	27	36.0
No	48	64.0
Fetal Presentation		
Cephalic	75	84.3
Breech	7	7.9
Face	4	4.5
Other	3	3.4
Mode of delivery		
Vaginal delivery	56	62.9
Caesarean section	33	37.1
Indication for caesarean section(n=33)		
Failure to achieve adequate contraction	14	43.8
Fetal distress	8	25.0
CPD	3	9.4
Prolonged labour	5	15.6
Other	2	6.3
Duration of labour after induction started in vagina delivery(n=56)		
<12	41	73.2
>12	15	26.8

The study also reported that contraction of 3-5 in 10 minutes with intensity of 40-60 seconds was achieved after induction in more than two third (84.3%) of the induction, among those 26(35.1%) develop uterine hyper stimulation. Related to this among women induced by IV infusion of oxytocin alone or with cervical repining half of them achieved adequate

contraction in third phase while 21(33.9%) achieved in second phase. Furthermore, in 41(73.2%) women who achieved vaginal birth labour lasts no more than 12 hours.

5.5 Associated factors for prevalence of induction of labour

Bivariate logistic analysis show that gestational age, diastolic blood pressure, ANC follow up, parity, source of referral and residences of the women has significant association with

induction of labour. However, in multivariate logistic analyses only diastolic blood pressure, gestational age and parity has significant association with induction of labour. Related to these prime Para mothers and Women's with diastolic blood pressure of >80mmhg at admission has 3.11 [A OR=3.11 (95% CI: 1.76, 5.51)] and 4.76 [AOR = 4.76 (95% CI: 2.18, 10.44)] risk of being induced respectively. Similarly, women with gestational age of greater than 42 weeks had 3.78 times [A OR=3.78 (95% CI: 1.88, 7.68) chance of being induced. **(Table 6)**

Table 6: Bivariate and multivariate analysis of associated factors for prevalence of induction of labour in women delivered in Woldia General Hospital from 2013 to 2018(n=365).

Variable	**Induction of labour**		**COR (95%CI)**	**AOR (95%CI)**	***p*-value**
	Done	**Not done**			

Residence of the mother					
Urban	201(79.1%)	53(20.9%	0.55(0.33-0.91)	0.57(0.32-1.03)	0.061
Rural	75(67.6%)	36(32.4%)	1.00	1.00	
Source of referral					
Health centre	99(70.2%)	42(29.8%)	1.72(1.05-2.82)	1.23(0.69-2.17)	0.484
Hospital	7(58.3%)	5(41.7%)	2.89(0.87-9.56)	2.34(0.60-9.08)	0.221
Self	70(80.2%)	42(19.80%	1.00	1.00	
Antenatal follow up					
Yes	223(78.2%)	62(21.8%)	0.55(0.32-0.92)	0.56(0.31-1.03)	0.063
No	53(66. %)	27(33.8%)	1.00	1.00	
Parity					
Primi	93(66.4%)	47(33.6%)	2.48(1.01-6.07)	**3.11(1.76-5.51)**	**<0.001**
Multi	183(81.1%)	42(18.7%)	1.00	1.00	
Diastolic blood pressure (mmHg)					
60-80	250(79.9%)	63(20.1%)	1.00	1.00	
>80	15(41.7%)	21(58.3%)	5.56(2.71-1.39)	**4.76(2.18-0.44)**	**<0.001**
<60	11(68.8%)	5(31.2%)	1.80(0.61-5.37)	1.68(0.52-5.46)	0.388
Gestational age (wk.)					
37-42	160(77.7%)	46(22.3%)	1.00	1.00	
>42	34(55.7%)	27(44.3%)	2.76(1.51-5.05)	**3.78(1.88-7.68)**	**<0.001**
Unknown	57(82.6%)	12(17.4%)	0.73(0.36-1.48)	0.67(0.32-1.42)	0.298
<37	25(86.2%)	4(13.8%)	0.56(0.18-1.68)	0.55(0.17-1.72)	0.303

5.6 Associated factors for labour outcome of induction

Related to factors associated with pattern of labour outcome induction the study revealed that

parity, diastolic blood pressure, indication and bishop score before induction shows significant association with failed of induction of labour at binary logistic analysis. However only parity and bishop score show significant relation at multivariate logistic analysis with prime Para and bishop score of six less than six have significant association with failed induction with AOR 4.11(95% CI: 1.31, 12.86) and 3.48(95% CI: 1.15, 10.55) respectively.**(Table7)**

Table 7: Bivariate and multivariate analysis of associated factors for labour outcome of induction of labour among women delivered in Woldia General Hospital from 2013 to 2018(n=89).

Variable	Labour outcome of induction		COR (95%CI)	AOR (95%CI)	*p* -value
	Success	**Failed**			

Parity					
Primi	22(46.8%)	25(53.2%)	2.48(1.01-6.07)	**4.11(1.31-12.86)**	**0.015**
Multi	11(26.2%)	31(73.8%)	1.00	1.00	
Diastolic blood pressure (mmHg)					
60-80	19(30.2%)	44(69.8%)	1.00	1.00	
>80	13(61.9%)	8(38.1%)	3.76(1.34-10.56)	1.73(0.32-9.36)	0.523
<60	1(20.0%)	4(80.0%)	0.58(0.06-5.53)	2.76(0.11-67.10)	0.532
Gestational age (wk.)					
37-42	20(43.5%)	26(56.5%)	1.00	1.00	
>42	11(40.7%)	16(59.3%)	0.89(0.34-2.34)	0.74(0.18-3.10)	0.679
Unknown	1(8.3%)	11(91.7%)	0.12(0.01-0.99)	0.11(0.01-1.07)	0 .058
<37	3(75.0%)	1(25.0%)	0.43(0.04-4.49)	0.40(0.01-16.64)	0.628
Indication for induction					
Post term Pregnancy	9 (39.1%)	14 (60. %)	1.93(0.61-6.14)	2.89(0.58-14.29)	0.192
IUFD	1(16.7%)	5(83.3%)	0.60(0.06-5.93	0.53(0.04-8.08)	0.650
PIH	14(58.3%)	10(41.7%)	4.20(1.34-13.13)	4.92(0.80-30.08)	0.085
Other	1(25.0%)	3(75.0%)	1.00(0.09-11.03)	2.08(0.14-30.75)	0.593
PROM	8(25.0%)	24(75.0%)	1.00	1.00	
Bishop score before induction					
Less than six	19(48.7%)	20(51.3%)	2.44(1.01-5.9)	**3.48(1.15-10.55)**	**0.028**
Six and more	14(28.o %)	36(72.0%)	1.00	1.00	

CHAPTER 6. DISCUSSION

This study tries to assess the prevalence, outcome and associated factors of induction of labour together with its indication and methods in Woldia general hospital. The finding reported that from the total delivery 89 women were delivered after induction of labour making its prevalence rate 24.4%. This shows that the prevalence of induction of labour was significantly

high in the study area. This finding was comparable with the study done in Woliso St. Luke Hospital (24.4%) (5). However, it is much lower than a study in Spain that reports 35% of delivery occurred following induction (30). The reasons for lower rates of induction of labour compared to that of Spain might be due to the setting of this hospital in which induction of labour done only for mothers with medical and obstetrics indication. The other possible reason might be related to maternal belief that the pain of induction of labour is more than that of spontaneous contraction combined to the low availability and usage of pain reliefs in the study area for pain associated with the initiation of uterine contraction. Moreover, the prevalence was much higher as compared to studies conducted in Latin-American (11.4%) (24). This is explained by the higher rate of CS in these countries (33%) leading to more mothers with medical and obstetrics indication for induction to undergo elective CS than induction.

In this study, the most common indication for induction was PROM (36.0%) followed by pregnancy-induced hypertension (27.0%). This is in line with a study done in Jima referral hospital Ethiopia (14). In contrast to this, the most common for IOL indication at King Khalid University Hospital, Kingdom of Saudi Arabia was post-term pregnancy (31%) followed by gestational and pre-existing diabetes mellitus (23.2%) while PROM was only the third frequent indication (26). One possible reason for this difference might be the difference in the socio-economic condition of the two countries and infarct that PROM is more common in low socioeconomic societies that affect the strength of the membranes due to nutrition and infection condition. The other possible reason could be the higher rate of diabetes in Saudi community with an estimated adult prevalence rate of 23.7%(39).

The study also observed that the most common method of induction was IV infusion of oxytocin (86.7%) either with prior cervical ripening (55.1%) or alone (31.5%) followed by artificial rupture of membrane (9%). This varies from other study done in Hawassa health facilities, sowthern Ethiopia,where 73.5%of induction of labour done by oxytocin infusion followed by oral or vaginal misoprostol (26.5%)(27).This variation might be because of the fact misoprostol used as method of induction in this hospital only if the fetus is not alive.

The study reports that out of total 89 inductions 33 of them delivered by caesarean section while 56 achieved vaginal delivery making the prevalence rate of failed induction 37.1%. This is in line with the finding of previous studies in Jima referral hospital (34.2%) and Army referral hospital Addis Ababa (37.8%)(14, 36). However, the finding shows much higher

difference than the finding reported by in Aga Khan Hospital, Pakistan, that revealed only 19.1. % and King Khalid University Hospital Saudi Arabia 16%(26, 33). This discrepancy could be due to the difference in hospital setup, skilled professional and availability of a different method for applying induction. Another reason might be due to the predominant use of PGE2 for ripping the cervix in King Khalid University Hospital, which was used in 86.7% of the cases, while it was used only in 55.1% of the cases in our study(26). Moreover the finding of the current study shows great difference from a study done in Woliso that reported the prevalence of failed induction was 42.1%(5). This might largely have attributed to the difference in defining of induction of the studies in which they include both instrumental vaginal delivery and caesarean section as failed induction whereas, only delivery by caesarean section considered as failed induction in this study.

Related to the factors associated with the prevalence of induction the study shows that induction of labour occurred mostly in prime Para mother 38.6% compared to 18.7% in mothers have one or more previous birth. This was further explained by multivariate analysis with primiparous mother have 3.11 times high risk of undergoing induction of labour than multiparous women. Even if it does not show the significant of association similar finding reported in the study done in Nepal with 61.9% of induction occurred in prim gravid mothers(29). This can be justified by the fact that the indications for induction are more common in prime Para mother than multi.

The study also shows that prevalence of induction has a significant association with gestational age of >42 weeks [AOR=3.78 (95% CI: 1.88, 7.68). A similar result was found in the previous study done in eight Latin-American countries that shows induction of labour was 3.85 times higher in gestational age more than 42 weeks (24). The reason behind this association could be due to one of the indications of induction is post-term pregnancy and it is the third most frequent indication in our study (25.3%). In contrast to other studies, this study reported that diastolic blood pressure of greater than 80mmHg has strong relation with induction of labour (adjusted OR=4.76). This may be due to the higher prevalence of pregnancy-induced hypertension in the study area that leads to artificial initiation of labour as its management.

In agreement with previous studies, the prevalence of failed induction of labour shows

significant association with parity of the mother and Bishop Score before the start of induction. Prime par women have 4.11 times more risk of undergoing caesarean section due to unable deliver virginally following induction. This consistence with a study done in Hawassa health facilities where prime Para women had 3.11 time more risk of going to CS delivery (27). This higher rate of failed induction in prime may be due to prime Para woman has more risk of developing complications that need CS delivery or because of they are less likely to achieve adequate contraction than multi.

Moreover, failed induction was also having 3.6 times more prevalent in women who have unfavourable bishop score than those who have a favourable cervix. This finding is supported by the finding in two studies done in south-west Ethiopia Jima and Woliso, where women with unfavourable bishop score had 5.3 and 4.1 times high risk of failed induction respectively (5, 14). This association is supported by scientific findings of different kinds of literature that show the condition of the cervix at the start of induction is an important predictor for a good outcome of induction of labour by affecting the progress of labour. That way modified Bishop Score become the widely practiced scoring system in the field of obstetrics.

6.1 limitation of the study

The study gives an insight about one of the frequently practiced obstetrics intervention in the country especially in the study area where no any previous study was done. However, the study has some limitations including that

- Since it was a retrospective study it only depends on available data's, as a result, some important variables were not assessed including socio-demographic and past obstetric history.
- The study was done only in one setting so the result may not describe the induction data all over the county.

Since the total number of delivery by induction in the study participant was only 89, it might affect the analysis of the outcome of induction and its predictors.

CHAPTER 7. CONCLUSION AND RECOMMENDATION

7.1 CONCLUSION

Given the increasing attention towards improving the maternal and childcare service the use of induction of labour in field of obstetrics have continued to rise over the past few decades. However, different studies recommend the use of induction of labour only if the possible benefit of artificial imitation of uterine contraction out ways the risk of continuing pregnancy. In our study, the prevalence of induction of labour is relatively high. Prime gravid, gestational age of above 42 weeks and diastolic blood pressure greater than 80 mmHg were found to be

predictor of induction of labour. It was also found that the most common indications for inductions were PROM and pregnancy induced hypertension. Furthermore, the study described that the most common method of induction in Woldia General Hospital is oxytocin infusion with prior cervical repining. However, the finding revealed even if it is not recommended, starting of induction with bishop score of less than six is practiced frequently in the study area.

In this finding having prim Para and unfavourable bishop score as significant risk factors, the prevalence of failed induction of labour is also relatively high. More ever the study revealed that significant amount of maternal and fetal complications occurred in mothers undergo induction of labour in Woldia General Hospital.

7.2 RECOMMENDATION

For minister of health and other stakeholders

- It was found that significantly high portion of mothers undergo induction of labour. Therefore, the minister of health and other stakeholders should develop national evidence-based clinical practice guidelines for indications of induction of labour and enforce its implementation. In addition, it should insure availabilities of obstetric care services other than induction of labour for management of pregnancy complications.

For the Woldia general hospital

- It was also found that significantly high portion of induction commenced with modified bishop score of less than six. Therefore, the hospital also should develop clear induction protocol for whom, when and how induction should be started and implemented. In addition, it should have a follow-up and evaluation method for induction service.

For health care professionals

- Before conducting induction, the health care providers also should consider that induction of labour has a high risk of failure and adverse feto-maternal outcome. Therefore, they must make sure that the possible benefit of induction outweighs the risk of induction.

For researchers

- Further study should be made with large sample size to investigate predictors of labour, maternal and neonatal outcomes of induction of labour.

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ANNEX I. CONSENT FORM

Hello! My Name is _____. I am a member of the research team from Addis Ababa University, College of Health Science, School of Allied Health Science and Department of Nursing and Midwifery and I have obtained permission from the hospital ethical review committee to

conduct the study. If you are willing, I request you to take this chart in order to gather some information. Before I take the chart, I request you to listen carefully to what I am going to read to you about the purpose and general condition of the study and tell me whether you agree or disagree to provide the chart.

Read the following paragraph

The purpose of conducting a study is to assess the prevalence and failure rate of induction of labour with associated factors among mothers delivered at Woldia General Hospital. I am kindly requesting you for the chart to take some information. In the end, it is hoped that the information taken from the chart could help to provide appropriate induction and delivery services for labouring women. I would like to assure you that the name of the women will not be used and the information obtained will not be given to anyone else and no reports of the study will ever identify the women. If a report of results is published, only information about the total group will appear. Are you willing to give the chart?

[] Yes [ ] No Signature_____

THANK YOU

ANNEX II. CHECKLIST

Checklist for collecting data on induction of labour

Participant ID #_____ Date: _____

Please encircle or enter in the appropriate space.

Part 1 (Socio-Demographic information)

No	Question	Answer and code
101	Age of the women	1. _____ In Years 9. Missing
102	Marital status	1. Married 2. Single 3. Divorced 4. Widowed 1. Missing
103	Residential address	1. Urban 2. Rural 9. Missing
104	From where did the mother referred?	1. Self 2. Health extension workers 3. Health Centre 4. Hospital 9. Missing

Part II obstetrics characteristics

No	Question	Answer and code
201	Number of previous birth excluding current delivery	1. Prime Para 2. Multi Para 3. Missing
202	Gestational age(wk.) based on LNMP	1. < 37 wk. 2. 37-40wk

		3. >42 wk. 4. Unknown LNMP 5. Missing
203	Have ANC follow up?	1. Yes 2. No
204	Ton of pregnancy	1. Single 2. Multiple 1. Missing
205	Diastolic Blood pressure at admission	1. _____mmHg
206	Sex of neonate	1. Male 2. Female
207	Weight of new born in gram	1. _____ 9. Missing

Part III induction of labour

No	Question	Answer and code
301	**Induction of labour done? (If NO the end)**	1. Yes 2. No
302	Indication(s) for Induction	1. Post term pregnancy 2. PROM 3. IUFD 4. Pregnancy induced hypertension

		5. Others specify_____
303	Method of induction	1. Oxytocin only 2. Misoprostol only 3. Oxytocin with cervical repining 4. Artificial rupture of membrane
304	Bishop's score before induction started	1. Less than six 2. Six and more 9.Missing
305	Membranes already ruptured before induction? (**if NO jump to Q 306)**	1. No 2. Yes 3. Missing
306	If membranes already rupture did Liquor foul smell ?	1. No 2. Yes. 3. Missing
307	Fetal heart beat pattern before induction started **(if NEGATIVE jump to Q 311)**	1. Regular 2. NRFHR 3. Negative 9. Missing
308	If regular for **Q307**does Non-reassuring fetal heart r ate following induction of labour present?	4. No 5. Yes. 9. Missing
309	Meconium stained amniotic fluid present following	1. Yes

	induction of labour?	2. No
310	Adverse newborn outcome present?	1. No 2. Yes 9. Missing
311	Newborn Status at birth. **(if still birth the end)**	1. Alive 2. Fresh still birth 3. Macerated still birth
312	APGAR score at 5 min	1. _____ 9. Missing
313	Admission to NICU after delivery	1. Yes 2. No
314	Adverse maternal outcome present?	1. No 2. Yes 9. Missing

Part IV labour outcome of induction of labour

No	**Question**	**Answer and code**
401	Does adequate contraction achieve after induction? **(If NO jump to 405).**	1. Yes 2. No
402	**If oxytocin infusion** was **t**he method of induction a t which phase were contraction achieved?	3. At first phase 4. Second phase 5. Third phase

403	Time from start of induction to delivery of labour?	1. Les than12hr 2. 12 or more hr. 9 Missing
404	Uterine hyper stimulation present following inducti on?	1. No 2. Yes 9. Missing
405	Fetal presentation at delivery	1. Cephalic 2. Breach 3. Face 4. Other specify _____
406	Mode of delivery,**(If vaginal jump to Q. 501)**	1. Vaginal delivery 2. Caesarean section
407	If delivery was by **CAESAREAN SECTION**, wha t was the indication?	1. Failed induction of labour 2. Prolonged labour 3. Fetal distress 4. Cephalo-pelvic disproportion 5. Others indicators (specify)_____

THANK YOU