

ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCE
SCHOOL OF ALLIED HEALTH SCIENCES
DEPARTMENT OF NURSING AND MIDWIFERY

**ASSESSMENT OF PREVALENCE AND FACTORS AFFECTING
SUCCESS OF INDUCTION OF LABOUR AMONG WOMEN ATTENDED
INDUCTION IN ARMY REFERRAL AND TEACHING HOSPITAL
ADDIS ABABA JUN 2015**

BY: SARA HILUF(BSC.NUR)

**THESIS SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES OF ADDIS
ABABA UNIVERSITY COLLEGE OF HEALTH SCIENCES, DEPARTMENT OF
NURSING AND MIDWIFERY IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN MATERNITY
AND REPRODUCTIVE HEALTH NURSING**

JUNE 2015

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ADVISER: YESHI ASSEFA (MScN,BSc,,RN)

JUNE 2015

ADDIS ABABA

Approval by the Board of Examiners

This Thesis by _____ is accepted in its present form by the Board of Examiners as satisfying Thesis requirement for the degree of Masters of Science in maternity and reproductive health Nursing.

Internal Examiner

Full Name

Rank

Date

Research Advisor/Supervisor

Full Name

Rank

Date

Abstract

Background: There are a number of complications of pregnancy that confer significant ongoing risk to the mother or fetus. For these conditions, induction of labor is as an artificial termination of pregnancy utilized to decrease both maternal and neonatal morbidity and mortality. The process of inducing labor is not always successful and sometimes fails to achieve a safe vaginal delivery.

Objectives: The objective of the study is to assess the prevalence and factors associated with induction of labor success among laboring mother in Addis Ababa army hospital.

Methods: Institution based retrospective cross-sectional study was conducted among 347 pregnant women undergone induction of labour from 2011-2013 in Addis Ababa referral army hospital. Using structured questionnaire. Three data collectors and one supervisor were trained and involved in data collection process. Data was entered and coded using Epiinfo and analysed using Statistical Package for Social Sciences (SPSS) version 21. Descriptive statistics were used to describe the study variables. Odds ratios (95% confidence intervals) was used to determine the association of different factors with success of induction of labour. Logistic regression analysis was used to assess the relative effect of determinants. A $P < 0.05$ was considered statistically significant in all tests of significance.

Result: A total of 347 women's record reviewed, 207 (59.7%) of women who undergone induction had successful induction. Oxytocin IV infusion was the only method used for the purpose of induction. In addition PROM, 167(48.1%) and postdate, 122(35.2%) were found to be the two most common reasons for induction. After controlling for other factors while women of age ≤ 24 years, Bishop Score greater than 5 and Apgar score greater than or equal to 7 at first minute were significantly more likely to have successful induction of labor.

Conclusion: Generally this study has disclosed three from five women who undergone induction had successful induction. The study also revealed that age of women, bishop score, Apgar score and fetal heart beat at the beginning of induction were significantly associated with success of induction of labor.

Recommendation: The hospital should have quality assurance programs and induction policies, including safety tools such as checklists, to ensure that inductions are performed in the best possible quality.

Key words *Induction of labor, failed induction of labor, Success of induction of labor, fetal heart rate non-reassuring*

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Acronym

CS	Caesarian Section
MDG	Millennium Development Goal
PPROM	Pre term premature rupture of the membranes
IOL	Induction of labor
IUGR	Intrauterine growth restriction
UN	United Nation
WHO	The World Health Organization
SPSS	Statistical package for social science

CHAPTER ONE

INTRODUCTION

1.1. Back Ground

There are a number of complications of pregnancy that confer significant ongoing risk to the mother or fetus (e.g., preeclampsia; preterm premature rupture of the membranes (PPROM); intrauterine growth restriction (IUGR); and post term pregnancy). For these conditions, induction of labor (IOL) is often the principal medical intervention utilized to decrease both maternal and neonatal morbidity and mortality [1].

The World Health Organization (WHO) recommends induction be performed with a clear medical indication and when expected benefits outweigh potential harms. In addition to the rise in the rate of indicated induction of labor, it seems that there has also been an increase in the rate of induction of labor that is not indicated for a medical reason [2]. Major indications for induction of labor include maternal, fetal, social or a combination of these factors; these indications may also either be evident or anticipated [3].

Despite the undisputed importance of labor induction for ending pregnancies in which there is a risk to the mother or fetus, this intervention may result in undesirable effect. Induction sometimes fails with potential risks of increased rate of operative vaginal delivery, caesarean birth, excessive uterine activity, abnormal fetal heart rate patterns, uterine rupture, maternal water intoxication, delivery of preterm infant due to incorrect estimation of dates, and possibly cord prolapse [4].

There is a consensus that the success of induced labor is directly related to the status of the cervix, with higher caesarean section rates in those with an unfavorable cervix. In addition to an unfavorable cervix, other factors that contribute towards increasing the risks of a caesarean section following labor induction include null-parity, obesity, mother's age above 30 years, fetal macrosomia, use of epidural anesthesia, use of magnesium sulphate and chorioamnionitis [5].

During induction of labor, the woman has restricted mobility and the procedure itself can cause discomfort to her. To avoid potential risks associated with the procedure, the woman and her

baby need to be monitored closely. This can strain the limited health-care resources in under-resourced settings [2]. Therefore, studying the success of induction is important in identifying the factors that affecting its success and helps to improve quality of IOL and decrease unnecessary indication of the procedure.

1.2. Statement of the problem

As per the 2010 estimate by UN agencies, the maternal mortality ratio declined to 350 deaths per 100,000 births from 700 in 2000; this is an average annual reduction of 6.9 percent over the 10-year period. Nevertheless, Ethiopia has not made sufficient progress toward reducing maternal deaths over the last decade. Thus, immediate and innovative interventions should be designed and implemented in order to accelerate progress and bring performance on maternal health back on track and possibly progress toward meeting the MDG target by 2015 [6]. Induction of labor is directly relevant to the reducing maternal mortality as it has potentials for preventing maternal complications and improving pregnancy outcome.

Strategies to optimize birth outcomes are a top priority in maternal child health, where the examination of health disparities and elimination of unnecessary and potentially adverse interventions serve as important public health objectives. Africa has the highest maternal mortality [7] as well as the highest stillbirth and perinatal mortality rates [8].

In developing countries, improvement of maternal and perinatal health strongly depends on strengthening of health systems [9]. When resources are scarce, caesarean sections that are not medically indicated, if done in large numbers, represent a serious resource drain. At the same time as unnecessary overuse of surgical practices is being assessed in some countries, millions of women in other countries who need these procedures do not have access to them, putting their own and their children's lives at risk [10].

Efforts aimed at achieving the health related millennium development goals (MDGs) should focus on increasing access to effective interventions and on improving quality of health care [7]. Induction of labor is directly relevant to the health related MDGs. As it has potentials for preventing maternal complications and improving pregnancy outcome.

Beyond 41 weeks gestation, the number of routine induction of labor needed to prevent fetal or neonatal death decreases constantly [11]. Higher rates of induction of labor may also contribute

to lowering caesarean section rates without increasing other adverse pregnancy outcomes [9]. In otherwise uncomplicated singleton pregnancies, meta-analysis of randomized controlled trials showed that a policy of induction of labor at 41 weeks reduces caesarean section rates without adverse perinatal outcomes. Minimizing caesarean section rates without increasing other adverse pregnancy outcomes is a priority consideration in low income countries where available resources need to be judiciously utilized [12].

The outcomes of labor induction are multi factorial, involving the synergistic influences of the patient, provider, system, and the intervention itself (labor induction). If fundamental changes in the healthcare delivery system are to transpire, a fundamental understanding of the sources of variations and recommendations for improvements in processes must likewise occur [13].

Induced labor has an impact on the birth experience of women. It may be less efficient and is generally more painful than spontaneous labor and always not end with vaginal delivery. The greatest maternal risk of induction of labor is the risk of morbidity associated with CS for failed induction and for other obstetric indications like non-progress of labor and fetal distress [13].

Despite the fact that IOL plays a vital role in reduction of maternal mortality, the success rate of induction and factors that contributes to it is not well studied in the study area. Therefore , this study will help to fill this gap by identifying factors related to health indications for labor induction, methods of induction, demographic factors and obstetric history.

1.3. Significance of the study

Induction of labor is an important practice that is carried out commonly in modern day obstetrics. The procedure is not always successful and sometimes fails to achieve a safe vaginal delivery. Little is known about factors that lead to success of induction of labor at Addis Ababa Army Hospitals. This study therefore identify those factors. This enable the institution and the health care providers to have data when counseling women for induction. It also help in informing evidence-based protocols on induction of labor in a local setting.

Like many other obstetrics population statistics, and similar to many sub-Saharan countries, the national rate of IOL in Ethiopia is not adequately studied. The importance of this study was to evaluate the prevalence of labor induction success, and factors associated with successful IOL. To the best of our knowledge there is a paucity of such studies in literature. Therefore, knowledge of the determinants of IOL out come in Hospitals may be employed as a foundation for a database to monitor rates, and outcome of IOL in similar hospitals found in the country. It can also be used to improve future quality of care provided for woman who needs induction of labor in the hospital.

CHAPTER TWO

LITERATURE REVIEW

2.1. Induction of labor

Induction of labor is defined as the artificial termination of pregnancy after the age of viability and before the spontaneous onset of labor for the purpose of accomplishing vaginal delivery. It is common obstetric procedure primarily employed when the benefits of delivery outweigh the risks of continuing the pregnancy [14].

Induction of labor is perhaps unique in medicine because it seeks to advance a process which in the natural course of events is inevitable unless the pregnancy is terminated by caesarean section or the mother dies before giving birth. A variety of specific clinical circumstances may indicate the need for induction of labor with a greater or lesser degree of urgency. The essential judgment that the clinician and the pregnant woman must make before IOL is whether the interests of the mother or the baby, or both, will be better served by ending or continuing the pregnancy [13].

The reason for inducing labor may be due to maternal problems, fetal problems or sometimes because of social issues. It is performed when vaginal birth is the most appropriate mode of delivery and therefore it is contraindicated when otherwise. [2, 15].

Induction of labor is one of the medical procedures that are increasingly being practiced around the world. For example, In the United states, rate of induction of labor more than doubled between the years 1980 and 2001 [16, 17]. According to WHO, up to 25% of all deliveries at term involve induction of labor in developed countries, but generally lower in developing countries. However, in some settings in developing countries induction of labor is as high as those observed in developed countries [2].

Rate of induction of labor vary from region to region. In the United States of America and United Kingdom about 20% of all deliveries are by induction of labor [16, 18], while 11.4% is reported in Latin America [19]. It is generally lower in African region as shown by a study done in Nigeria that reported 3% [18, 20]. According to WHO secondary analysis study on unmet need for induction of labor in Africa, rates of induction of labor were variable from country to country, ranging between 1.4% in Niger to 6.8% in Algeria. Overall rate of induction for the

African region was 4.4%. Most inductions being performed between 37 and 41 weeks of gestation [18].

In study conducted in Aga Khan Hospital for women Karimabad, Pakistan, from total of 719 women included in the study, in 130 (18.1%) induction as not ended with vaginal delivery [21]. In another study conducted in King Khalid University Hospital, King Saud University, Riyadh, Kingdom of Saudi Arabia from a total of 564 women who had IOL, 472 (84%) of women had vaginal delivery which is considered to be successful outcome of IOL. Post-term pregnancy was found to be the most common 174 (31%), indications followed by diabetes mellitus in 131 (23.2%) of the participants [22].

On A hospital based prospective study done in Kathmandu Medical College Teaching Hospital, Nepal of the 156 cases who had IOL, 91 (58.33%) underwent vaginal deliveries and 11 (7.05%) had instrumental deliveries. Hence, 102 (65.38%) of the study group had successful induction while 54 cases from the study group required Caesarean sections giving a failure rate of 34.6% [23].

In study conducted in Niger Delta University teaching Hospital, Nigeria majority of the women had spontaneous vaginal delivery 51 (85.0%), while 9 (15.0%) had emergency caesarean section [24].

In retrospective cohort study among women with singleton pregnancies who delivered at term in the university clinics of Kinshasa, DR Congo, from 115 clients 3.2% of them were concerned with induction of labor. From these 78 (66.9%) women had vaginal delivery and 34 (29.6%) experienced cesarean section [25].

2.2. Factors associated with failed induction of labor

According to study from Nepal induction failure rate was 53.8% when maternal age >30y and 28.2% in those <30y. In another study conducted in King Khalid University Hospital, Kingdom of Saudi Arabia, there was no association between maternal age and successful IOL. Based on study in factors and outcomes associated with the induction of labour in Latin America, it was found that mothers from the poor socio-economic areas were at a greater risk for poor pregnancy outcome (19).

According to study from Nepal women with normal BMI had a failure rate of 25.6% compared to 36% for overweight and 44.4% for obese women. Study done in also found that the mean admission BMI in the successful induction group was significantly lower than the mean BMI in the failed induction group. With each increase in the BMI by one unit, the patient was more likely to need CS after [22]. Another study done in the university clinics of Kinshasa, DR Congo failure of induction was more likely to occur in association with high maternal weight[25].

Study done in Pakistan reported that failed induction rate was 4.6 times higher in nulliparous patients compared to their multiparous counterparts [21]. Similarly in Kingdom of Saudi Arabia statistically significant raise in odds of CS was found in nulliparous women compared with multiparous women [22].

Previous bad obstetric history has also been found to be associated with increased chance of having CS following induction of labor compared with previous vaginal delivery [21]. In another prior vaginal delivery was associated independently with an increased likelihood of successful induction of labor [22].

Study done on factors associated with failed induction of labor in a secondary care hospital, in Pakistan women undergoing caesarean section were significantly more likely to have gestational age more than 40 weeks (47.7%) than women having vaginal delivery (36.7%) after IOL. It was also observed that women having failure of induction were 2.5 times more at odds of having macrocosmic babies (3.8%) than patients with successful inductions (1.5%) [21].

A meta-analysis of 19 randomized trial showed routine labor induction at > 41 weeks of gestation to be associated with significantly lower rate of perinatal mortality than expectant management and no significant increase in the caesarean birth rate with induction at 41 week [12].

Induction of labor results in high failure rate if the cervix is not ripe [26, 27]. A significant association between Bishop Score and failed induction was also noted. Rate of induction failure was 1.9 times higher in women with Bishop score of 5 or less (84%) versus (18%) in women with favorable cervix. This Pakistan study also proves a relationship between ruptured membranes and failed induction. According to study from Pakistan women having a cesarean section were 1.3 times more likely to have ruptured membranes than their counterparts. It was

further noted that women with failed induction were 2.9 times more at odds of having prolonged latent phase and 1.4 times more likely to have prolonged second stage. No association was noted between of failed induction and booking status of patient and level of responsible physician [21].

In other case control study done in Netherland it was noted that the risk of cesarean delivery was significantly associated with low maternal height, a history of preterm delivery, and the amount of dilatation at the start of induction of labor [28].

2.3. Conceptual framework

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

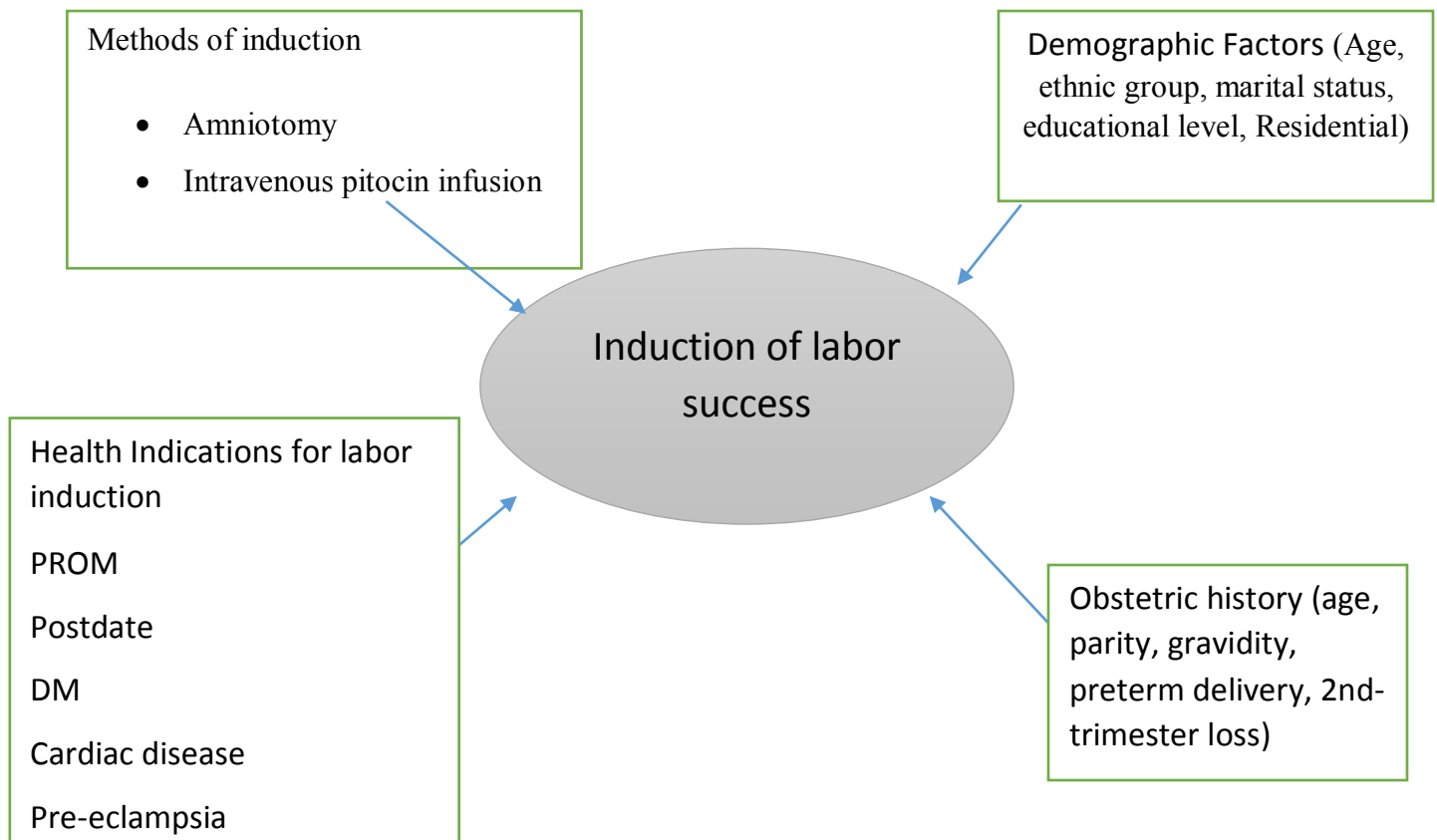


Figure 1. Conceptual frame work of factors affecting induction of labor success (constructed after Reviewing literatures (23).

CHAPTER THREE

OBJECTIVES

3.1. General objective

To assess the prevalence and factors associated with induction of labor success among delivered Mother in army hospital Addis Ababa March -April 2015.

3.2. Specific objective

1. To determine prevalence of induction of labor success.
2. To identify the determinants of induction of labor success.

CHAPTER 4

METHODS AND MATERIALS

4.1. Study area and period

The study will be conducted in Addis Ababa, the capital city of Ethiopia and seat of African Union & United Nations World Economic Commission for Africa. Addis Ababa has a population size of over 3 million (3,038,096) with annual growth rate of 2.1% (data obtained from central statistical agency of Ethiopia). The city is divided into ten sub-cities and 100 Kebeles (lowest administrative units in Ethiopia). Addis Ababa is located at 9° 1' 48" North and 38° 44' 24" East and the total land area is 54,000 hectares. Its average elevation is 2,500 m above sea level, and hence has a fairly favorable climate and moderate weather conditions (40).

The study was conducted in Army Hospital Addis Ababa. The Armed force General teaching hospital is situated in Yeka and Ledeta KefeleKetemato the south west and northern part of Addis Ababa which is the capital city of Ethiopia. The hospital serve as teaching for Defense University College of health sciences and provide healthcare services for out-patients and in-patients, in addition to that gives private wing services. Delivery ward is one of areas in which mothers get the service which is given by 2 obstetricians Dr, 1 Health officer, 1 Head nurse 11 midwifery and 15 post and prenatal Beds. According to data from the hospitals labor ward registration book more than 190 inductions has been conducted in the past one year in the hospital. This study was conducted in Addis Ababa army hospitals from March to April 2015.

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 undergone induction of labor at army hospital Addis Ababa before from 2011 to 2013.

4.3.2. Study population:

The study population was all selected women who had undergone induction of labor at army hospital Addis Ababa from 2011 to 2013.

4.4. Inclusion and exclusion criteria

4.4.1. Inclusion criteria

- All registered women who had been delivered through induction of labor at maternity wards at army hospital Addis Ababa from 2011 to 2013.
- All registered women who had delivered at gestational age of 28 weeks and above and
- Women of all parities

4.4.2. Exclusion criteria

All registered women who had induction without full document.

4.5. Sample size determination

To determine the sample size, we used the formula for single population proportion:

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

Where: n = sample size

Z = standard normal distribution corresponding to significance level at $\alpha = 0.05$

p = proportion of labor induction success

“P”, proportion of labor induction success was assumed to be 66.9% which was derived from study conducted in rural DR, Congo [25].

d = margin of error 5%

$$n = \frac{(1.96)^2 \times (0.669)(1-0.669)}{(0.05)^2} = 340$$

By adding 10% of the non-response rate the final sample size was 340+10% of calculated sample which was 340+34 = 374.

4.6. Sampling technique

A quota sampling procedure was used to choose the study participants. All women with induction of labor from registration book were selected back starting from 2013 to 2011 until desired sample size was achieved.

4.7. Data collection instrument

Information regarding demographic features, details of induction of labor (indication, method, mode of delivery, complications, and neonatal outcome) was collected from the induction register and medical record files and entered in a predesigned perform. Since there is no previous study in the study area and client record book was not complete to use questionnaire from study done in other areas, the questionnaire was developed by using questionnaire from other areas as base line and client documentation form prepare to be used all over the country.

4.8. Data Collectors

Three midwifery nurses who were working in the other unit during investigation filled predesigned preform form women's record after they had two days training. One supervisors with first degree was trained and supervised the data collection process closely and he/she was followed by principal investigator. The questionnaire was collected each day by principal investigator and checked for any error. Then appropriate measure was taken accordingly.

4.9. Data quality Assurance

To ensure the quality of data to be gathered from the study subjects, a range of mechanisms was employed in order to address major areas of bias introduction during the data collection process.

A two days training was given for data collectors and supervisors on the objective and relevance of the study, how to gather the appropriate information, procedures of data collection techniques and the whole contents of the questionnaire. The questionnaire was pre-tested by taking 5 percent of the sample size in Addis Ababa Police referral Hospital and necessary modification in the questionnaire was made based on the nature of gaps identified. Data was double entered in to EpiData, cleaned and explored for outliers, missed values and any inconsistencies.

4.10. Data processing & analysis

After data collection, each questionnaire was checked for completeness consistency and clarity and was coded entered in to the prepared template and re checked for errors. Data was entered in to Epidata, and exported to SPSS version 20. Data was cleaned and explored for outliers, missed values and any inconsistencies and analysed using SPSS version 20. Descriptive statistics like frequency tables, graphs and descriptive summaries were used to describe the study variables. Odds ratios (95% confidence intervals) was used to determine the association of different factors with success of induction of labor. Logistic regression analysis was used to assess the relative effect of determinants. A $P < 0.05$ was considered statistically significant in all tests of significance. And those are not recorded or found from client chart were considered as missing during logistic regression.

4.11. Study Variables

Dependent variable:

- Success of induction of labour

Independent variables:

- Women socio economic factors (Age, ethnic group , marital status, educational level, Residential)
- Obstetric history (age, parity, gravidity, preterm delivery, 2nd-trimester loss), weight and current obstetric characteristics (gestational age, Bishop score, birth weight), indications and methods of induction.

4.12. Ethical consideration

Ethical clearance to conduct the study was obtained from Addis Ababa University, health science faculty Nursing and Midwifery department and permission to conduct the study in the army hospitals was secured from the hospital. Confidentiality was ensured for the information by not recording the name of the respondent or other identifiers.

4.13. Dissemination plan

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

4.14. Operational definitions

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

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

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

Fetal heart rate non-reassuring: Fetal heart either below or above normal range following induction of labor

CHAPTER 5

RESULT

5.1. Characteristics of the Respondents

A total of 347 women's document was reviewed during the study period. From these women 231 were in the age group 25-34 years with the mean age of 27.23 (± 4.2) years. Greater proportion 228 (65.7%) of the women were Orthodox Christian and 132 (38.0%) of the participants belong to Amhara in ethnicity, followed by Oromo and Tigre constituting 77(22.2%) each. Almost all 333 (96.0%) of the study participant were married. Although for greater than half 198 (57.1%) of the participant information on educational status was not found; 60(17.3%) were from grade 9 to 12 followed by 47(13.5%) diploma and above and 42(12.1%) less than grade 8.

Table 1:- Socio demographic characteristics women who undergone induction of labor from 2011 to 2013 in Army Referral Hospital Addis Ababa (N=347)

Characteristics	Frequency N=347	Percentage (%)
Age		
15-24	86	24.8
25-34	261	75.2
Educational status		
Less than grade 8	42	12.1
Grade 9 to 12	60	17.3
Diploma and above	47	13.5
No information	198	57.1
Religion		
Orthodox	228	65.7
Protestant	73	21.0
Muslim	43	12.4
No information	3	0.9
Ethnic group		
Amhara	132	38.0
Oromo	77	22.2
Tigre	77	22.2
Gurage	55	15.9
Other	6	1.6
Marital status		
Married	333	96.0
Others	14	4.0

5.2. Obstetric condition

The mean gestational age was 39.55 ± 2.49 weeks (range: 30 – 44 weeks). Of the included 347 women, 167(48.1%) undergone induction of labor for premature rupture of membranes (PROM), 122 (35.2%) for post-date, while 42(12.1%) for medical disorders with pregnancy. Out of the 294 women who had recorded information on bishop score 256 (73.8%) of them had a modified bishop score of greater than or equal to 6. Regarding method of induction, all of the women had been reported as received intravenous Pitocin infusion. Out of the total 307 (88.5%) of the women liquors was recorded as foul smelling and 15(4.3%) women's diastolic blood pressure was of greater than 90.

Table 2:- Obstetric condition of women who undergone induction of labor from 2011 to 2013 in Army Referral Hospital Addis Ababa (N=347)

Characteristics	Frequency	Percentage (%)
Reason for induction		
PROM	167	48.1
Post term	122	35.2
Medical disorders with pregnancy	42	12.1
No information	16	4.6
More than 90 DBP at booking		
Yes	15	4.3
No	332	95.7
Bishop score		
≤ 5	38	11.0
> 6	256	73.8
No information	53	15.3
Liquor foul smelling		
Yes	18	5.2
No	307	88.5
No information	22	6.1
Gestational age		
Less than 37 weeks	27	7.8
38 to 41 weeks	203	58.5
Greater than 42 weeks	91	26.2
No information	26	7.5

Out of the total 207 (59.7%) of the women delivered vaginally within 12 hour after induction was started, while 132 (37.8%) delivered by Cesarean section (CS); from this, 92 (26.5%) undergone CS due to failed induction of labor that means unable to deliver vaginally within 12 hour, 24 (6.9%) were due to fetal distress, while the rest were due to different reason like Cephalo-pelvic disproportion and malposition. From a total of 347 women sampled in 159(45.8%) of the cases membranes were ruptured before induction. Following induction in 51(14.7%) of the cases fetal heart rate were recorded as non-reassuring. At birth 326(93.9%) of them were born alive and the rest, 21(6.1%) were recorded to be still birth. From these 326 live

birth 149 (45.7%) and 50(15.3%) had Apgar score of ≤ 7 at birth and 5th minute respectively. And 39(12.0%) of these live births were admitted to neonatal intensive care unit with the main reason being neonatal distress followed by meconium aspiration.

Table 3:- Outcome of induction of labor among women who undergone induction of labor from 2011 to 2013 in Army Referral Hospital Addis Ababa.

Characteristics	Frequency N=347	Percentage (%)
Membranes already ruptured before induction (N=347)		
Yes	159	45.8
No	180	51.9
No information	8	2.3
Fetal heart rate non-reassuring following induction of labor (N=347)		
Yes	51	14.7
No	290	83.6
No information	6	1.7
Mode of delivery (N=347)		
Vaginal delivery	207	59.7
Caesarean section	131	37.8
Instrumental vaginal delivery	9	2.5
Newborn Status at birth (N=347)		
Alive	326	93.9
Fresh/macerated still birth	21	6.1
APGAR at Birth (N= 326)		
≥ 8	177	54.3
≤ 7	149	45.7
APGAR at 5 min (N= 326)		
≥ 8	276	84.7
≤ 7	50	15.3
Admission to NICU (N= 326)		
Yes ≤ 7 APGAR	39	12.0
No	287	88.0
Reason for admission to NICU(N= 39)		
Neonatal distress	18	46.2
Meconium aspiration	9	23.1
Preterm	4	10.3

Others	8	20.5
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Induction of labor was considered successful when induction of labor is end up with spontaneous vaginal delivery. Accordingly as shown in the figure 2 from 347 reviewed record 207 (59.7%) of them delivered vaginally so that their induction were considered to be success.

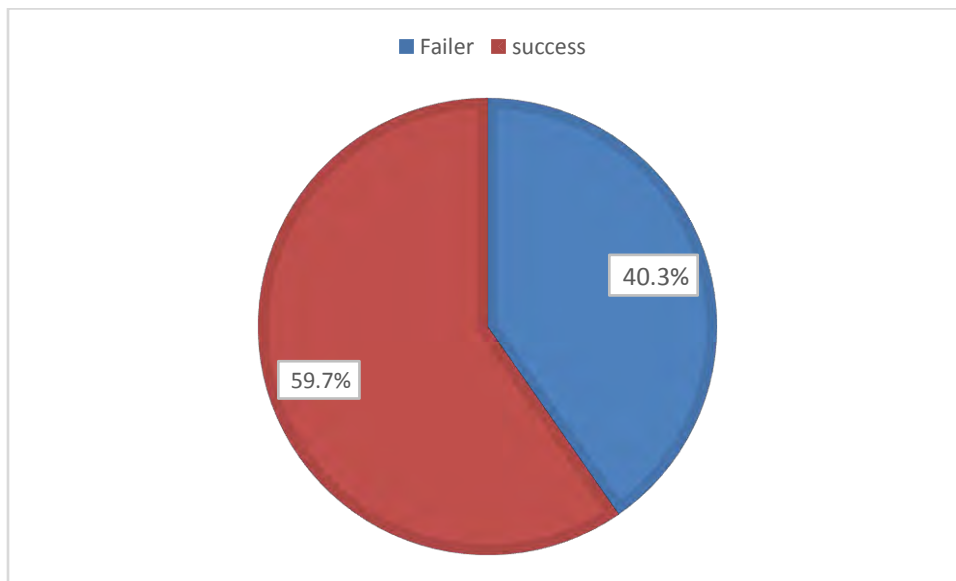


Figure 2:- Prevalence of successful induction of labor among women who undergone induction of labor from 2011 to 2013 in Army Referral Hospital Addis Ababa.

5.3. Association between selected factors and success of induction

In this study the association of different factors of the respondents with success of induction was investigated using bivariate and multivariate logistic regression analysis.

On bivariate analysis women who had bishop score of greater than 5 were about 8 times more likely to have successful induction [COR=8.60(3.64-20.33)]. Those women with new born Apgar score of greater than 8 at birth were 3.88 times more likely to have successful induction than who had Apgar score of less than 7 [COR= 3.88 (2.44-6.17)]. On the other hand those women whose fetal heart rate recorded as non-reassuring were 0.37 times less likely to have successful induction [COR= 0.37(0.20-0.69)]. New born status [COR=0.14(0.03-0.63)] and when liquor is meconium stained [COR= 0.31(0.16-0.62)] were also found to be significantly associated in bivariate analysis. Both fetal heart rate, new born status (alive or still birth) and when liquor is meconium stained were failed to show association when controlled for other factors (Table 4).

Multivariate logistic analysis results showed that the odds of women with age of less than 24 years were 2 times [AOR=2.437 (1.126, 5.275)] higher than those who were age of 25 and above to experience successful induction. And again the likely hood of successful induction was approximately 2.6 times more prevalent among those women's with Apgar score of greater than 7 [AOR=2.61(1.40, 4.86)] (Table 4). The result of this study also showed significant association of women's bishop score 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 [AOR=7.51(2.44, 23.07)]. On the other hand the success of induction was 0.36 times lower among women with fetal heart rate record of non-reassuring [AOR= 0.36(0.13-0.98)].

Table 4:- Factors associated with successful induction of labor among women who undergone induction of labor from 2011 to 2013 in Army Referral Hospital Addis Ababa.

Characteristics	Successful induction (%)		COR (95%CI)	AOR (95%CI)
	Yes	No		
Age				
18-24	59(68.6)	27(31.4)	1.64(0.98, 2.77)	2.44(1.13,5.28) *
25-34	142(57.0)	107(43.0)	1.00	1.00
Gestational age				
Less than 41 weeks	150(59.5)	102(40.5)	1.01 (0.62, 1.64)	0.66(0.24,1.86)
Greater than 42 weeks	54(59.3)	37(40.7)	1.00	1.00
Membranes already ruptured before induction				
Yes	102(64.2)	57(35.8)	1.43 (0.92, 2.22)	2.21(0.77,6.37)
No	100(55.6)	80(55.6)	1.00	1.00
Fetal heart rate non-reassuring following induction of labor				
Yes	20(39.2)	31(60.8)	0.31(0.17, 0.62) *	0.36(0.13,0.99) *
No	184(63.4)	106(36.6)	1.00	1.00
Liquor meconium stained				
Yes	14(35.0)	26(65.0)	0.92 (0.61, 1.40)	0.40(0.15,1.06)
No	185(63.4)	107(36.6)	1.00	1.00
Bishop score				
> 5	169(66.0)	87(34.0)	8.60(3.64,20.33)*	7.70(2.49,23.8)*
≤ 5	7(18.4)	31(81.6)	1.00	1.00
Reason for induction				
Post term	69(56.6)	53(43.4)	1.67(0.53, 2.15)	0.97(0.26,3.77)
PROM	106(63.5)	61(36.5)	0.80(0.39, 1.64)	0.79(0.19,3.33)
Medical disorders with pregnancy	26(61.9)	16(38.1)	1.00	1.00
Apgar score at birth				
> 7	128(72.3)	49(27.7)	3.88(2.45,6.67) *	2.61(1.40,4.86)*
≤ 7	60(40.3)	89(59.7)	1.00	1.00

CHAPTER 6

DISCUSSION

Induction of labor is one of the fastest growing medical procedures in current obstetric practice. In this study out of five women who undergone induction about three women had successful induction. This finding was similar with study done in Kathmandu Medical College Teaching Hospital, Nepal in which 65.38% undergone successful induction and study done in university clinics of Kinshasa, DR Congo in which 66.9% women had vaginal delivery so could successful induction [23, 25]. In other way successful induction rate in these studies was lower than study conducted in King Khalid University Hospital, King Saud University, Riyadh, and Kingdom of Saudi Arabia from in which 84% of women had successful outcome of IOL [22]. Similarly in study done in Aga Khan Hospital for women Karimabad, Pakistan, 81.9% of the case experienced vaginal delivery [21]. This discrepancy may be due to difference in quality of induction care provided by the hospitals. Similar to study done in Kathmandu Medical College Teaching Hospital, Nepal this study the main reason to undergone Caesarean sections was failed induction followed by fetal distress.

Various methods have been recommended for induction of labor such as intra-cervical Foleys balloon, prostaglandin E2 and I/V Oxytocin etc. In this study oxytocin IV infusion was used exclusively to induce induction. My finding was similar with study done in Latin America on factors and outcomes associated with the induction of labor. From over all cases in this Latin American countries study misoprostol was used in only about 10% of all labor inductions. This is also in agreement with other studies that have reported its use in 85–100% of inductions, mainly in cases in which the cervix was favorable to induction. [29,30,31]. But in Egyptian study by Mohamed S. Ali and his colleagues 34.4% received intravenous oxytocin infusion as the method of induction of labor, 65.5% received vaginal misoprostol. The decision whether to induce with oxytocin or misoprostol was probably not dependent on the favorability of the woman's cervix, but more on their availability and culture within the unit.

According to this study the primary reason for induction of labor was premature rupture of membranes (PROM) followed by for post-date and medical disorders with pregnancy. This finding was in line with study done in Ain Shams University Maternity Hospital, Egypt [32].

Premature rupture of membranes was also found to be the commonest indication for induction of labor in study done on unmet need for induction of labor in Africa [18] In other study done in Kingdom of Saudi Arabia post-term pregnancy was found to be the most common indications followed by diabetes mellitus in participated women [22]. While the common indications for induction in Nepal study was post term pregnancy [23].

In this study it was found as age was significant predictor for successful induction of labor, its likelihood being greater among women of age less than 24 years. Which is similar with study from Nepal maternal age was found to be risk factor for successful [23].

The condition of the cervix at the start of induction is an important predictor, with the modified Bishop score being a widely used and predominant risk factor scoring system. Induction of labor results in high failure rate if the cervix is not ripe or vice versa [13, 14]. In line with these studies, our study also found as there is strong association between this score and successful induction of labor. The odds of successful induction were 7 times more likely in women with Bishop Score above 5 [AOR=7.51(2.44, 23.07)]. [36-39]

Apgar score at first and fifth minute one of indicator of the outcome of induction of labor related to the baby. Pervious study done in Latine America has shown that induction was associated with lower 5th minute Apgar scores even following adjustment for confounding factors. In our study even though Apgar score at fifth minute did not show significant association, the success of induction of labor has increased as first Apgar score become > 7.

Conclusion and Recommendation

This study has disclosed three from five women who undergone induction had successful induction that is the prevalence of success of labour in this study area was 59.7 %. Regarding method used, Oxytocin IV infusion was the only method used for the purpose of induction. In addition PROM 48% and postdate 35% were found to be the two most common reasons for induction.

After controlling fore other factors while women of age ≤ 24 years about 2 times more likely to have successful IOL. Women who has Bishop Score greater than 5 and Apgar score less than or equal to 7 at first minute were 7.7 and 2.6 times more likely to have successful induction of labor, respectively. On the other hand women's with non-reassuring fetal heart beat at the beginning of induction were found to be 0.36 times less likely to have successful induction of labor.

Recommendation

- It was found this study all health providers were not assesses and following in labor informally therefore Ministry of health with its partner should develop national evidence-based clinical practice guidelines for induction of labor and monitor its implementation.
- The hospital should have quality assurance programs and induction policies, including safety tools such as checklists, to ensure that inductions are performed only for acceptable indications.
- The hospital should facilitate availability of facilities for assessing maternal and fetal well-being.
- Health care providers should assess and document the cervix (using the Bishop score) to determine the likelihood of success and to select the appropriate method of induction. They need also to consider that induction of women with an unfavorable cervix is associated with a higher failure and a higher Caesarean section rate.
- Future research should be directed to conducting a multicenter study of similar objectives to provide national data set for evaluating and monitoring this important intervention, and provide information for health services provision.

Limitation of the study

The results of the study gave an insight to the induction of labor services in one of the leading health institution in the capital of Ethiopia, Addis Ababa. In addition it provided information on the outcomes of a common obstetrical intervention. Such information is vital, considering the scarcity of data on reproductive health and obstetrical practice in the country. However, we are aware of the limitation of this study including that

- The study was conducted in a small population in Army Referral Hospital and the results may not be representative of the entire country.

- The study was limited by the retrospective use of a database, allowing only the available variables to be used. In this particular hospital, for example, information on general medical and past obstetric history were not routinely and clearly recorded.
- Personal bias may not have been completely eliminated but proper training of research assistants helped in minimizing this.

Strength

- The data was collected by registered midwife nurses.

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Annex I

Preform for collecting data on induction of labor

Participant ID # _____ Date: _____

Please tick or enter in the appropriate space.

Part 1 (Socio-Demographic and baseline health information)

No	Question	Answers and codes	Go to
101	Age of the women?	_____ In Years Didn't recorded _____ 88	
102	Religion of the women?	Orthodox _____ 1 Muslim _____ 2 Protestant _____ 3 Others(specify) _____ 4 Didn't recorded _____ 88	
103	To which ethnic group of the women?	Oromo _____ 1 Amhara _____ 2 Tigre _____ 3 Gurage _____ 4 Others(specify) _____ 5 Didn't recorded _____ 88	
104	What is women's marital status?	Never married _____ 1 Married _____ 2 Divorced _____ 3 Widowed _____ 4 Others(Specify) _____ 5 Didn't recorded _____ 88	
105	What is women's educational level?	Can't read and write _____ 1 Grade 1-8 _____ 2	

		Grade9-12_____3 Diploma and above_____4 Others(specify)_____5 Didn't recorded _____88	
106	Residential Address	Urban _____3 Rural _____4 Didn't recorded _____88	

Part 2 (Induction of labour)

No	Question	Answers and codes	Go to
201	Date and Time induction commenced (from notes)	__/_/_____ Didn't mentioned _____88	
202	Indication(s) for Induction, tick where applicable	Post term _____1 PROM _____2 Hypertensive disorders _____3 Diabetes _____4 IUGR _____5 Others specify _____6 Didn't recorded _____88	
203	Gestation age in weeks (indicate)	_____ Didn't recorded _____88	
204	Membranes already ruptured before induction	Yes _____1 No _____2 Didn't recorded _____88	
205	Liquor foul smelling	Yes _____1 No _____2 Didn't recorded _____88	
206	Bishop's score	_____	
207	Method of induction (indicate)	Amniotomy _____1 Intravenous pitocin infusion-----2 Complementary methods _____3 Didn't recorded _____88	

208	If misoprostol only, route of administration	Vaginal _____ 1 Oral _____ 2 Sublingual _____ 3 Not applicable _____ 4 Didn't recorded _____ 88	
209	Total amount of misoprostol given	50ug _____ 1 100ug _____ 2 150ug _____ 3 200ug _____ 4 >200ug _____ 5 Didn't recorded _____ 88	
210	Uterine hyper stimulation present (as recorded in notes)	Yes _____ 1 No _____ 2 Didn't recorded _____ 88	
211	Fetal heart rate non-reassuring following induction of labor	Yes _____ 1 No _____ 2 Didn't recorded _____ 88	
212	Change of color of liquor to meconium stained	Yes _____ 1 No _____ 2 Didn't recorded _____ 88	
213	Mode of delivery	Vaginal delivery _____ 1 Instrumental vaginal delivery _____ 2 Caesarean section _____ 3 Didn't recorded _____ 88	
214	If delivery by caesarean section, indication:	Failed induction of labour _____ 1 Fetal distress _____ 2 Cephalopelvic disproportion _____ 3 malposition _____ 4 Others indicate _____ 5 Didn't recorded _____ 88	
215	Ruptured Uterus present	Yes _____ 1 No _____ 2 Didn't recorded _____ 88	

216	Newborn Status at birth	Alive _____ 1 Fresh/macerated still birth _____ 2 Didn't recorded _____ 88	
217	Apgar score at 1 and 5 min	Score at 1 min _____ Score at 5 min _____ Didn't recorded _____ 88	
218	Admission to NICU after delivery	Yes _____ 1 No _____ 2 Didn't recorded _____ 88	
219	Reason for admission to NICU (mention)	_____	
220	Perinatal death	Yes _____ 1 No _____ 2 Didn't recorded _____ 88	