



MEKELLE UNIVERSITY

COLLEGE OF HEALTH SCIENCES

SCHOOL OF NURSING

PREVALENCE AND FACTORS ASSOCIATED WITH FAILED INDUCTION
OF LABOR AMONG WOMEN UNDERGOING INDUCTION AT PUBLIC
HOSPITALS OF MEKELLE CITY, TIGRAY

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DECLARATION FORM

Ethical clearance was obtained from the institutional review board of Mekelle University, College of Health Science. The study was carried out after obtaining permission from public hospitals of Mekelle city, Tigray. Besides, the objective of the study was briefly explained to those public hospital managers to create a comfortable medium for data collectors. As I undersigned, this research thesis is my original work in partial fulfillment of the requirement for the degree of Master of Science in Maternal and Reproductive Health Nursing. I had also to acknowledged to my advisor, all the people and institution who gave support as well as all sources of material to work research thesis.

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This thesis on title - Prevalence and factors associated with failed induction of labor among women undergoing induction at public hospitals of Mekelle city, Tigray; 2024: hospital-based cross-sectional study design conducted by Haben Niguse is therefore to certify that the thesis has been accepted in partial fulfillment of the requirements for the Master's Degree in Maternal and Reproductive Health Nursing.

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Abbreviations

ANC	Antenatal Care
ACSH	Ayder Comprehensive Specialized Hospital
BMI	Body Mass Index
CPD	Cephalo-Pelvic Disproportion
FD	Fetal Distress
FIOL	Failed Induction of Labor
GA	Gestational Age
GDM	Gestational Diabetes Mellitus
IOL	Induction of Labor
IRB	Institutional Review Board
IUFD	Intra-Uterine Fetal Death
LBW	Low Birth Weight
NGOs	Non-Governmental Organizations
OR	Odds Ratio
OTM	Oral Titrated Misoprostol
PROM	Premature Rupture of Membrane
PTL	Pre-Term Labor
RDS	Respiratory Distress Syndrome
SPSS	Statistical Package for Social Sciences
WHO	World Health Organization

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Abstract

Introduction: Induction of labor is more frequently used obstetric procedure, practiced in over 20% of pregnancies globally, with 20% resulting in cesarean delivery. Worldwide, unsuccessful induction of labor is a public health concern. Numerous unfavorable outcomes for both the mother and fetus are linked to it, including postpartum hemorrhage, uterine rupture, birth asphyxia, and prolonged hospital stays. This study aimed to assess the prevalence and factors associated with failed induction of labor among women undergoing induction at public hospitals of Mekelle city, Tigray origin, Ethiopia.

Objective: To determine the prevalence and factors associated with failed induction of labor among women undergoing induction at public hospitals of Mekelle city, Tigray, 2024/25

Method: A facility-based cross-sectional study design was implemented on 312 samples from women undergoing labor induction at public hospitals of Mekelle city from September to October, 2024. The sample size was allocated to the selected hospitals proportionally. A structured questionnaire was used for interview of woman on induction and checklist was used to extract data from medical records. Data was analyzed using Statistical Package for Social Science version 27. Binary logistic regression model was used to see the association between dependent and independent variables and multivariable logistic regression was used to identify the independent predictors of failed labor induction. Odds ratio with 95% confidence interval computed and level of significance declared at P-value <0.05.

Result: This study showed that the prevalence of failed induction was 26.3% (95% CI: 21.6-31.4). Factors associated with failed inductions were; Lack of labor induction history (AOR: 10.6; 95% CI: 1.61-70.29), no artificial rupture of membrane (AOR: 4.1; 95% CI: 1.28–13.27), shorter maternal height, (AOR=0.9, 95% CI: 0.88–0.99), and longer induction-to-delivery time (AOR= 0.9, 95% CI: 0.80–0.98).

Conclusion: The prevalence of failed induction was high in this study. Lack of labor induction history, no artificial rupture of membrane, shorter maternal height, and longer induction-to-delivery time were independent predictors for failed induction of labor. Recognizing these factors and timely interventions can help reduce the risk of failed inductions and improve both maternal and neonatal outcomes.

Keywords Labor induction, failed induction, outcome of induction, Tigray, risk factors, Cesarean delivery

1. Introduction

1.1 Background

A failed induction of labor occurs when artificial labor stimulation is unsuccessful in progressing to active labor and eventually vaginal delivery. This could occur despite the use of medications, mechanical methods, or other techniques intended to prompt contractions and cervical dilation. Factors include insufficient cervical ripening, inadequate uterine contractions, or other maternal or fetal health issues.(1,2).

Failure to initiate a good uterine contraction is the definition of FIOl given by the Federal Ministry of Health (FMoH) of Ethiopia. It is diagnosed if, after administering oxytocin for 6 to 8 hours and using the maximal dosage for at least an hour, enough uterine contractions are not obtained (1).

Induction of labor (IOL) is the initiation of labor artificially after the age of fetal viability to achieve a vaginal birth. It is become a more frequently used obstetric procedure. Its use has more than doubled in the last 20 years, and about 1 in 4 pregnant women in affluent nations currently have labor induced upon them and 1 in 4 of these induced labor results in failed induction(3).

Worldwide, unsuccessful induction of labor is a public health concern. Numerous unfavorable outcomes for both the mother and the fetus are linked to it, including uterine rupture, nonreassuring fetal heart rate monitoring, postpartum hemorrhage, admission to an intensive care unit, prolonged hospital stays, low Apgar scores, stillbirth, and severe birth asphyxia (4).

FIOl has a significant negative psychological and physical impact. Instances of unsuccessful induction are more likely to result in unpleasant delivery experiences. Women who experience a failed induction experience agony, disappointment, letdown, and wasted effort (5).

An increased chance of cesarean birth, as well as higher hospital resource utilization and delivery costs, are linked to unsuccessful labor induction. Avoiding issues during induction could save a significant amount of money on medical expenses and resource use. Key risk factors include primiparity, unfavorable Bishop Scores, and maternal health issues.

1.2 Statement of the problem

Over 20% of pregnancies worldwide have been induced into labor, and 20% of these pregnancies result in a cesarean delivery (6).

The average prevalence of failed induction was found to be 4.4% in Africa (ranging from 1.4% in Niger to 6.8% in Algeria) and 12.1% in Asia (ranging from 2.5% in Cambodia to 35.5% in Sri Lanka), according to a secondary analysis of World Health Organization (WHO) data on the outcomes of IOL in 16 Asian and African countries (7).

Labor induction rates increased in the US from 9.5% in 1991 to 27% in 2019(2). With 233 inductions classified as unsuccessful, the induction rate was 28.1% (11,314 out of 40,301 deliveries). Among the induced cohort, the overall FIOL was 21.4% (8).

Ethiopia has a greater percentage of failed IOLs than the norm for Asian and African nations. In Adama Hospital Medical College, for example, the percentage of failed IOL was reported to be 20.5%. This percentage was also reported to be 17.3% in Hawassa public hospitals, 19.7% in Dessie Referral Hospital, 21.4% in Jimma University Hospital, and 25.4% in Addis Ababa teaching hospitals (9).

Worldwide, unsuccessful induction of labor is a public health concern. Numerous unfavorable outcomes for both the mother and the fetus are linked to it, including uterine rupture, nonreassuring fetal heart rate monitoring, postpartum hemorrhage, admission to an intensive care unit, prolonged hospital stays, low Apgar scores, stillbirth, and severe birth asphyxia (4).

The rates of cesarean delivery (35.6 vs. 16%), chorioamnionitis (14.2 vs. 4.7%), endometritis (6.4 vs. 1.9%), and postpartum hemorrhage (18.8 vs. 11.9%) were greater in women who underwent a protracted induction of labor (4).

According to a study done at Mattu Karl Hospital in Ethiopia, FIOL had a negative impact on 6.5% of women and 35.5% of newborns (5).

An increased chance of cesarean birth, as well as higher hospital resource utilization and delivery costs, are linked to unsuccessful labor induction. Avoiding issues during induction

could save a significant amount of money on medical expenses and resource use. A financial analysis of the FIOL in the USA revealed that failed induction during the year 2010 resulted in additional healthcare expenditure cost of 41,600 USD (10).

There are numerous contributing variables when labor induction fails. When labor induction methods fail, mothers and newborns suffer grave consequences. A failed induction is associated with a higher risk of an emergency cesarean section, which is related to higher rates of maternal morbidity. An unsuccessful induction effort can have a detrimental effect on the health of the newborn due to fetal discomfort, prolonged labor, and other issues. When there is a failed induction, there are several reasons that increase the cost of healthcare, including longer hospital stays and more interventions. One of the many variables affecting the likelihood of a failed induction is primiparity. New mothers who are primiparous have a higher risk of having a failed induction (11).

FIOL has a significant negative psychological and physical impact. Instances of unsuccessful induction are more likely to result in unpleasant delivery experiences. Women who experience a failed induction experience agony, disappointment, letdown, and wasted effort (5).

Prior research to determine the FIOL risk variables was conducted in a different nation and at a different time. The failure rate of induction and its contributing factors were not thoroughly researched, and there is a regional variation in its rate in Ethiopia. Furthermore, the majority of the secondary data (record reviews) used in the nation's earlier investigations were incomplete and lacked crucial information in most situations. Despite existing research, there is a gap in studies specific to Tigray, particularly given the region's war-affected healthcare system. This study aims to assess the prevalence and factors associated with FIOL in Mekelle public hospitals, providing valuable insights to improve clinical practices in the region.

1.3 Significant of the study

This study provides valuable insights into factors influencing labor induction success, enabling healthcare providers to provide personalized care. Early identification of potential complications improves labor management and reduces unnecessary interventions. The findings also contribute to better maternal and neonatal health outcomes, reducing healthcare facility burden and promoting healthier mothers and babies.

The study provides valuable insights for healthcare workers, policymakers, and health planners on the risk factors associated with failed labor induction. It helps identify high-risk women early, offering targeted interventions to improve patient care and reduce adverse outcomes. The findings can also guide efforts to rebuild and strengthen the healthcare system in post-conflict settings like Tigray.

This research aids decision-makers in shaping the healthcare environment by identifying areas for improvement, such as better training, resource utilization, and medical supply access, which can enhance short and long-term healthcare outcomes.

The study contributes to maternal health research by examining labor induction in post-conflict healthcare settings, offering new insights and a model for future studies. Future research should explore long-term effects of failed inductions, healthcare system recovery, and optimizing labor induction outcomes.

2. Literature Review

2.1. Overview

Induction of labor is a widely practiced obstetric intervention aimed at stimulating uterine contractions before the spontaneous onset of labor, with the goal of achieving vaginal delivery when medically indicated. Despite its clinical importance, the success of labor induction varies significantly across different populations and settings, with failure often resulting in increased maternal and neonatal complications, including prolonged labor and higher cesarean section rates. Globally, and particularly in low- and middle-income countries like Ethiopia, the burden of failed induction remains a critical public health concern. Various studies conducted across different regions of Ethiopia have reported varying prevalence rates and identified a range of associated factors, including maternal age, parity, Bishop score, hypertensive disorders, and artificial rupture of membranes. However, there is a scarcity of region-specific evidence from conflict-affected areas such as Tigray, where the healthcare system has been severely disrupted. Therefore, this literature review aims to synthesize existing evidence on the prevalence and determinants of failed labor induction, providing a contextual foundation for the current study conducted in public hospitals of Mekelle city.

2.2. Prevalence of failed induction

A systematic review conducted in Ethiopia reported that, out of 1,052 articles initially retrieved, 28 studies met the inclusion criteria, encompassing a total of 9,757 participants. The pooled prevalence of failed induction of labor across these studies was 22.39% (95% CI: 21.57–23.21) (12).

A study conducted in Adama reported a prevalence of failed induction of labor at 20.5% (95% CI: 15.7%–25.3%), indicating a relatively lower failure rate compared to other regions in Ethiopia(13). A study conducted in Worabe found that the prevalence of failed induction of labor was 22.2%(13),

A study conducted in Gondar reported that the prevalence of failed induction of labor was 24.4% (95% CI: 21.4%–27.9%), (14). 26.5% & 25.4% prevalence of failed induction was also reported in study conducted in Wolaita Sodo teaching hospital(15), and Addis Ababa(16), respectively .

In a study done at tertiary obstetric service in Southwest Nigeria, the prevalence of failed induction of labor was 36.5%, (17). Another study conducted at India reported a 50.5% failure rate of induction of labor(18).

2.3. Associated factors

2.3.1. Sociodemographic related factors

A study done in china found that height, age, weight are critical variables in predicting the outcome of IOL. Compared to short height, taller women have a higher success rate of induced labor. A case control study conducted in Netherlands found that the risk for FIOL was significantly associated with low maternal height (19,20).

A study done in USA found that African-American race were two times more likely to experience FIOL than white race (21).

A study conducted in Boston, USA found that older maternal age is associated with increased risk of cesarean delivery. Another study conducted in Nepal also showed that induction failure rate was higher in maternal age of greater than 30 years when compared with those of less than 30 years (22,23).

Another finding from a research done by Claramonte Nieto and Mula Used showed Maternal age ≥ 40 years was associated with an increased risk of c-section after IOL at term compared with younger women, mainly because of failed induction(24)..

A study conducted in public Hospitals of Harari Regional State found that the odds of FIOL were two times higher among mothers greater than 24 years of age than those whose age is less than or equal to 24 years. Another study done in Arsi also revealed that, maternal age at 31–35 years was 8.788 times more likely to have failed induction of labor than at age 20 years. Similar results also seen in studies done in Gonder (25–27)..

A study done in University of Gondar Specialized Hospital revealed that women from the rural area were 3.7 times more likely to have FIOL than women from urban. Another study done in public hospitals of Arsi zone, Worabe Comprehensive Specializd Hospital and East Gojjam zone public hospitals also showed that women from rural residence are more likely to have FIOL than women from urban residence. In contrast a study done in Tanzania

showed that deliveries from women who reside in urban areas were 29% more likely to experience CS intervention after IOL compared to those living in rural areas(25,26,28–30).

2.3.2. Obstetric related factors

A study done in the USA found that null parity (OR 5.12, $p < 0.01$) and gestational age >41 weeks (OR 1.82, $p < 0.01$) were factors most strongly associated with failed induction(21).

A study conducted Adama hospital medical college revealed that the odds of failed induction in unfavorable bishop score were 4.05 higher than the odds in favorable bishop. The odds of failed induction in an intact membrane were 2.05 higher than the ruptured membrane. The odds of failed induction in prim gravida were 2.33 higher than the odds in the multiparous women(31).

Several studies conducted in Ethiopia have identified key factors significantly associated with failed induction of labor. A systematic review revealed that nulliparity (AOR = 2.63; 95% CI: 2.14–3.24), an unfavorable Bishop score (AOR = 3.98; 95% CI: 2.19–7.08), hypertensive disorders during pregnancy (AOR = 3.63; 95% CI: 2.69–5.01), and premature rupture of membranes (PROM) before the onset of labor (AOR = 2.51; 95% CI: 1.5–4.26) were all significantly associated with an increased likelihood of induction failure (12).

Another study done in Southwest Ethiopia showed that the odds of induced women with pre induction bishop score of ≤ 5 were 2.3 times more likely to have failed induction Women whose newborn birth weight ≥ 4000 g were 2 times as likely to have failed induction as compared with women whose newborn birth weight was 2500–3900 g. The odds of failed induction were 2.3 times more likely in Prim parous than in multiparous women (32).

Independent risk factors for CS delivery were; prim parity, high birthweight, and post-term pregnancy according the study done in Tanzania (30).

A retrospective study conducted at the Catholic Maternity Hospital in Ogoja, Nigeria, revealed that, multiparous women were found to have higher chances of successful vaginal delivery with mean success rate of 91.7% than nulliparous women with rate of 58.4%. With respect to indications, those induced on account of hypertensive diseases had the highest success rate (100%) followed by those who had IUFD (88.9%)(33).

Another study conducted in three hospitals of Southwest Ethiopia found that women whose body mass index $> 24 \text{ kg/m}^2$ were 5.7 times more likely to have failed induction as compared to their counterparts [AOR = 5.71 (3.26–10.01)] (31)

A case-control study in the Department of Obstetrics and Gynecology of the Máxima Medical Center, Netherlands revealed that neonates born after cesarean delivery are more often had a low Apgar score after one minute (15% versus 6%) and an arterial umbilical pH under 7.15 (15% versus 8%). These children were more often admitted to the neonatal care (20% versus 7%), *PP* value 0.004) (20).

A cross sectional study conducted in Gondar indicated that the prevalence of failed induction of labor was 24.4%. Age ≤ 30 years, rural residence, being nulliparous, 5 or less Bishop Score, premature rupture of membrane, having pregnancy-induced hypertension, and artificial rupture of membrane with oxytocin were associated with failed induction of labor (34).

According to a facility-based cross-sectional study carried out in Mekelle, 346 of the 3834 women who gave birth in the study region were induced, meaning that induction prevalence was 9 percent. 244 (70.5%) of them were delivered vaginally, 19 (5.5%) by artificial means, and 83 (24%) by Cesarean section. Of these, 263 (76%) had successful inductions and 25 (7.2%) did not. Twenty-five out of the individuals who failed induction had cesarean sections, accounting for 3.3% of all cesarean deliveries at the institution throughout the study period. The most frequent sign was prolonged rupture of the membranes, and Bishop's score during cervical ripening was a strong predictor of the induction's effectiveness [AOR = 8.150, 95% CI = (1.265, 52.526)] (35).

A study done in Adama showed that the prevalence of failed induction was 20.5% (95% CI: (15.7– 25.3%)). The odds of failed induction in unfavorable bishop score were 4.05 higher than the odds in favorable bishop [AOR = 4.05 95%CI (1.19–13.77)]. The odds of failed induction in an intact membrane were 2.05 higher than the ruptured membrane. [AOR = 2.05, 95%CI (1.06–3.98)]. The odds of failed induction in prim gravida were 2.33 higher than the odds in the multiparous women [AOR = 2.33, 95%CI (1.26–4.29)] (36).

A study conducted in Gondar identified several factors significantly associated with failed induction of labor. These included maternal age ≤ 30 years (AOR = 3.7; 95% CI: 2.2–6.2), rural residence (AOR = 3.7; 95% CI: 2.4–5.8), nulliparity (AOR = 2.1; 95% CI: 1.2–3.7), and a Bishop score of ≤ 5 (AOR = 3.4; 95% CI: 2.2–5.4). Additionally, premature rupture of membranes (AOR = 2.7; 95% CI: 1.5–4.6) and pregnancy-induced hypertension (AOR = 4.0; 95% CI: 2.3–7.1) were also significantly linked to failed induction. Conversely, artificial rupture of membranes combined with oxytocin was found to be protective against induction failure (AOR = 0.2; 95% CI: 0.1–0.4) (14).

Shorter maternal height, maternal BMI of 40 or higher, and maternal cervical dilatation of less than 2 cm on admission were significantly associated factors with induction failure at the study done in Massachusetts General Hospital, Boston (37).

2.4 Conceptual framework of failed induction predictors

The different predictors of failed induction can be categorized as method related factors, obstetric characteristics, sociodemographic characteristics and indication characteristics (22,24,27,35,36).

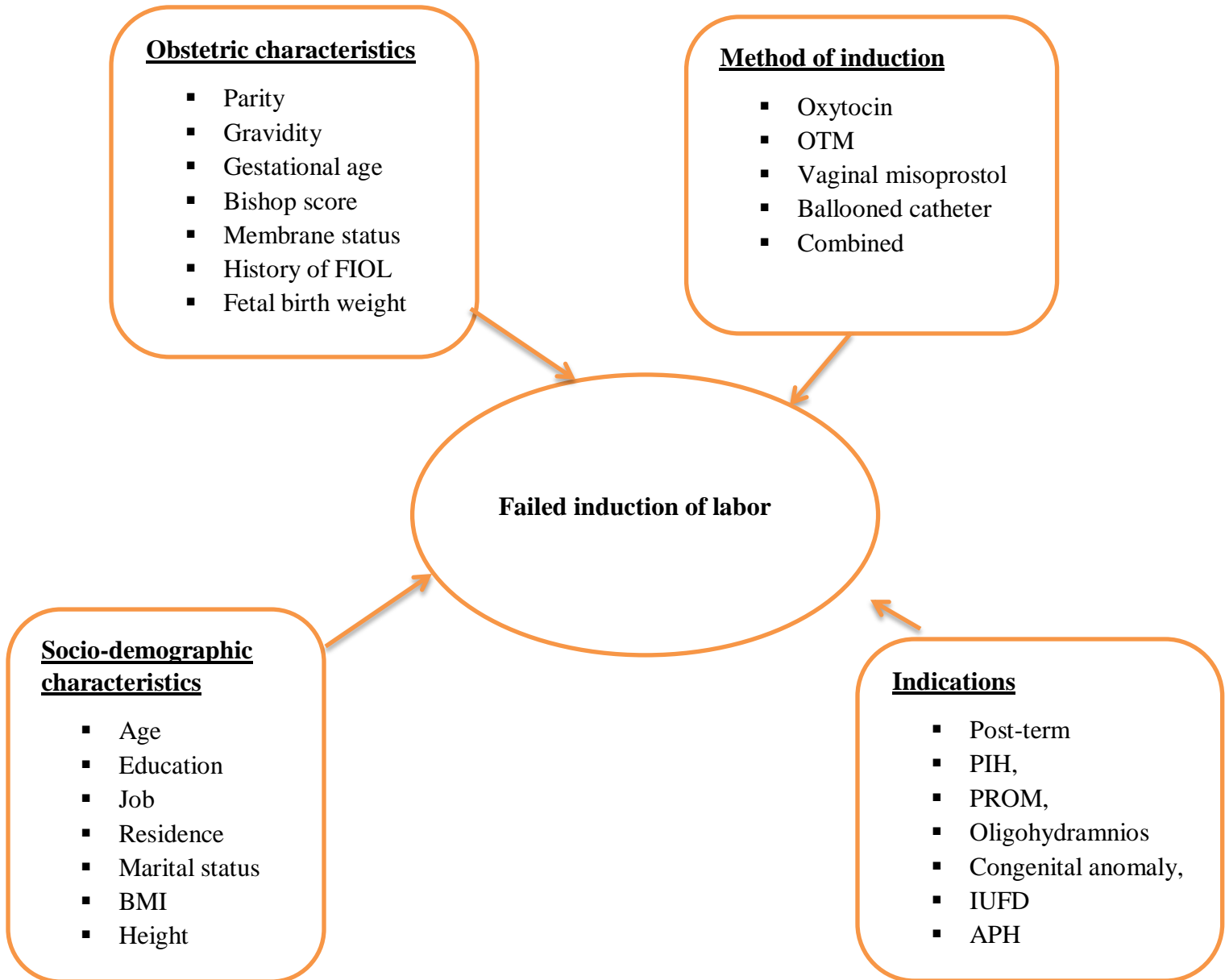


Figure 1: Conceptual framework adapted from different literatures on the predictors of failed induction

3. Objectives

3.1 General objective

To determine the prevalence of failed induction of labor and identify its associated factors among women undergoing induction at public hospitals of Mekelle city, Tigray, Ethiopia from September to October 2024

3.2 Specific objectives

To determine the prevalence of failed induction of labor among women undergoing induction at public hospitals of Mekelle city, Tigray Ethiopia

To identify the risk factors of failed induction of labor among women undergoing induction at public hospitals of Mekelle city, Tigray Ethiopia

4. Method

4.1 Study area and Period

The study was conducted in Mekelle city from September to October 2024. Mekelle is the capital city of Tigray Region. It is located around 780 kilometers north to Addis Ababa, the capital city of Ethiopia, at a latitude and longitude of 13°29'N 39°28'E Coordinates;13°29'N 39°28'E, with an elevation of 2084 meters above sea level.

Administratively, Mekelle is considered a Special Zone, which is divided into seven sub-cities. Based on the house hold survey 2013 the Tigray bureau of urban development estimates that the population growth rate of Mekelle to be 5.5% per year. Currently the city has a total population of 587, 407(36).

There are four public hospitals (One referral hospital, two general hospital, and one primary hospital) and eight health centers. The health centers and the hospitals provide majority of maternal and child health services. Ayder Comprehensive Specialized Hospital is one of a public hospital with a capacity of 500 beds established in 2000. Currently it is one of the only two referral hospitals (at the tertiary level) for a population of 8.5 million from Tigray and Afar. Mekelle hospital is the oldest regional hospital in the region. Quiha hospital was established in 1985 by Italian cooperation and its current capacity is 50 beds Maternity service along other services is available in all of the hospitals(36).

4.2 study design `

A facility-based cross sectional study design was implemented.

4.3 Population

4.3.1 Source population

All Pregnant women who come to labor ward of the public hospitals of Mekelle city

4.3.2 Study population

Pregnant women who have induced labor at the public hospitals of Mekelle city during the data collection period

4.3.3 Study subjects

Individual pregnant women with induced labor who actually asked for the prepared questionnaire regarding the study.

4.4 Eligibility

4.4.1. Inclusion criteria

All Pregnant Women who undergoes labor induction in Mekelle city public hospitals during the study period was included in the study.

4.4.2 Exclusion criteria

- Women who is critically ill and unable to respond
- Induced Women who referred to higher hospitals for further management

4.5 Variables

4.5.1 Dependent variable

Failed induction of labor

4.5.2 Independent variable

Socio-demographic variables: age, marital status, job, educational level, residence,

Obstetric variables: bishop score, gestational age, parity, birth weight, status of the membrane, history of IOL,

Indications: PROM, IUFD, hypertensive disorder of pregnancy, post term pregnancy, sever oligohydramnios

Induction Methods: oxytocin, misoprostol, balloon catheter, combined

4.6 Sample size determination

The sample size for the first objective is calculated using an EPI INFO version 7.2.6 statistical software using the single population proportion formula with the following assumptions: a 95% confidence interval, 5% margin of error and 24.4% proportion of failed induction which is taken from a study conducted in Gondar town (34).

$$n = \frac{Z^2 \cdot p \cdot (1-p)}{d^2}$$

Where

n=minimum sample size required for the study

Z=standard normal distribution (Z=1.96) with confidence interval of 95% and

$\alpha=0.05$ P=prevalence/ population proportion (p=0.244)

d=is a tolerable margin of error (d=0.05)

$$n = \frac{3.8416 \cdot 0.184464}{0.0025} = \frac{0.7083456}{0.0025} = 283.34$$

After adjusting 10% non-response rate, the final sample size is 312.

Table 1. Sample size calculation for the second objective

Determinant factors	Confidence interval	Power	Ratio exposed to unexposed	% of outcome in unexposed group	AOR	10% non-response rate(Ref)	Total sample size
Premature rupture of membrane	95%	80%	1:1	20.5	2.7	10%	185
Age \leq 30 years	95%	80%	1:1	40.8	3.7	10%	99
less Bishop Score	95%	80%	1:1	12.2	3.4	10%	170

Therefore, the minimum sample size required for this study is 312.

4.7 Sampling procedure

There are four public hospitals in Mekele city. These are ACSH, Mekelle regional hospital, Lekatit primary hospital, and Quiha zonal hospital. The sample size was allocated to the study hospitals proportionally based on the number of induced women flow in the preceding two months. A systematic random sampling technique was used to select study respondents. Sampling interval approaches was implemented. Sampling interval (K) was calculated using the summation of two months of labor induction at the public hospitals, which is 520. Then $K = N/n$, $520/312 = 1.67 \approx 2$. Every 2nd (every other) induced woman was interviewed and their medical records was reviewed until the calculated sample size is attained. To start with the first interview, we was use lottery method.

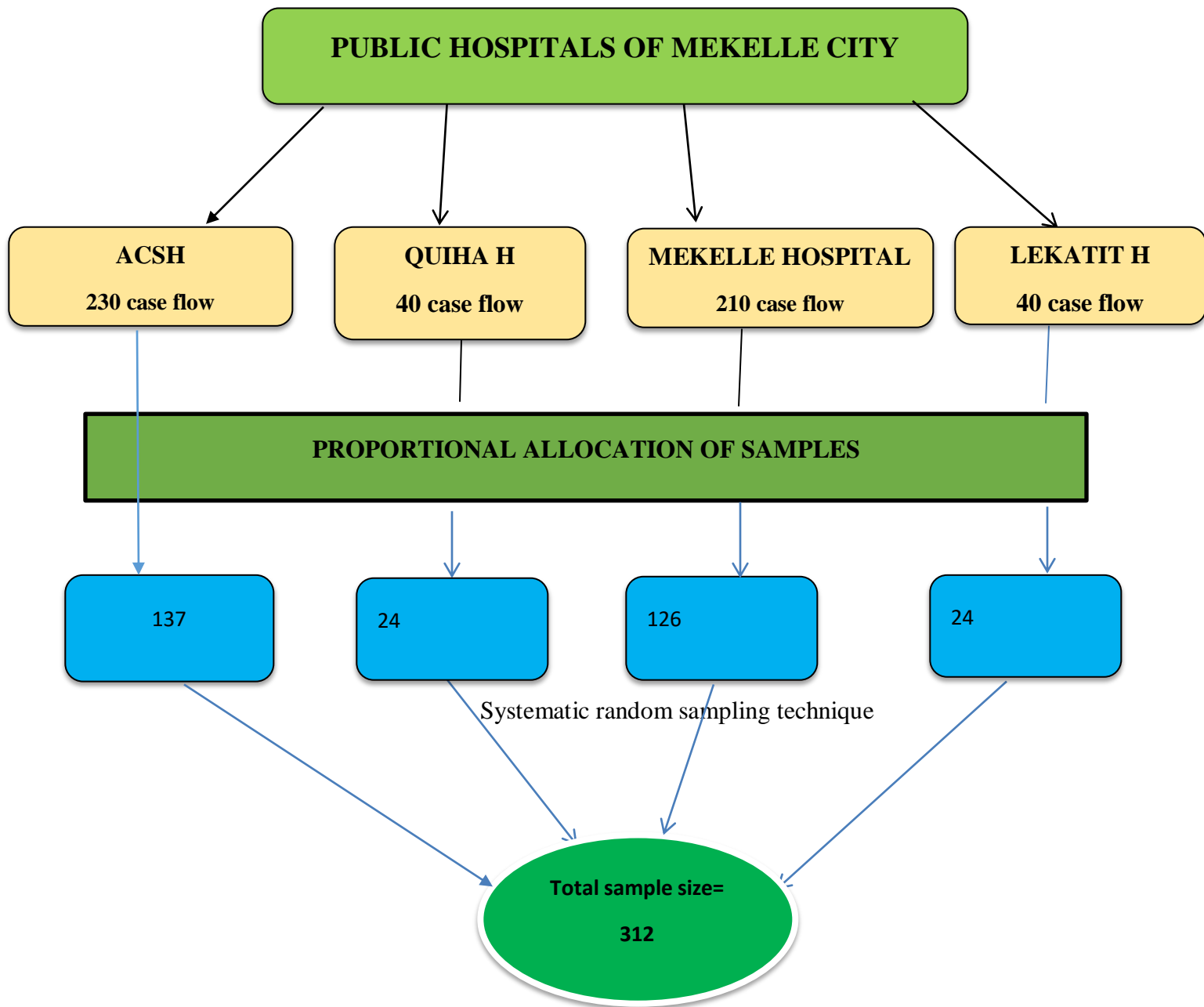


Figure 2: schematic presentation of sampling procedure.

4.8 Data collection tools and procedures

Structured questionnaire and checklist adapted from different literatures (5, 12, 13, 17, 18, 29) was used as data collection instrument. Upon enrollment and through the period of labor and delivery, information regarding socio-demographic factors, obstetric history and physical examination findings, indication for induction, methods used for induction and outcomes were collected using interviewer-administered structured questionnaire and checklist from mothers who have a labor by induction. Four BSc midwives working in the labor ward of each study hospitals were trained and recruited for data collection by the principal investigator to collect the data by interviewing face-to-face and reviewing patient card from September to October 2024. One MSc degree holder midwife was recruited as a supervisor. The principal investigator and supervisor checked the collected data on a daily basis in order to have quality data during the study period.

4.9 Operational definitions

Failed induction of labor is defined as the procedure labor induction doesn't lead to a vaginal birth, instead it leads to caesarean delivery.(18)

Induction of labor is the initiation of labor artificially after 28 weeks of gestation and before the onset of spontaneous true labor to achieve a vaginal delivery.(1)

Bishop score is a quantifiable method of assessing the cervical condition to predict labor induction outcomes which is described by Bishop (1964). A score ≤ 4 is unfavorable, 5-8 is intermediate, and ≥ 9 is favorable.(38)

4.10 Data quality control

The adapted questionnaire was initially written in English, and translated to Tigrigna which is the local language of the study area. Then it was re-translated back to English by language Experts to see its consistency.

One day training was given to the interviewers concerning the questionnaire, interviewing technique, purpose of study, purpose of maintaining subject's privacy, discipline and keeping confidentiality. Pretest was conducted at 5% (16 cases) of the sample size at a nearby hospital (Wikro) which won't be included in the study. Based on the results necessary measures were taken to orient the data collectors. The principal investigator and the supervisor had a day to day on site supervision to make sure the data collection is going as planned. At the end of each day the principal investigator and supervisor checked the questionnaire for completeness and legibility of the filled questionnaire.

4.11 Data management and analysis

The collected data was coded, entered, checked and analyzed using SPSS version 27 statistical software. Tables and text were used for descriptive statistic. Frequency and percentage were used for categorical variable. Mean and standard deviation was computed for normally distributed continuous variables, whereas for the skewed variables median and inter quartile range was used. Odds ratio with 95% confidence interval was used to measure strength of association. Bivariate logistic regression model was used to see the association between the dependent and independent variables.

Those variables which was happen to be associated at a bivariate regression model with $P < 0.25$ was exported to multivariable logistic regression model to control confounding factors and to see the independent predictor of FIOL. Statistical significance was declared at $P < 0.05$. The assumption of logistic regression were checked before proceeding to estimate the association. The Hosmer-Lemeshow goodness of fit static larger than 0.05 was confirmed to assess the logistic regression models fitness.

4.12 Ethical considerations

Ethical clearance letter was obtained from institutional review board of Mekelle University College of Health Sciences. An official letter was written from Mekelle University to the selected public health facility. And oral permissions for collection of data was obtained from the respective public health facility. Supporting letter written to selected department was given. Before conducting the interviews, information was given to the participants and participants are assure of voluntary participation, confidentiality, anonymity and freedom to withdraw from the study at any time. The nature, objectives, expected outcomes, benefits and associated risks of the study is explained to adults enrolled in the study. Finally, a written consent was taken from the participants before interview

4.13 Dissemination of results

The result of the study will be submitted to Mekelle University College of health sciences school of nursing as partial fulfillment for master's degree in maternity and reproductive health nursing. The result will also be disseminated to the Tigray health bureau and to the hospitals in which the study will be done. Efforts will be made to publish in scientific journals.

5. Result

5.1. Socio-demographic characteristics

In this study, a total of 312 participants were included with 100% response rate. The mean age of the women was 27.79 (SD±5.03) years. The findings indicate that a majority of the women had achieved at least a secondary level of education, with 102 (32.7%) attaining college and above, and 116 (37.2%) completing secondary school. Similarly, their partners also demonstrated relatively high educational attainment, with 134 (42.9%) having college and above education and 109 (34.9%) completing secondary school. A large proportion of participants 178 (57.1%) were housewives. Most of the participants were married 277 (88.8%). Related to their resident majority 281 (90.1%) of women were urban residence. The mean height of the participants was 159 (SD 6.8) centimeter. (**Table 2**).

Table 2. Socio-demographic characteristics among women undergoing Induction at public hospitals of Mekelle city, Tigray, 2024. (n=312)

Variables	Frequency	Percent
Occupation		
House wife	178	57.1
Merchant	52	16.7
Daily laborer	16	5.1
Employee	39	12.5
Student	27	8.7
Residence		
Urban	281	90.1
Rural	31	9.9
Marital status		
Single	23	7.4
Married	277	88.8
Divorced	8	2.6
Widowed	4	1.3
Ethnicity		
Tigray	312	100.0
Religion		
Orthodox	284	91.0
Muslim	18	5.8
Catholic	7	2.2
Protestant	3	1.0
Partner education level		
Illiterate	8	2.6
Read and write	12	3.8
Elementary school	49	15.7
Secondary school	109	34.9
College and above	134	42.9

5.2 Obstetric characteristics

Among the total induced women, 141(45.2%) of the study participants were primipara and a majority 152(48.7%) of them had ANC follow up at a health center. Regarding their gestational age more than three quarter 238(76.3%) of inductions occurred at term.

The known medical illness of respondents shows that 275(88.1%) of women reported no underlying medical conditions, while hypertension was the most common condition among the remaining, affecting 32(10.3%) participants. Regarding past history of labor induction, 33(10.6%) of women had previously undergone induction, and notably, all of them 33(100%) reported successful outcomes. In terms of membrane status, the distribution was nearly even, with 159(51%) having intact membranes and 153(49%) ruptured at the time of assessment (**Table 3**).

Table 3. Obstetric characteristics of women undergoing Induction at public hospitals of Mekelle city, Tigray, 2024. (n=312)

Variables	Frequency	Percent
Parity		
Primipara	141	45.2
Multipara	137	43.9
Grand multipara	34	10.9
Gestational age		
Preterm	27	8.7
Term	238	76.3
Post term	47	15.1
Place of ANC follow-up		
Health center	152	48.7
Public hospital	96	30.8
Private hospital/clinic	64	20.5
Known medical illness of respondents		
Hypertension	32	10.3
Diabetes	2	0.6
Cardiac Disease	3	1.0
None	275	88.1
Past history of labor induction		
Yes	33	10.6
No	279	89.4
Outcome of the past labor induction		
Successful	33	100.0
Failed	0	0.0
Membrane status		
Intact	159	51.0
Ruptured	153	49.0
Status of the fetus		
Alive	310	99.4
Dead	2	0.6

5.3 Ripening and induction related characteristics

Among the total respondents, Bishop’s score at admission was unfavorable in 232(74.4%) of cases. Cervical ripening was performed in 129(41.3%) of women, and of those, the most commonly used agent was misoprostol 75(58.1%), followed by balloon catheter 39(30.2%) and mixed methods 15(11.6%). After cervical ripening, 128(99.2%) achieved a favorable Bishop’s score. The method of labor induction reveals a clear preference for oxytocin infusion, which was used in 61.9% of cases. The second most common method was oral titrated misoprostol, employed in 193(32.1%) of cases, vaginal misoprostol was less frequently used, representing only 19(6.1%) of cases. Regarding the ARM (artificial rupture of membranes), 66(21.2%) of women had their membranes ruptured artificially. (**Table 4**)

Table 4. Ripening and induction related characteristics among women undergoing Induction at public hospitals of Mekelle city, Tigray, 2024. (n=312)

Variables	Frequency	Percent
Bishop’s score at admission		
Favorable	80	25.6
Unfavorable	232	74.4
Cervical ripening		
Yes	129	41.3
No	183	58.7
Ripening agent		
Misoprostole	75	58.1
Balloon catheter	39	30.2
Mixed	15	11.6
Bishop score after cervical ripening		
Favorable	128	99.2
Unfavorable	1	0.8
Method of labor induction		
Oxytocin infusion	193	61.9
Vaginal misoprostol	19	6.1
Oral titrated misoprostol	100	32.1
ARM done		
Yes	66	21.2
No	246	78.8

Regarding indications for labor induction, premature rupture of membranes (PROM) was the most common reason, affecting 146(46.8%) of cases, followed by hypertensive disorders 43(13.8%) and oligohydramnios 37(11.9%)

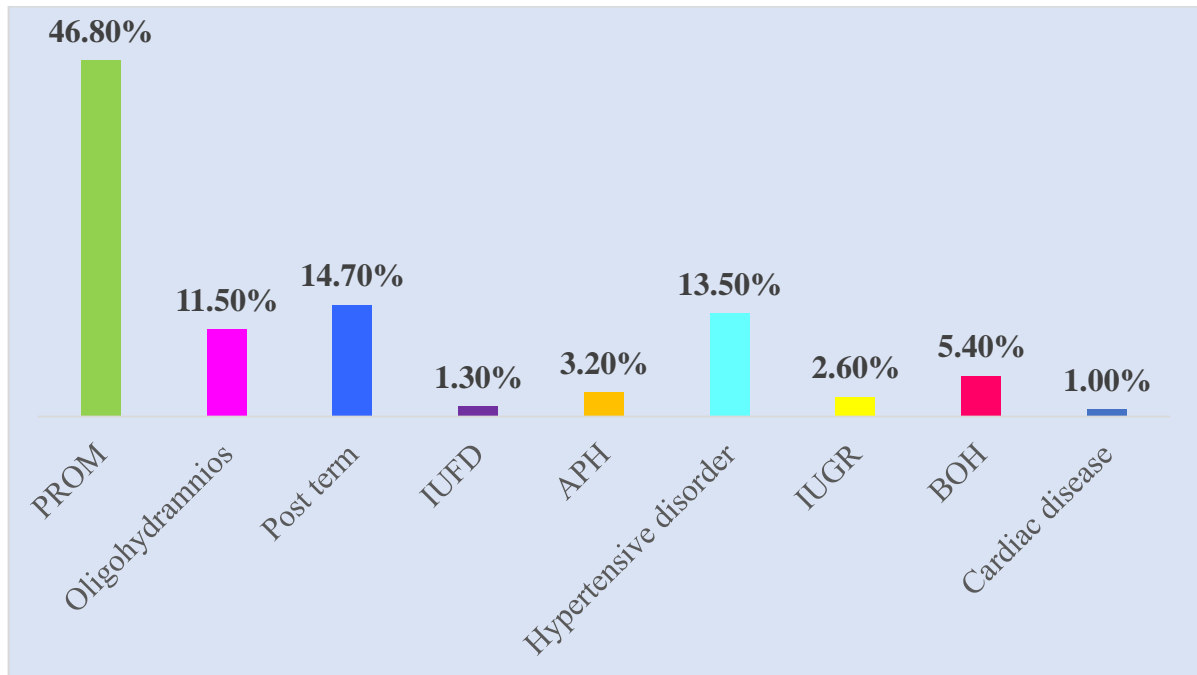


Figure 3. Indication for labor indication among respondents at public hospitals of Mekelle city, Tigray, 2024.

5.4 Outcome of induction

As the graph bellow indicated, the level of failed induction was 26.3% (Figure 4)

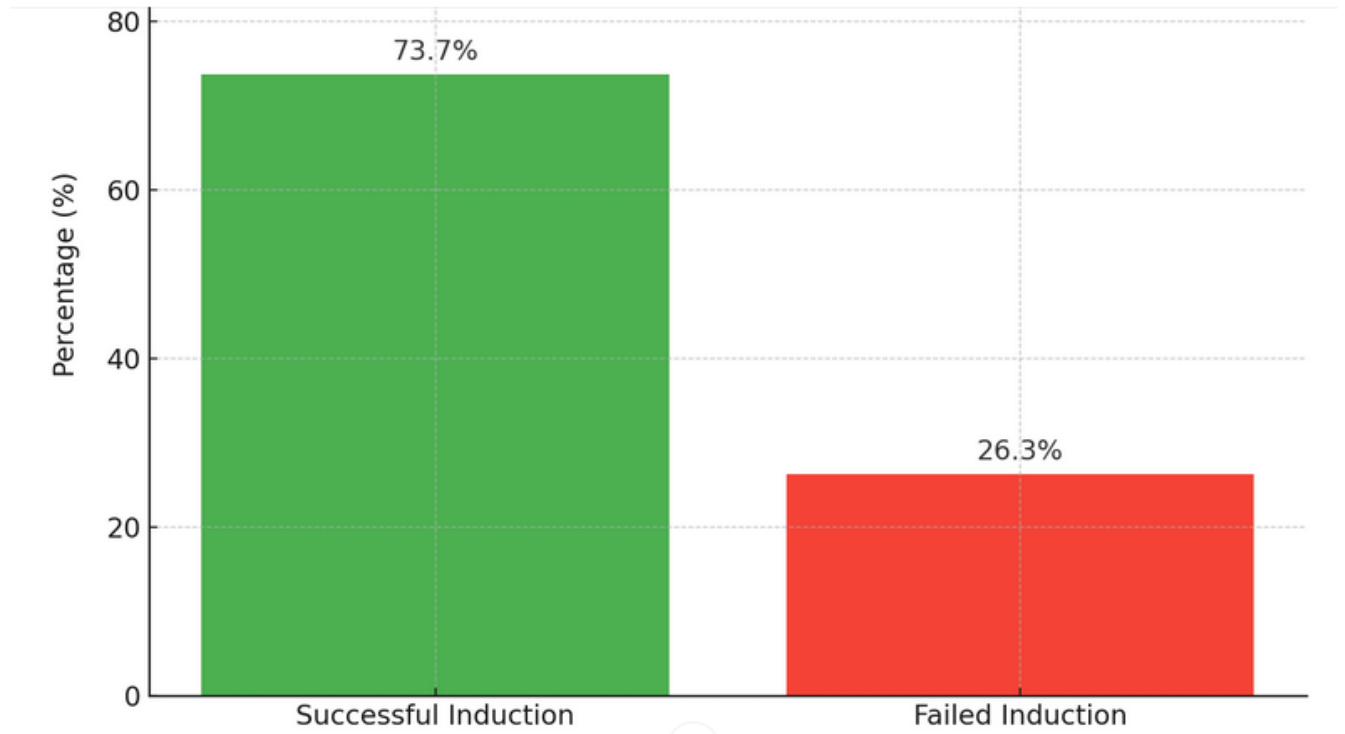


Figure 4. Percentage distribution of labor induction outcomes among respondents at public hospitals of Mekelle city, Tigray, 2024.

5.5. Induction outcomes and complication

The mode of delivery data shows a predominant occurrence of vaginal delivery, with 230(73.7%) of women experiencing this mode, while cesarean delivery accounted for 82(26.3%). Indications for cesarean delivery reveal that non-reassuring fetal heart rate patterns (NRFHRP) were the most common reason, accounting for 48(58.5%) of cesarean deliveries. In terms of birth outcomes, 309(99%) of neonates were alive. Neonatal sex was also assessed, with 186(59.6%) of neonates being male and 126(40.4%) female.

Regarding Maternal complications, 6(1.9%) of women experiencing precipitated labor and 5(1.6%) facing postpartum hemorrhage (PPH). The overwhelming majority of women, 301(96.5%), had no complications. Similarly, fetal and neonatal complications were assessed, with 45(14.5%) of fetuses experiencing NRFHRP and 21(6.8%) being admitted to the NICU. (**Table 5**).

Table 5. Induction outcomes and complication related characteristics among women undergoing Induction at public hospitals of Mekelle city, Tigray, 2024.

Variables	Frequency	Percent
Mode of delivery		
Vaginal	230	73.7
Cesarean	82	26.3
Birth outcome		
Alive	309	99.0
Dead	3	1.0
Neonatal sex		
Male	186	59.6
Female	126	40.4
Maternal complications		
Precipitated labor	6	1.9
PPH	5	1.6
No complication	301	96.5
Fetal/neonatal complications		
NRFHRP	45	14.5
Admission to NICU	21	6.8
END	1	0.3
No complication	243	78.4

5.2. Associated factors

Binary logistic regression was used to see the association of each variable with the outcome of labor induction and seven variables were found significant at 0.25 p-value. After adjusting for other confounders in multivariable logistic regression, four variables: Past history of labor induction, ARM, height, and Induction-delivery time were found significantly associated with failed labor induction at p-value of 0.05 and 95% confidence interval.

Women who had no previous history of labor induction were 10.6 times (AOR: 10.6; 95% CI: 1.61-70.29) more likely to experience a failed induction compared to those who had experienced labor induction in the past.

Women who did not undergo ARM (AOR = 4.1; 95% CI: 1.28–13.27), were 4.1 times more likely to experience a failed induction compared to those who did receive ARM.

Maternal height also showed a significant association with the outcome of labor induction. For each unit increase in maternal height (measured in centimeters), AOR=0.9, 95% CI: 0.88–0.99) the odds of induction failure decreased by 10%.

The AOR for induction-to-delivery time was 0.9 (95% CI: 0.80–0.98), indicating that with each unit decrease in time (presumably in hours), the likelihood of induction failure decreased by 10% (**Table 6**).

Table 6. Multivariable Logistic regression analysis of factors associated with failed induction of labor among women undergoing Induction at public hospitals of Mekelle city, Tigray, 2024.

Variables	Outcome of labor induction		COR (95% CI)	AOR (95% CI)	P-values
	Successful n(%)	Failed n(%)			
Past history of labor induction					
Yes	31 (13.5)	2 (2.4)	1	1	0.042
No	199(86.5)	80(97.6)	6.2(1.46-26.65)	10.6(1.61-70.29)*	
Membrane status					
Intact	108(47)	51(62.2)	1	1	0.148
Ruptured	122(53)	31(37.8)	0.5(0.32-0.90)	1.06(0.12-9.46)	
Cervical ripening					
Yes	88(38.3)	41(50)	1	1	0.193
No	142(61.7)	41(50)	0.6(0.37-1.03)	0.4(0.12-1.66)	
Method of labor induction of respondents					
Oxytocin infusion	135(58.7)	58(70.7)	1	1	0.887
Vaginal misoprostol	14(6.1)	5(6.1)	0.8(0.28-2.41)	1.4(0.35-5.79)	
Oral titrated misoprostol	81(35.2)	19(23.2)	0.5(0.30-0.98)	1.3(0.41-4.15)	
ARM done					
Yes	58(25.2)	8(9.8)	1	1	0.033
No	172(74.8)	74(90.2)	3.1(1.42-6.86)	4.1(1.28-13.27)*	
Height					
			0.9(0.89-0.97)	0.9(0.88-0.99)*	0.033
Induction delivery time					
			0.9(0.78-0.94)	0.9(0.80-0.98)*	0.012

6. Discussion

This study was aimed to determine the prevalence and factors associated with failed induction of labor among women undergoing induction at public hospitals of Mekelle city from September to October 2024, Tigray.

This study showed that the prevalence of failed induction was 26.3%. This current proportion of FIOL is in line to previous research reports like 26.5% in Wolaita Sodo teaching hospital, Southern Ethiopia, (15), 25.4% in Addis Ababa (16), 24.4% at University of Gondar Specialized Hospital, Northwest Ethiopia (14) and 26.7% at tertiary hospital in North Tanzania (27).

However, the proportion of failed IOL reported in this study was higher than a study conducted in Ethiopia. A systematic review done in Ethiopia indicated that the pooled prevalence of failed induction of labor across these studies was 22.39%, (12). Similarly this was higher than a study conducted in Adama. A study conducted in Adama reported a prevalence of failed induction of labor at 20.5%, (13). The higher failure rate observed in the present study may be attributed to the disrupted healthcare system in Tigray, which has been severely affected by the recent armed conflict. The collapse of health infrastructure, quality of care, and shortage of skilled professionals could contribute to the increased rate of failed labor inductions in this region.

On the other hand, the result of this study is encouraging as the current prevalence of failed IOL is comparatively lower than previous studies conducted in different countries like Nigeria (36.5%), (17) and India (50.5%) (18). The difference might be due to the use of analgesics (opioid) during the induction, the time gap between study periods, and the difference in the sample size of the studies. Three strong contractions in ten minutes is also the required intensity to maintain the induction process in these studies, in contrast to our study which is four and above. Other possible justification for this discrepancy might be due to; induction methods, and cervical ripening methods might be different per protocol.

The finding of this study shows that compared to tall height, shorter women have a higher failure rate of labor induction. This finding is in line with a study done at in Netherlands, China and Boston (16, 17, 35). One possible explanation is that shorter maternal height may be associated with a smaller pelvic cavity, potentially leading to CPD, then to FIOL.

Furthermore, the odds of FIOL increases in women who did not undergo ARM. Women who did not undergo ARM were 4.1 times more likely to experience a failed induction compared to those who did receive ARM. This might be due to the fact that ARM initiates the release of natural hormones (prostaglandin) that stimulates uterine contraction, which might result in successful labor induction. This finding is consistent with study conducted in University of Gondar Specialized Hospital (14).

This study showed the likelihood of FIOL decreased among women with past history of labor induction compared to women who had not. This may be due to the uterine muscles in these women can be easily stimulated and contracted, because of the exposure and multiparty nature of the women. This finding is supported by the study done in Hospitals of Arsi Zone and Worabe Comprehensive Specialized Hospital, (23,25)

Lastly, this study showed that as the induction-to-delivery time increases, the odds of FIOL increase which might be as it puts the mothers and the fetus at greater risk of complications like uterine rupture and NRFHRP.

7. Strength and limitation of the study

7.1. Strength of the study

- This study uses primary data and it includes variables that has not been studied in previous local studies

7.1. Limitation of the study

- This study's cross-sectional nature limits the ability to establish causal relationship

8. Conclusion and Recommendations

8.1. Conclusion

In conclusion, the study found that the failure rate of labor induction was 26.3%, which indicates a relatively high rate of failed induction of labor in the study area. The study found that factors associated with failed induction of labor included having no prior history of labor induction, absence of artificial rupture of membranes, shorter maternal height, and longer induction-to-delivery time.

8.2. Recommendations

Recommendation on Prevalence:

For health care workers:

- The absence of artificial rupture of membranes was significantly associated with failed induction. Therefore, timely and judicious use of ARM should be considered as part of the induction management protocol, particularly in cases where other conditions for labor progression are favorable.
- It is also recommended that healthcare providers identify women of shorter stature early and consider their anthropometric characteristics when planning labor induction.
- Prolonged induction-to-delivery time was a predictor of induction failure. Monitoring labor progression efficiently and addressing delays with timely clinical interventions—such as dosage adjustments and ARM may improve the rate of successful inductions.

To policy makers

- Serial induction (repeated dosing of oxytocin subsequent to overnight resting) is one of the most commonly used option in case of FIOL in other countries with a success rate of approximately 50%. Therefore it is important to integrate this option to the obstetrics protocols of the nation.
- Post conflict psychological and economic status of the health care workers should be evaluated as it could contribute to the quality of care the pregnant women receive.

To researchers

- Further research is recommended to explore additional maternal, fetal, and institutional factors that may contribute to induction outcomes. A larger, multicenter prospective study could provide more comprehensive evidence to guide national policy and clinical practice on labor induction in Ethiopia.

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8. Annexes

Annex I: Information sheet (English Version)

My name is _____. I am working with Haben Niguse who is doing a research for the partial fulfillment of Master's Degree in Maternity and RH nursing at Mekelle University. This questionnaire is intended to assess the prevalence and factors associated with failed induction of labor among women undergoing induction at public hospitals of Mekelle city, Ethiopia. You are selected because you fulfill the criteria to be participant.

The purpose of the study is to identify risk factors, so that appropriate strategy will be designed by health policy makers to minimize them. It will also serve the investigator as a partial fulfillment for a Master's degree in maternal and RH nursing. There are questions prepared to assess the risk factors so I would like to ask you to give me your honest and genuine answers. If you are unclear with anything you can ask me at any time. It will take about 15 minutes to finish the survey.

Being study participant in this study will not get you any direct benefit. However, the information will be used as an input for policy makers to design an appropriate prevention mechanism. Your involvement in the study will not give you any risk. Your right not to involve at first place or to withdraw at any time is respected.

You will not be asked to give your name to be recorded on the questionnaire. The information you gave will be kept confidential. It will only be used for the purpose of research. Any information which identifies you will not be released.

Participation in the study is entirely voluntary. You can answer all, some or none of the questions. You can stop filling out the questionnaire at any time without giving a reason and your relationship with the community or any other body will not be affected in any way.

If you would like to know more, please contact:

Principal investigator: Haben Niguse 0914043865

I thank you in advance for taking your time to answer the questions

Are you willing to participate? Yes _____ No _____

Annex II: Consent of participant

I the undersigned have been informed about the purpose of this research project. Based on the above information I agree to participate in the research voluntarily.

Signature _____ Date _____ interviewee no _____

Annex III: Questionnaire English version
Part one: socio -demographic characteristics

Code	Question	Possible response	Skip
101	How old are you?	_____years	
102	What is your educational level?	<ol style="list-style-type: none"> 1. Illiterate 2. Read and write 3. Elementary school 4. Secondary school 5. College and above 	
103	Current occupation	<ol style="list-style-type: none"> 1. House wife 2. Merchant 3. Daily laborer 4. Employee 5. Student 6. Others (specify 	
104	Residence	<ol style="list-style-type: none"> 1. Urban 2. Rural 	
105	Marital status	<ol style="list-style-type: none"> 1. Single 2. Married 3. Divorced 4. Widowed 	
106	What is your ethnicity?	<ol style="list-style-type: none"> 1. Tigray 2. Amahra 3. Others(specify) 	
107	What is your religion	<ol style="list-style-type: none"> 1. Orthodox 2. Muslim 3. Catholic 4. Protestant 5. Others 	
108	Partner educational level	<ol style="list-style-type: none"> 1. Illiterate 2. Read and write 3. Elementary school 4. Secondary school 5. College and above 	
109	BMI	<ol style="list-style-type: none"> 1. Underweight 2. Normal 3. Overweight 4. Obese 	
110	Height	_____ meter	

Annex IV: Checklist
Part two: Obstetrics characteristic

Code	Question	Possible response	Skip
201	Parity	<ol style="list-style-type: none"> 1. Primipara 2. Multipara 3. Grand multipara 	
202	Gestational age	<ol style="list-style-type: none"> 1. Preterm 2. Term 3. Post term 	
203	ANC follow up	<ol style="list-style-type: none"> 1. Health Center 2. Public Hospital 3. Private Hospital/Clinic 4. No ANC follow up 	
204	Known medical illness (Multiple answer is possible)	<ol style="list-style-type: none"> 1. Hypertention 2. Diabetes 3. Cardiac Disease 4. None 5. Other 	
205	Past history of successful IOL	<ol style="list-style-type: none"> 1. Yes 2. no 	
206	Membrane status	<ol style="list-style-type: none"> 1. Intact 2. Ruptured 	
207	Status of fetus	1. Alive 2. dead	

Part three: Ripening and induction-related characteristics

Code	Question	Possible response	Skip
301	Indication for induction	<ol style="list-style-type: none"> 1. PROM 1. Oligohydramnios 2. Post term 3. IUFD 4. APH 5. Hypertensive Disorders 6. Congenital Malformation 7. Others _____ 	
302	Bishop's score at Admission	<ol style="list-style-type: none"> 1. Favorable 2. Intermediate 3. Unfavorable 	
301	Cervical ripening	<ol style="list-style-type: none"> 1. Yes 2. No 	If no, skip to 304
302	If yes, Ripening agent	<ol style="list-style-type: none"> 1. Misoprostol 2. Balloon catheter 3. Mixed 	
303	Bishop's score after cervical ripening	<ol style="list-style-type: none"> 1. Favorable 2. Unfavorable 	
304	Method of induction	<ol style="list-style-type: none"> 1. Oxytocin 2. Vaginal misoprostol 3. Oral titrated misoprostol 	
305	Induction to delivery time in hours		
306	Induction to diagnosis of failed induction time in hours		

Part four: Outcomes and complication of labor induction

Code	Question	Possible response	Skip
401	Outcome of IOL	1. Successful Induction 2. Failed Induction	
402	Mode of delivery	1. Vaginal 2. Instrumental 3. Cesarean	
403	Indications for Cesarean delivery	1. Failed Induction 2. NRFHRP 3. CPD 4. Others	
404	Birth outcome	1. Alive 2. Dead	
405	Neonatal sex	1. Male 2. Female	
406	First minute APGAR score	1. < 4 2. 5 – 7 3. > 7	
407	Fifth minute APGAR score	1. ≤ 3 2. 4 – 6 3. ≥ 7	
408	Birth weight in gram		
409	Maternal complications	1. Precipitated labor 2. Placental abruption 3. Uterine rupture 4. Postpartum Hemorrhage 5. Maternal death 6. No complication	
410	Fetal/neonatal complications	1. NRFHRP 2. IUFD 3. Low APGAR 4. Admission to NICU 5. END 6. No complication	

Annex V: መብርሃ ቅድመ መሕትትን ቅጥዒ ስምምዕነት (Tigrigna Version)
የንቨርሲቲ መቐለ ጥዕና ሳይንስ ኮሌጅ ክፍሊ ት/ቲ ነርሲንግ

ጥዕና ይሃበለይ! ----- እበሃል:: አብ የንቨርሲቲ መቐለ ክፍሊ ት/ቲ ነርሲንግ ናይ ካልኣይ ዲግሪ መማልኢ ፅንግታዊ ፀሐፍ ምስ ዘካይድ ዘሎ ኣይተ ሓበን ንጉሰ እየ ዝሰርሕ ዘለኹ:: ንስኺ ኣብዚ መፅናዕቲ ንምስታፍ ዘድልዩ ረቐቒታት ኣማሊእኪ ስለዝተረከብኪ ኢኪ ተመሪፅኪ:: ዕላማ ናይዚ መፅናዕቲ ኣብ ከተማ መቐለ ኣብ ዝርከባ መንግስታዊ ሆስፒታላት ዘጋጥም ዘይምስኻዕ ብሕኽምና ዝግበር ምጅማር ሕርሲ ከምፅኡ ዝኸእሉ ነገራት ንምፍላይ እዩ:: እቲ ዝእከብ ሓበሬታ ትልሚ ንምውፃእ፣ ንሕብረተሰብ ንምምሃርን ካሎኦት ስራሓቲ ንምስራሕን ከምኡውን ብሰንኪ ዝመፀ ፀገማት ንምቕናስ ይሕግዝ ኢዩ ተባሂሉ ስለ ዝእመነሉ እዩ:: ብተወሳኺ ነቲ ዋና ኣፅናዓይ ንካልኣይ ዲግሪ መማልኢ ፀሐፍ ከገልግሎ እዩ::

ነዚ መፅናዕቲ ንምክያድ ዝተፈላለዩ ሕቶታት ክህልዉና እዮም:: ትክክለኛ ሓበሬታ ክትህብኒ ድማ ብትሕትና ይሕትት:: እተን ሕቶታት ኣስታት 15 ደቂቓ እየን ዝወስዳ:: ኣብዚ መፅናዕቲ ብምስታፊን ቀጥታዊ ዝኾነ ጥቕሚ ዘይክትረኽባ ትኸእላ:: ኮይኑ ግና እቲ ዝእከብ ሓበሬታ ነዚ ፀገም ንምክልኻል ኣብ ዝሕንፀፀ ትልሚ ግደ ክህልዩ ዩ:: ኣብዚ መፅናዕቲ ብምስታፍኪ ምንም ዓይነት ሳዕቤን ኣባኺ ኣይበፀሕን::

ናይ ውልቀ ሰባት መልሲ ዝትሓዝ ብዝወሃብ ኮይ ቁፅሪ ክኸውን ከሎ ናይ ውልቀ ሰብ ሽም ይኹን ኣድራሻ ኣይተሓዝን:: ብዘይካ ናይቲ መፅናዕቲ ኣባላት ካሊእ ማንም ሰብ ኣይሪኦን:: ውፅኢት እውን ዝግለፅ ብጥቅሉል እምበር ናይ ውልቀ ሰባት ዝግለፅ ኣይኮነን:: ንዞም ሕቶታት ምሉእ ብ ምሉእ ወይ ከዓ ብኸፋል ናይ ዘይምምላስ መሰልኪ ሕልው እዩ:: እዚ ደማ ኣብ ዝወሃበኪ ግልጋሎት ዝፈጥሮ ምንም ዓይነት ፅዕንቶ የለን:: ተወሳኺ ሓበሬታ እንተድልይኪ ብዝሰዕብ ኣድራሻ ምጥያቕ ትኸእሊ ኢኺ::

ኣድራሻ በዓል ዋና እዚ ጽንግት: ሓበን ንጉሰ ቁ.ስ 0914043865

ናይ ተሳታፋይ ቅጥዒ ስምምዕነት: ኣነ ኣብዚ ትሕት ኢለ ዝፈረምኩ ወልቀሰብ ዕላማ ናይዚ መፅናዕቲ ተገሊፁለይ ተረዲኡኒ እዩ:: ኣብ ሳዕሊ ብዝተወሃበኒ ሓበሬታ መሰረት ኣብዚ መፅናዕቲ ንምስታፍ ፍቓደኛ እዩ::

ፊርማ ተሳታፋ..... ፅለት
.....

የቀንዩልና

Annex VI: ትግርኛ መሕትት

ቐዳማይ ክፋል: ማሕበራዊን ኢኮኖሚያዊን ኩነታት

ተ.ቁ	ሕቶ	መልሲ	ናብ ዝቅፅል ይሕለፋ
101	ዕድመ ?	-----ዓመት	
102	ናይ ኣዶ ትምህርቲ ድረጃ?	<ol style="list-style-type: none"> 1. ዘይተመሃረት 2. ምንባብን ምፅሓፍን 3. 1^ይ ብርኪ 4. 2^ይ ብርኪ 5. ኮልጅን ልዕሊኡን 	
103	ስራሕ ኣዶ?	<ol style="list-style-type: none"> 1. ሰበይቲ ገዛ 2. ነጋዴ 3. መዓልታዊ ስራሕ 4. ቁፃር 5. ተማሃሪት 6. ካሊእ(ይግለፃ) 	
104	ትነብርሉ ቦታ?	<ol style="list-style-type: none"> 1. ከተማ 2. ገጠር 	
105	ኩነታት ሓዳር?	<ol style="list-style-type: none"> 1. ዘይተመርዐዎት 2. ባዓልቲ ሓዳር 3. ዝተፋተሐት 4. በዓል ገዝኣ ዝሞታ 	
106	ብሄርክን እንታይ እዩ?	<ol style="list-style-type: none"> 1. ትግራዊይቲ 2. ኣምሓራይቲ 3. ካሊእ(ይግለፃ) 	
107	ሃይማኖትኪ እንታይ እዩ ?	<ol style="list-style-type: none"> 1. ኦርቶዶክስ 2. ሙስሊም 3. ካቶሊክ 4. ፕሮቴስታንት 5. ካሊእ(ይግለፃ) 	
108	ናይ በዓልገዛኪ ድረጃ ትምህርቲ?	<ol style="list-style-type: none"> 1. ዘይተመሃረ 2. ምንባብን ምፅሓፍን 3. 1ይ ብርኪ 4. 2ይ ብርኪ 5. ኮልጅን ልዕሊኡን 	

109	ቦዲ ማስ ኢንዴክስ	<ol style="list-style-type: none"> 1. ≤18.5 2. 18-24.9 3. 25-29.9 4. ≥30 	
110	ቁመት	_____ ሜትር	

Annex VII: ዝረጋገፁ ዝርዝራት ካልኣይ ክፋል፡ ኩነታት ጥንስን ስነ ተዋልዶን

201	ክንደይ ግዘ ወሊድኪ	<ol style="list-style-type: none"> 1. መጀመርያ 2. 2 -4 3. 5ተን ልዕሊኡን 	
202	ዕድመ ጥንሲ	<ol style="list-style-type: none"> 1. መዓልቱ ዘይኣኸለ 2. መዓልቱ ዝኣኸለ 3. መዓልቱ ዝሓለፈ. 	
203	ክትትል ጥንሲ	<ol style="list-style-type: none"> 1. ጣብያ ጥዕና 2. መንግስታዊ ሆስፒታል 3. ውልቃዊ ሆስፒታል/ክልኒክ 4. ክትትል አይገበርኩን 	
204	ሕዱር ሕማም	<ol style="list-style-type: none"> 1. ፀቅጢ ደም 2. ሽኮርያ 3. ሕማም ልቢ 4. የብለይን 5. ካሊእ(ይገለግ) 	
205	ዕውት ምጅማር ሕርሲ ነይሩኪ ዶ ይፈልጥ	<ol style="list-style-type: none"> 1. እወ 2. አይፋልይ 	
206	ኩነታት ቀሽቲ አንስቲ	<ol style="list-style-type: none"> 1. ዝፈሰሰ 2. ዘይፈሰሰ 	
207	ኩነታት ዕሽል	<ol style="list-style-type: none"> 1. ብሂወት ዘሎ 2. ዝሞተ 	

ሳልሳይ ክፋል፡ ኩነታት ምጅማር ሕርሲ

301	ምኽንያት ብሕክምና ዝግበር ምጅማር ሕርሲ	<ol style="list-style-type: none"> 1. ምፍሳስ ቀሽቲ አንስቲ 2. ምውሓድ ቀሽቲ አንስቲ 3. መዓልቱ ዝሓለፎ ጥንሲ 4. ሞት ዕሽል አብ ውሽጢ ማህፀን 5. መድመይቲ ቅድመወሊድ 6. ፀቅጢ ደም 7. ናይ አፈጣጥራ ፀገም 8. ካሊእ(ይገለግ) 	
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302	ቢሾፕ ስኮር	1. ምኞት 2. ማእኸላይ 3. ዘይምኞት	
303	መለስለሲ ማህፀን ወሲዳ ዶ?	1. እወ 2. ኣይፋልይ	ኣይፋል ናብ ተ.ቁ 306
304	መልሲ 303 እወ እንተኾይኑ እንታይ ዓይነት መለስለሲ ማህፀን ወሲዳ?	1. ሚሶፕሮስቶል 2. ባሎን ካታተር 3. ክልቲኡ	
305	ቢሾፕ ስኮር ድሕሪ መለስለሲ ማህፀን ምውሳዳ	4. ምኞት 5. ማእኸላይ 6. ዘይምኞት	
306	መድሓኒት መጀመሪ ሕርሲ	1. ኦክሲቶሲን 2. ብማህፀን ዝውሰድ ሚሶፕሮስቶል 3. ብአፍ ዝውሰድ ብፅባፅ ሚሶፕሮስቶል	
307	ካብ መጀመሪ ሕርሲ መድሓኒት ዝወሰደትሉ ክሳብ ወሊድ ዝወሰዶ ግዘ (ብሰዓት)	
308	ካብ መጀመሪ ሕርሲ መድሓኒት ዝወሰደትሉ ክሳብ ውሳኔ ዘይተሳኸፀ ሕርሲ ዝወሰዶ ግዘ (ብሰዓት)		
	ራብዓይ ክፋል: ውፅኢት ብሕክምና ዝግበር ምጅማር ሕርሲ		
401	ውፅኢት ብሕክምና ዝግበር ምጅማር ሕርሲ	1. ዝተሳኸፀ 2. ዘይተሳኸፀ	
402	ዓይነት ሕርሲ	1. ብተፈጥሮ 2. ብሓገዝ መሳርሒ 3. ብመጥባሕቲ	
403	ምኽንያት መጥባሕቲ	1. ዘይተሳኸፀ ምጅማር ሕርሲ 2. ምዕፋን ዕሽል 3. ዝተዓናቀፈ ሕማም ሕርሲ 4. ካሊእ(ይገለፅ)	
404	ኩነታት ሕንጦ	1. ብሂወት ዝተወለደ 2. ሞይቱ ዝተወለደ	

405	ዖታ ሕንጦ	1. ተባዕታይ 2. አንስቴቲ	
406	መጀመርያ ደቂቃ አፕጋር ስኮር	1. ≤ 3 2. 4 — 6 3. ≥ 7	
407	ሐምሻይ ደቂቃ አፕጋር ስኮር	1. ≤ 3 2. 4 — 6 3. ≥ 7	
408	ክብደት ሕንጦ ብግራም	
409	አብ እዋን ሕርሱን ወሊድን አብ ልዕሊ አዶ ዘጋጠመ ዝተሓላለኸ ፀገም	1. ዝተቃላጠፈ ሕርሲ 2. ምልቃቅ መዳሕንቲ ቅድመ ወሊድ 3. ምስንጣቅ ማህፀን 4. መድመይቲ ድሕረ ወሊድ 5. ሞት አዶ 6. ዘጋጠመ ፀገም የለን	
410	አብ እዋን ሕርሱን ወሊድን አብ ልዕሊ ዕሽል/ሕንጦ ዘጋጠመ ዝተሓላለኸ ፀገም	1. ምዕፋን ዕሽል 2. ሞት ዕሽል 3. ትሑት አፕጋር ስኮር 4. ምእታው ናብ ክፍሊ ጽዑቕ ክንክን ህጻናት 5. ሞት ሕንጦ 6. ዘጋጠመ ፀገም የለን	