INCIDENCE AND FACTORS ASSOCIATED WITH FAILED INDUCTION OF LABOR AMONG WOMEN DELIVERING AT JINJA REGIONAL REFERRAL HOSPITAL, UGANDA.

DR. EPHRAIM OLUOCH ONANGA,MBCHB

(MOI UNIVERSITY, KENYA-2012)

2021-04-03469

A RESEARCH DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF MEDICINE IN OBSTETRICS AND GYNAECOLOGY OF KAMPALA INTERNATIONAL UNIVERSITY, UGANDA

JANUARY, 2024

DECLARATION

I, Dr. Ephraim Oluoch Onanga, hereby declare that, this research dissertation entitled: "*Incidence and factors associated with failed induction of labor among women delivering at Jinja Regional Referral Hospital, Uganda*" is out of my own effort through literature search from publications but not necessarily full texts from those sources.The research work is original and the product of my effort with guidance from my supervisors and has not been presented for academic award in any other university. References to work done by others have been duly indicated, cited and acknowledged.

PRINCIPAL INVESTIGATOR

Signature……Date…05/01/2024……

Dr. Ephraim Oluoch Onanga

2021-04-03469

Kampala International University, Uganda.

APPROVAL

I have supervised **Dr. Ephraim Oluoch Onanga** in the process of developing this research proposal entitled: "**Incidence and factors associated with failed induction of labor among women delivering at Jinja Regional Referral Hospital, Uganda**" and have approved this work to be forwarded to the next level.

1.

Signature……Date…05/01/2024……

Dr. ADAM DDAMULIRA (Supervisor)

MBChB, MMED Obstetrics & Gynaecology

Department of Obstetrics and Gynaecology,

Kampala International University- West Campus

2.

Signature……Date…04·01·2024……

Dr. THEONESTE HAKIZIMANA (Supervisor)

MBChB, MMED Obstetrics & Gynaecology

Department of Obstetrics and Gynaecology,

Kampala International University- West Campus

3.

Signature……Date…05/01/2024……

DR. Eilu Emmanuel (Ph.D., MB, FHSE)

HoD. Department of Microbiology,

Senior Lecturer Departmetn of Microbiology,

Kampala International Universtity –Western Campus

DEDICATION

This book is dedicated to my mother Mrs. Florence Anyango Onanga, late father Mr. Marcus Onanga Sewe, and my devoted wife Dr. Teresiah Achieng Agwanda for their unending love, sacrifice, prayers, encouragement, support, and guidance during the entirety of my course. Additionally, this dedication extends to all the women who might benefit from the research's findings.

ACKNOWLEDGEMENT

I extend my heartfelt gratitude to God for giving me the guidance that has illuminated my path throughout this postgraduate journey and all my undertakings. My deepest appreciation goes to the esteemed Consultants, Lecturers, Senior House Officers, Interns, and Midwives within the Department of Obstetrics and Gynecology. Their unwavering mentorship and support during my Masters of Medicine training have been invaluable.

I am profoundly thankful for the exceptional guidance provided by my Supervisors, Dr. Adam Ddamulira, Dr. Theoneste Hakizimana and Dr. Eilu Emmanuel whose insights have been instrumental in shaping this dissertation.

Acknowledgment is also due to Prof. Fernando Perez, Head of the Department of Obstetrics and Gynecology, for fostering an enabling academic environment. Gratitude extends to the entire faculty for their constructive contributions that have guided this research's trajectory.

I wish to express my appreciation to my fellow professionals who contributed their critical insights and suggestions, enhancing the depth of this work.

Lastly, I extend profound gratitude to the participants of the study and the dedicated research assistants whose voluntary contributions provided the cornerstone for this endeavor. This work stands as a testament to the collective efforts of all those mentioned, and I am sincerely thankful for their contributions.

.

TABLE OF CONTENTS

DECLARATION ..... **i**
APPROVAL ..... **ii**
DEDICATION ..... **iii**
ACKNOWLEDGEMENT ..... **iv**
TABLE OF CONTENTS ..... **v**
LIST OF FIGURES ..... **ix**
LIST OF TABLES ..... **x**
LIST OF ABBREVIATIONS ..... **xi**
OPERATIONAL DEFINITIONS ..... **xii**
ABSTRACT ..... **xiii**
CHAPTER ONE **1**
INTRODUCTION **1**
1.1 Background of the study. 1
1.1.1 Historical background 1
1.1.2 Theoretical background 2
1.1.3 Conceptual background 2
1.1.4 Contextual background 4
1.2 Problem statement 5
1.3 Objectives 6
1.3.1 General objective 6
1.3.2 Specific objective 6
1.4 Research questions 6
1.5 Justification of the study 6
1.6 Significance of the study 7
1.6.1 Obstetricians and other healthcare workers. 7
1.6.2 Obstetric patients 7
1.6.3 Other Researchers 7
1.6.4 Jinja Regional Referral Hospital 7
1.6.5 Science. 7
1.6.6 The Researcher 7

1.7 Conceptual Framework 8
..... 8
1.7.1 Description of the Conceptual Framework 8
1.8 Scope of the study 9
1.8.1 Content scope 9
1.8.2 Study setting 9
1.8.3 Time scope 9
CHAPTER TWO 10
LITERATURE REVIEW 10
2.0 Introduction 10
2.1 Incidence of failed induction of labor 10
2.3 Factors associated with failed induction of labor 12
2.3.1 Age 12
2.3.2 Parity 12
2.3.3 Birthweight 12
2.3.4 Body Mass index 13
2.3.5 Indication for induction 13
2.3.6 Gestational age 14
2.3.7 Bishop Score 14
2.4 Duration of Latent phase in women with successful induction of labor 14
CHAPTER THREE 15
METHODOLOGY 15
3.1 Study Design 15
3.2 Study Area and setting 15
3.3 Target Population 15
3.4 Study Population 15
3.5 Accessible Population 15
3.6 Selection Criteria 15
3.6.1 Inclusion Criteria 15
3.6.2 Exclusion Criteria 15
3.7 Sample Size Determination 16

3.8 Sampling Techniques/ Strategy 16
3.9 Study Feasibility 17
3.10 Data Collection Procedure 17
3.10.1 Data Collection Instruments 17
3.10.2 Flow of participants during data collection 18
3.11 Study Procedure 19
3.12 Data presentation and analysis 20
3.13 Study limitations and delimitations 20
3.14 Quality control 20
3.15 Ethical consideration 21
3.15.1 Informed consent and autonomy for participants 21
3.15.2 Risks and adverse events to study participants 21
3.15.3 Benefits of the research 21
3.15.4 Privacy and Confidentiality 21
3.15.5 Criteria for Selection of Participants 21
3.15.6 Incentives and Reimbursement 22
3.15.7 Approval Procedure 22
3.15.8 Respect for community 22
3.16 Dissemination 22
CHAPTER FOUR 23
RESULTS 23
4.0: Study profile 23
4.1 Descriptive statistics of socio-demographic characteristics of study participants 24
4.2: Descriptive statistics of obstetrics characteristics of study participants 25
4.3: Incidence Of Failed Induction Of Labor In Women Delivering At Jinja Regional Referral Hospital 26
4.4: Bivariate analysis of factors associated with failed induction of labor 27
4.5: Multivariate analysis of factors associated with failure of induction 28
4.4 Correlation between duration of latent phase and preinduction Bishop score in successful induction 29
CHAPTER FIVE 30

DISCUSSIONS, CONCLUSION AND RECOMMENDATIONS 30
5.1 Discussion 30
5.1.1 Incidence of failed induction of labor 30
5.1.3 Factors associated with failed induction of labor 31
5.1.3.1 Parity 31
5.1.3.2 Pre-induction Bishop score 31
5.1.2 Correlation between duration of latent phase and Preinduction Bishop score in successful inductions 32
5.2 Study Strength 32
5.3 Study Limitations 32
5.4 Conclusion 32
5.5 Recommendations 33
REFERENCES 34
APPENDICES 36
APPENDIX I: WORK PLAN 36
APPENDIX II: BUDGET 37
APPENDIX III: INFORMED CONSENT DOCUMENT (English Version) 38
APPENDIX IV: INFORMED CONSENT DOCUMENT (Lusoga version) 43
APPENDIX V: INVESTIGATOR ADMINISTERED QUESTIONNAIRE(English Version) .. 47
APPENDIX VI: INVESTIGATOR ADMINISTERED QUESTIONNAIRE (Lusoga Version) . 50
APPENDIX VII: UGANDA INDUCTION OF LABOR PROTOCOL 53
APPENDIX VIII: MAP OF JINJA DISTRICT 54
APPENDIX IX: CURRICULUM VITAE 55
APPENDIX: X: ORIGINALITY REPORT 58

LIST OF FIGURES

Figure 1: Conceptual framework showing interaction of the different study variables 8
Figure 2: Flow chart for patient flow during the period of data collection..... 18
Figure 3: Study profile 23
Figure 4: Pie-chart showing incidence of failed induction of labor..... 26
Figure 5: Bar graph showing indications for cesarean section 29

LIST OF TABLES

Table 1: Socio-demographic characteristics of study participants 24
Table 2: Obstetrics characteristics of study participants..... 25
Table 3: Bivariate Analysis Of Factors Associated With Failed Induction of labor. 27
Table 4: Multivariate Analysis Of Factors Associated With Failure Of Induction 28

LIST OF ABBREVIATIONS

ACOG	American College of Obstetrics & Gynaecology.
BMI	Body Mass Index
fIOL	Failed Induction of Labor.
IOL	Induction of Labor
IREC	Institutional Research & Ethics Committee.
JRRH	Jinja Regional Referral Hospital
KIU-TH	Kampala International University Teaching Hospital.
NIH	National Institute of Health.
PI	Principal Investigator.
PPH	Postpartum Hemorrhage
RCOG	Royal College of Obstetricians and Gynaecologists
SD	Standard Deviation
WHO	World Health Organization

OPERATIONAL DEFINITIONS

Failure of induction: Inability to achieve cervical dilatation of 4cm after a maximum of 24hours of misoprostol administration.

Latent phase of Labor: Interval from initiation of induction to cervical dilation of 4cm.

Gestational Age determination: Is calculated from the 1st day of Last Normal Monthly Period (LNMP) that is documented in ANC card, mother's recall, ultrasound estimation and obstetric examination.

Postterm: Pregnancy lasting >42weeks

Parity: Fetus delivered after 28weeks.

ABSTRACT

Background: Induction of labor is the process of artificially initiating labor to attain vaginal delivery. The proportion of induced deliveries is increasing steadily among referral hospitals of Uganda. However, there is limited information regarding failure rate of this intervention. Factors associated with the failure rate has also not been well documented. Therefore, this study aimed to determine the incidence and factors associated with failed induction of labor at Jinja Regional Referral Hospital in Uganda.

Materials and Methods: A hospital based prospective cohort study was conducted among 138 women undergoing labor induction at Jinja Regional Referral Hospital from 15th June, 2023 to 15th August, 2023. A consecutive sampling technique was used to recruit study participants and data was collected using pretested questionnaire. The collected data was entered into Microsoft excel and exported to Stata 14.2 for further analysis. A multivariate logistic regression analysis was performed to estimate effect of each of associated factors on fIOL after controlling for potential confounders. Statistical significance was declared at p-value <0.05 associated factors.

Results: The incidence of failed induction of labor was found to be 49(35.51%). Statistically significant factors associated with failed induction of labor were nulliparity (aOR=2.26, 95% CI; 1.01-5.06), Pre-induction Bishop score <6 (aOR=4.82, 95% CI;2-10.87).There was a linear relationship of latent phase of labor and pre-induction Bishop score with Pearson correlation of

(-0.804)

Conclusion: The study highlights a significant burden of failed induction of labor among women delivering at Jinja Regional Referral. Clinicians should prioritize review of the execution of IOL services taking into consideration parity and pre-induction Bishop score that highly predicts failure before performing IOL. Finally,there is need to do pre-induction cervical assessment and determination of Bishop score in the setting of induction to improve outcome.

Keywords: Failed induction of labor, Factors associated, Jinja Regional Referral Hospital.

CHAPTER ONE
INTRODUCTION

1.1 Background of the study.

1.1.1 Historical background

Way back in history, Hippocrates first described induction of labour by mammary stimulation and mechanical dilatation of the cervix. Later on, Soranus practiced the induction of labour in the second century AD by a combination of different procedures such as artificial rupture of membranes and others. Other induction of labor methods were introduced during the period. Moshion was the first to describe manual cervical dilation, and Casis created various equipment that could do it. (Hertog, 2015)

During the 18th and 19th centuries, labor induction was used to deliver large babies whose mothers had pelvic anomalies. Prior to the availability of pituitary extract and subsequently synthetic oxytocin and prostaglandins in the 20th century, induction techniques were unreliable. Up until 1950s, the main reason for inducing labor was cephalo-pelvic disproportion, but then it became abundantly clear increased risk of perinatal morbidity and mortality that was associated with prolonged pregnancies (Drife, 2012).

The octapeptide amide exhibiting oxytocin's hormonal function was initially described in 1954 by Vincent du Vigneaud, an American scientist. He succeeded in synthesizing this octapeptide amide a year later(Hertog, 2015)

In his 1955 paper "*Elective induction of labor*," obstetrician Edward Bishop—a medical professional who specializes in childbirth—suggested the ideal circumstances under which a pregnant woman can choose to induce labor. Early in the 1950s, Bishop examined the outcomes of 1,000 elective inductions and found that some expectant mothers who underwent induced labor delivered their babies more quickly and easily. He later described this characteristics that an obstetrician should look for to determine if a pregnant woman can safely undergo an elective induction. This metrics have become determinants of decision to persue elective induction of labor in 21st century (Abboud, 2017)

1.1.2 Theoretical background

The basis for this research will be the Quality Health Outcome Model (QHOM). In order to provide a framework for quality and outcome research, the QHOM was created in 1998. System, intervention, patient/client, and result are the four constructs that the QHOM examines in terms of interaction and integration. By positing links with factors that not only act upon but are also equally influenced by components in the model, numerous connected variables affect how health care is delivered and how outcomes are ensured. (Mitchell, 1998)

1.1.3 Conceptual background

The purpose of inducing labor is to artificially start uterine contractions after the period of viability in order to achieve vaginal delivery before natural labor. It's an intervention that is undertaken when the benefits of an early delivery exceed the risk of pregnancy continuation. According to WHO recommendations, it should be prioritized for enhancing the standard of care and outcomes for expectant mothers and fetuses(Debele, 2021)

Several indications have been suggested that necessitates induction of labor such as hypertensive disease in pregnancy, IUFD, prolonged prelabour rupture of membranes, prolonged pregnancy, diabetes mellitus among others. (Tadese, 2022)

Induction of labor is intended to result in vaginal delivery. But this may not be as frequent as during spontaneous labor. It's imperative that medical professionals keep in mind that cervical ripening can take some time and that the emergence of an active labor pattern should occur before concluding that induction has failed. (Cunningham,2022).

The definition of fIOL has been very debatable and riddled with a lot of controversies. But usually, it's detected if there's no cervical change, descent of the presenting part or uterine contraction pattern of atleast three contractions felt within 10 minutes after 6 to 8 hours of starting IOL process (Muhdin ,2022). According to a publication on PLos ONE, the diagnosis of a fIOL has not been agreed upon. Several end points have been proposed, such as cesarean birth, failure to establish active phase of labor, not attaining vaginal delivery within a set amount of time, or not achieving active phase of labor within a set given duration. (Woubishet Girma et al, 2016)

The inability to produce regular contractions every three minutes and cervical change was proposed as the definition of fIOL in a workshop organized by the American College of Obstetricians and Gynecologists (ACOG), Society of Maternal-Fetal Medicine (SMFM), and United States National Institute of Child Health and Human Development (UNICHD) they

proposed that fIOL be defined as the inability to produce regular contractions every three minutes and cervical change roughly 24 hours after oxytocin administration in recommended dosage and frequency. (Debelo, 2022)

In this study it will be defined by labor induction process whose latent phase lasts for more than 24 hours (Debele, 2021). Hence, all mothers who are initiated on induction and fail to achieve a cervical dilatation of 4cm within a maximum of 24hours will be deemed to have failed induction. The reason for this is that the authors concluded that it was reasonable to continue administering misoprostol to women who failed to achieve atleast 4 cm of cervical dilatation in 24 hours, but that the benefit of doing so beyond 24 hours was unclear. They found a linear relationship between the failure to achieve cervical dilatation over time and the induction of labor failing. (Gabbe, 2017)

Over the past few decades, there has been an increase in the use of IOL worldwide to shorten pregnancy durations. WHO estimates that in affluent nations, the percentage of live births that are as a result of labor induction constitutes about 25%, with a failure rate of 19%. IOL for pregnancy termination is acceptable and successful, but it can occasionally have a deleterious impact on the mother's and the unborn child's health. For example, insufficient uterine contractions following IOL are linked to a higher risk of various unfavorable outcomes for both the mother and the fetus, including uterine rupture, nonreassuring fetal heart rate tracing, postpartum hemorrhage, endometritis, stillbirth, and severe birth asphyxia(WHO, 2010)

In a similar vein, research has linked intrauterine infections including chorioamnionitis and endometritis to unsuccessful IOLs. Additionally, cesarean birth for unsuccessful induction and other obstetric issues including non-progress of labor and fetal distress are linked to a greater rate of morbidity in both the mother and the fetus(Demssie, 2022)

A wide range of variables, including fetal characteristics like fetal weight and gestational age and maternal variables like primiparity, maternal age, and low bishop scores, have all been linked to fIOL. (Muhdin Mohammed et al,2022)

Methods of induction of labor include mechanical techniques e.g luminaria tents, use of catheters, membrane stripping and artificial rupture of membranes and pharmacological methods e.g the use of oxytocin and prostaglandins.Unless there are contraindication to their use the commonest method of induction as prescribed by Ugandan guidelines is pharmacological with use of misoprostol and oxytocin

1.1.4 Contextual background

Jinja RRH serves the Eastern Region of Uganda, a population of approximately 4.5 million. It serves 9 districts (Jinja, Iganga, Kamuli, Mayuge, Kaliro, Kamuli, Luuka, Namayingo, Kayunga and parts of Buikwe) and 1 city, Jinja.

The Health Management Information System (District Health Information System 2) report for the 3months of August, September, October indicated : total admissions 1951; total deliveries 1647; caesarean sections 551; vaginal deliveries 1096. PROM admissions 87 and hypertensive disorders 55. The cesarean section rate is 33.5% and maternal complication rate of 50%.

In a 3 months survey conducted between August to October, 2022 in Jinja RRH maternity unit, around 300 pregnant women were induced with a substantial number failing and were eventually delivered by emergency c/s due to various reasons.

1.2 Problem statement

Globally, IOL has been a potential intervention in 25% of deliveries with 20% resulting to eventual delivery by cesarean section in developed world. According to WHO report 2010 about 10% of deliveries in selected 7 African countries in Sub-saharan Africa including Uganda were preceded by induction with a failure rate estimated at 25%. The odds of a cesarean section following induction of labor is twice compared to spontaneous labor (Tadese, 2022)

There is no agreed-upon definition of what exactly qualifies as a failed induction. Further, the majority of research has been retrospective in nature and often defines cesarean section as the end point. It is imperative that the most important rule is to diagnose a failed induction only after sufficient time has passed for cervical ripening and the onset of active labor. This study highlights how crucial it is to provide the latent phase adequate time to transition into the active phase before diagnosing failure of induction (Mateveke, 2015).

In general, a failed induction of labor is always grounds for concern because the cause is usually unclear and difficult for medical professionals to identify. The mother and the healthcare practitioner get extremely anxious about the ultimate state of the mother's and the fetus's wellbeing as a result. Women who have induced labor are more likely to give birth via cesarean section; cesarean delivery has independent adverse maternal outcome.There is need for evidence generation of factors associated with failure to help clinicians well identify the mothers with high chances of being victims of failure of the intervention. Therefore, this study assessed factors associated with failed induction inorder to positively shape success rates and reduce cesarean section rates and morbidities associated with cesarean section (Tarimo, 2019)

Finally, the proportion of induced deliveries is increasing steadily among referral hospitals of Uganda. Unpublished report from District Health Inforamation System (DHIS) indicates that between August to October, 2022 Jinja Regional Referral hospital had 1951 maternity admissions and conducted 1647 deliveries. Importantly, 30% of the admitted mothers were admitted due to medical and obstetric conditions that might necessitate induction of labor. Further a survey conducted the same period indicated that from an analysis of daily admission an approximately 30% of women admitted with various medical and obstetrical conditions required expedition of their delivery by labor induction. Among the pregnant women induced,a daily episodic failure between 20% to 50% was observed. However no data exists in this facility concerning this

catastrophic failure that has potential for delivery by caesarean section with its attendant morbidity and mortality.

1.3 Objectives

1.3.1 General objective

To determine the incidence and factors associated with failed induction of labor among women delivering at Jinja Regional Referral Hospital

1.3.2 Specific objective

1. To determine the incidence of failed induction of labor among women delivering at Jinja Regional Referral Hospital.
2. To assess the factors that are associated with failed induction of labor among women delivering at Jinja Regional Referral Hospital.
3. To assess the correlation between the duration of latent phase and preinduction Bishop score among women who had successful induction at Jinja Regional Referral Hospital.

1.4 Research questions

1. What is the incidence of failed induction of labor among women delivering at Jinja Regional Referral Hospital?
2. What are the factors that are associated with failed induction among women delivering at Jinja Regional Referral Hospital?
3. What is the correlation between the duration of latent phase and preinduction Bishop score among women who had successful induction at Jinja Regional Referral Hospital?

1.5 Justification of the study

To improve the outcome of induction, preinduction conditions are of utmost importance. Its knowledge is crucial for practicing physicians because it may aid in understanding some maternal and fetal characteristics that can act as prediction model for individual probability for those undergoing labor induction and assist clinicians to promptly offer women an alternative method of delivery (Demssie, 2022)

There is limited information regarding the failure rates of induction of labor despite being an important and common obstetric intervention. Factors that are associated with failure rate have also not been well documented. The findings of this study will help inform knowledge at

institutional level on determinants of fIOL, its contribution to overall cesarean section rate. (Tarimo, 2019)

This study will also provide a basis to create a local protocol to standardize the treatment of these patients and to pursue ongoing quality improvement in the management of failed labor induction through routine case management audits and put in place emergency preparedness measures for those predisposed to failure thus prevent potential adverse outcomes. (Mateveke, 2015)

1.6 Significance of the study

The findings of this study are expected to be of benefit to the following:

1.6.1 Obstetricians and other healthcare workers.

This knowledge is crucial for practicing clinicians since it could assist in understanding specific maternal and fetal characteristics that contribute to failure in labor induction and enable them to promptly counsel women and offer them other alternative delivery methods..

1.6.2 Obstetric patients

Evidence-based information will be used to provide pregnant women with counseling before procedure performance on knowledge of characteristics that determine success of induction of labor and will be used in decision making to provide them with intervention that ensures optimum mode of delivery.

1.6.3 Other Researchers

In this study field, little has been done to determine incidence and risk factors. The results will serve as a guide for other studies.

1.6.4 Jinja Regional Referral Hospital

The findings will be used at institutional level as a database to track outcome failures and designing a validated prediction model to estimate individual probability when undergoing induction of labor to enhance future improvements in the quality of care.

1.6.5 Science.

The study outcome will add to the existing body of knowledge on incidence and factors associated with fIOLin Uganda, Africa, and the world at large.

1.6.6 The Researcher.

This work serves as partial fulfillment of the requirements for the award of the degree of Master of Medicine in Obstetrics and Gynaecology of Kampala International University.

1.7 Conceptual Framework

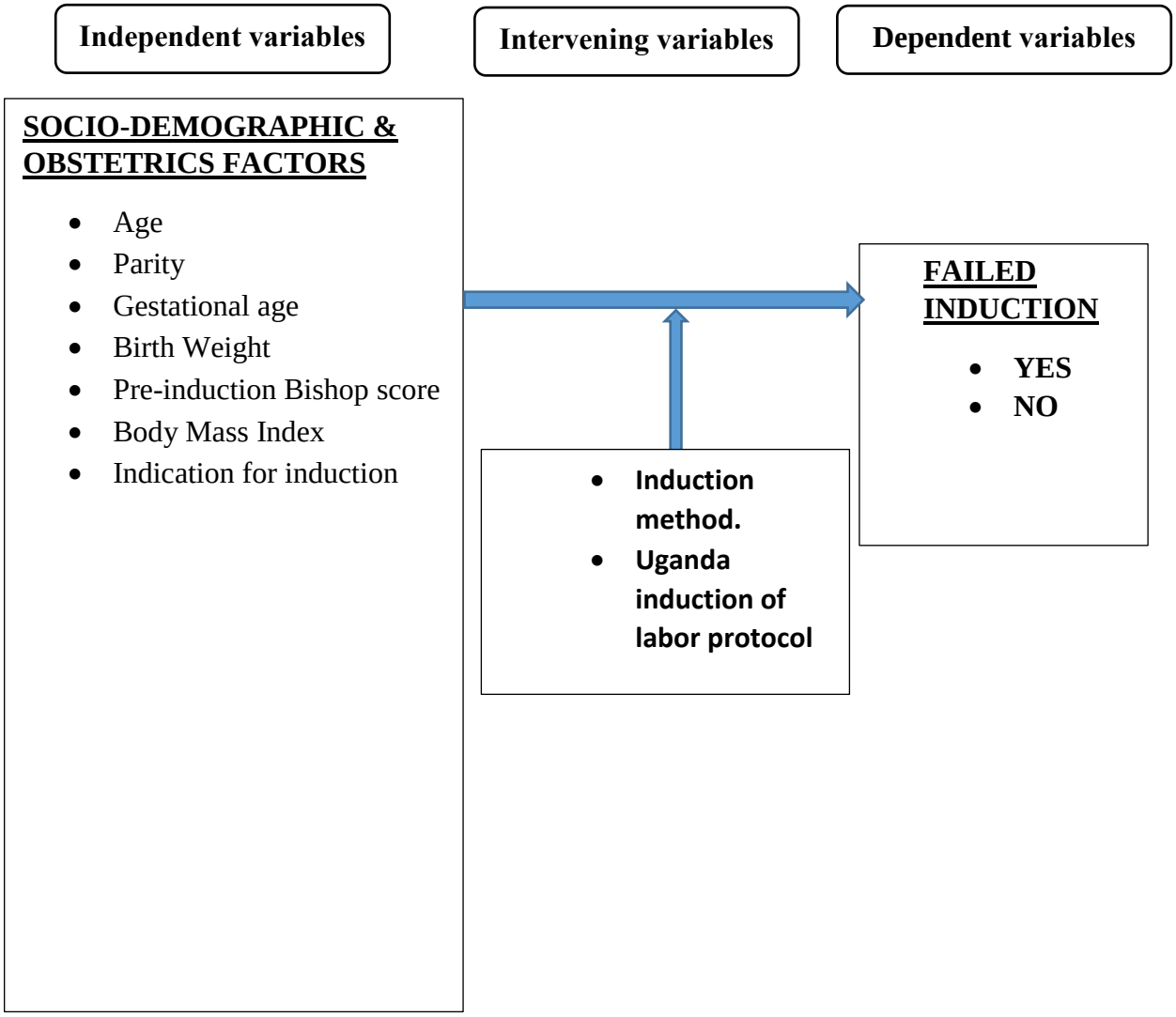


Figure 1: Conceptual framework showing interaction of the different study variables

1.7.1 Description of the Conceptual Framework

The conceptual framework presented above demonstrates the relationship between obstetric and sociodemographic factors and the result of IOL i.e this factors can combine to realize successful or failed induction of labor.They also have an intervening variable which is method of induction and Uganda Induction protocol. The framework shows that socio-demographic and obstetric factors as shown e.g age ,parity, gestational age, indication for induction, Bishop score , Birth

weight and Body Mass Index (BMI).This independent variables interrelate to give an outcome of either successful or failed induction of labor.

1.8 Scope of the study

1.8.1 Content scope

The study elucidated incidence of fIOL Jinja Regional Referral Hospital during the study period. Factors associated with this outcomes were identified.

1.8.2 Study setting

The study was conducted at Jinja Regional Referral Hospital department of Obstetrics and Gynaecology in both maternity and postnatal wards. It is located within Jinja City in Eastern Uganda.

1.8.3 Time scope

The study covered a period of 2months; from 15th June to 15th August 2023. This duration was adequate to achieve the study sample size basing on Jinja Regional Referral Hospital records of August 2022 to October 2022 , which showed that the maternity department of the regional hospitals induced around 300 pregnant women.

CHAPTER TWO
LITERATURE REVIEW

2.0 Introduction

In this chapter, we dived into the existing body of knowledge related to our research topic. We explored studies, theories, and findings that were conducted by other researchers in this area. By doing so, we highlighted gaps in the current understanding and identified key concepts that shaped our study. This chapter served as the foundation upon which we built our research questions and hypotheses, drawing from the insights provided by previous research.

2.1 Incidence of failed induction of labor

A prospective cohort study was done by Pushpa Shrestha and colleagues from March to August 2017 in Shree Birendra Hospital Chhauni, a Tertiary Centre of Kathmandu, Nepal to assess the prevalence and outcome of IOL. 117 women were enrolled, IOL was successful in only 82(70.1%) of the women. Further 9 (10.53%) had maternal complications that necessitated cesarean section (Shrestha, 2019). According to the study fIOL was a considered in a situation where a woman failed to deliver vaginally after successful administration of misoprostol for 24hours.

In a retrospective analysis conducted by Puliyath in 2019, in obstetric department of tertiary care teaching institute in India to determine the outcome of induction with PGE1 25mcg vaginal tablet. Data was collected from hospital records from January 2016 to January 2017. Selected women included those who completed 37weeks and underwent elective IOL for various reasons. 700 pregnant women were include in the study group. 151 (21.57%) had cesarean section done due to failed induction (Puliyath, 2019).

In a prospective cohort study carried out in Iraq to assess the risk of cesarean delivery after induction of labor in women in Salahaddin Hospital. The cesarean section rate among those who underwent induction was 22% (Sulaiman, 2020)

In a study done in Adama Hospital in Ethiopia by Mulalem and colleagues in 2020 to determine the magnitude of fIOL, the findings indicated an incidence rate of 20.5%. This was comparable with a study done in Jimma University Specialized Hospital at 21.4% and Hawassa Public Health facilities in same country.

In a prospective cohort study carried out in Harare Maternity Hospital in 2015 to determine factors associated with fIOL using titrated oral misoprostol, a sample size of 171 participants were selected. The main outcome measure was vaginal delivery within 24hours of completing one cycle of titrated oral misoprostol administration. The study found that 18 (11.1%) of the participants did not achieve vaginal delivery within 24 hours. A further 10 (17.1%) despite progressing to active labour within the stipulated period, underwent cesarean section for obstetric reasons during labor. They were equally included in the cohort for failing to achieve the critical end point of induction of labor which is vaginal delivery (Mateveke, 2015). In this study a repeat vaginal misoprostol was done after failed oral misoprostol. This was the most typical study because it considered cervical dilation and was a prospective study.

In order to identify predictors and factors linked to unsuccessful induction in women delivered in Northern Tanzania, Clifford Silver Tarimo conducted a hospital-based retrospective cohort study. Maternity linked data from the Kilimanjaro Christian Medical Centre, Tanzania, from mothers who gave birth to singletons from 2000–2015 were used. In the study, all induced deliveries were taken into account. 11,483 deliveries in all were examined. The fIOL rate was 19%.(Tarimo, 2019). In this study there was inclusion of other adverse obstetric events that necessitated cesarean section after induction also contributed to failed induction of labor.

A cross-sectional institutional based study done by Masan Jesang Evalyne in 2013 to determine the outcome of induction of labor in women at Kenyatta National Hospital, Kenya.The findings indicated that out of the 42 recruited in the study 16 (38%) underwent cesarean section either due to fIOL or complications of induction (Masan, 2013). The sample size in the study was small.

88 mothers who were over 28 weeks pregnant were enrolled in a prospective study by Rogers Kajabwangu that took place at Mbarara Regional Referral Hospital in Uganda over the course of six months to identify factors linked to delayed onset of active phase of labor after labor induction with vaginal misoprostol. Of these mothers, 20 (22.7%) had delayed onset of active phase of labor. (Kajabwangu, 2021). According to this study only delay to progression to active phase of labor within 12hours was considered fIOL.

2.3 Factors associated with failed induction of labor

2.3.1 Age

In a study done in Ethiopia,it was found that fIOL was 2times higher in woman more than 24years (aOR=1.93). (Bashir, 2019). Similar findings were found in a study done in Ethiopia, it showed that as maternal age increases the odds of fIOL increases. (Tadese, 2022).

According to a cross-sectional study conducted in an Ethiopian institution, women under 30years had a three times higher risk of experiencing a failed induction than those over 30years(Mebratu e. a., 2022)

This can be explained by the fact that myometrial contractility declines with age, which may lead to inadequate uterine contraction and, as a result, fIOL. In addition maternal anatomic stability decreases with age. Sacral promontory, ischial spine and coccyx deformities were postulated increases with age (Bashir, 2019)

2.3.2 Parity

Various studies have demonstrated primiparous and nulliparous are at an increased proportion and more at risk of failure. In Gondar University Specialized Hospital the odds was twice aOR, 95% CI (2.1, 1.2-3.7) (Tadese, 2022), KCMC hospitals, Tanzania aOR, 95% CI (1.71, 1.60-3.01) (Tarimo, 2019) and Mbarara, Uganda aRR 95% CI (2.34, 1.17-4.68)

A study done in Kenya demonstated that primigravida were twice likely to fail induction compared to multigravidas (Masan, 2013)

It is possible that primiparous women have poor preinduction effacement and reponse to induction methods. Further their cannot be easily stimulated and contracted compared to multiparous. This is due to poor cervical collagen fibre dissolution and poor oxytocin sensitivity respectively

2.3.3 Birthweight

Birth weight has been independently associated with fIOL.In a study carried out in Ethiopia, newborns whose BWT > 3500gm were more likely to have fIOl aOR=1.68 (Bashir, 2019), In KMC hospital, Tanzania >4000gm aOR, 95% CI (1.87, 1.58-2.27) (Tarimo, 2019)

In a study conducted in Pakistan in 2016, higher birth weight foetuses had increased risk of fIOL. Macrosmia was shown to be a risk factor for fIOL. Failure of induction was observed 2.5 times more in women with macrosomic babies compared to normal weight babies. (Pushpa, 2020)

A study done in Bangkok in 2021 estimated fetal weight of <3500grams was significantly associated with increased probability of successful vaginal delivery following labor induction. (Kamlungkea, 2022)

This may be due to dystocia associated with macrosmic babies including shoulder dystocia, malposition and malpresentation resulting into difficult labor and eventual c/s.

2.3.4 Body Mass index

In Harare study BMI was significantly associated with outcome of induction. Women who had BMI >30kg/m_2 were twice likely to experience a fIOL (Mateveke, 2015). Similarly in a study carried out in Bangkok maternal delivery BMI <25 kg/m_2 was significantly associated with increased likelihood of successful vaginal delivery (Kamlungkea, 2022)

In a Tanzanian study, obesity had a significant association with fIOL.This has been argued to be contributed by the obese conditions being associated with fat deposition that mechanically obstruct the birth canal causing obstructed labor (Tarimo, 2019)

2.3.5 Indication for induction

Researchers at Adama Hospital Medical College in Ethiopia found that women with preinduction PROM had a 3.6-fold increased risk of an unsuccessful IOL as compared to women whose fetal membranes were intact. Furthermore, compared to their contemporaries, those who had hypertensive problems during pregnancy had three times higher risks of failing an IOL(Demssie, 2022)

This was attributable to PROM affecting time required cervical ripening to active phase to to poor application of fetal presenting part to the cervix. The fear for introduction of infection may also lead to fear of using cervical ripening methods (Tadese, 2022)

2.3.6 Gestational age

In a study carried out at Jigjija Universiry Hospital, Ethiopia, it was found that women with gestational between 37 and 42weeks are 3times more likely to fail induction compared to those<37 weeks (Mebratu e. a., 2022)

In a prospective research carried out over a 6-month period at the Mbarara Regional Referral Hospital in Uganda, the causes of delayed commencement of the active phase of labor after vaginal misoprostol induction were identified. gestational age less than 37 weeks were associated with delayed onset of active labor. (Kajabwangu, 2021)

2.3.7 Bishop Score

In a cross sectional study done in Public Hospitals of Makelle Town, women with favourable Bishop score after cervical ripening were found to be 27times more likely to succeed induction of labor than those with unfavourable Bishop score. (Lueth, 2021)

In an institutional based cross-sectional study done in 2020 in Adama Hospital Medical College it showed that the odds of failed induction in unfavourable Bishop score were 4.05 higher than odds in favourable Bishop score (Debelo, 2022)

In a prospective cohort study carried out in 2019 at Tikrit Ciry. The mean Bishop score was 3.2 ±0.23. women who were induced with unfavourable cervix had 2times increased risk of failed inductin of labor (Sulaiman e. a., 2020)

Cervical status is a fundamental parameter in fIOL and unfavourable cervix is a sign of non effaced cervix that might result in prolonged labor due to failure to achieve active phase of labor. (Tadese, 2022)

2.4 Duration of Latent phase in women with successful induction of labor

A linear relationship has been discovered between cervical dilation and success of induction. In one large prospective study, the mean duration of latent phase of labor, defined as interval from initiation of induction of labor to cervical dilatation of 4cm in a woman with a Bishop score of 0 to 3 was 12hours in multipara and 16hours in nullipara (Gabbe, 2017)

In a study conducted at the Department of Gynecology and Obstetrics Unit,Civil Hospital Karachi. The mean duration of latent phase of labor was found to be 16.0 ±4.7 hours (Makhijani, 2017)

CHAPTER THREE
METHODOLOGY

3.1 Study Design

This was a prospective cohort study.

3.2 Study Area and setting

Jinja city is located 98.5 kilometers by road from Kampala, the capital of Uganda, and has the coordinates 0° 24' 59.99° N, 33° 11' 60.00° E. The Basoga are the dominant tribe, followed by Mushiga, Muganda and others. The majority of people work in commerce, agriculture, and animal husbandry.

Jinja Regional Referral Hospital has a number of departments and clinics, including general surgery, pediatrics, obstetrics and gynecology and internal medicine. It provides both in-patient and out-patient services. The hospital has bed capacity of approximately 400.

Currently the obstetrics and gynaecology department has 8 specialists, 2 Medical Officers and 27midwives with a bed capacity of 97 (30 beds in First stage- Ward 8; 30 in Postnatal- Ward 7 and 37 in Gynaecology- Oncology Ward-Ward 2)

3.3 Target Population

All pregnant women admitted at the maternity units of Jinja Regional Referral Hospital.

3.4 Study Population

All mothers at gestational age of ≥28 weeks with an indication for induction of labour.

3.5 Accessible Population

All mothers at gestational age of ≥28 weeks with an indication for induction of labour, met eligibility criteria, and have consented to join the study.

3.6 Selection Criteria

3.6.1 Inclusion Criteria

All pregnant women admitted at Maternity Units of JRRH at gestational ages ≥28 weeks with and meet the prerequisite for induction of labor as prescribed by Ugandan Essential Maternal and Newborn Care guideline May, 2022.

3.6.2 Exclusion Criteria

The mentally challenged and unconscious.

3.7 Sample Size Determination

This was achieved using the Daniel's formula (2009) for the different specific objectives.

Specific objective one: Incidence of fIOL.

Daniel's formula (2009) was used. It goes like this: n = desired sample size, Z = standard normal distribution 1.96 at 95% level of confidence and p = population proportion. The incidence of failed induction was 11% a failure rate of titrated oral misoprostol Regime at Harare Maternity Hospital (Mateveke, 2015)

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

$$n = \frac{(1.96)^2 \text{ X } 0.11(0.89)}{0.05^2}$$

n= 150

Specific objective two: Factors associated with failed induction of labour.

Modified Daniel's;

$$n = \frac{(Z_\alpha)^2 X \frac{1}{R} X p X (1-p)}{e^2}$$

zα = Z-statistic at α =1.96

R = Odds ratio = 2.34

p = 22.7%, based on a study done in Mbarara; gestational age (OR=2.34) was associated with the highest failure rates for induction of labour (Kajabwangu, 2021)

d= Level of precision= 0.05

$$n = \frac{(1.96)^2/2.34 \text{ X } 0.227(1-0.227)}{0.05^2}$$

n= 115

So overall, 150 was considered as the required sample size. Highest number calculated.

3.8 Sampling Techniques/ Strategy

Consecutive enrolment for all the study participants for all mothers who met the eligibility criteria was done until the required sample size was achieved.

3.9 Study Feasibility

According to data extracted from HIS (DHIS2) Jinja RRH for the months (August-October, 2022) total admission of 2113,total deliveries was 1647 and their total cesarean section was 551 translating to a rate of 37.6% respectively.

Cumulatively the site report induction of 10 pregnant women per week, an average of 40 per month.

3.10 Data Collection Procedure

3.10.1 Data Collection Instruments

A structured investigator-administered pre-tested and pre-coded questionnaire was used to collect patient biodata and patient-related factors. The questionnaire was in English and translated to Busoga for use when deemed necessary. Refer to Appendix V: Questionnaire for further on the questionnaire. A detailed obstetric history including thorough medical and social factors and physical examination was done as appropriate to ensure the patient meets inclusion criteria.

3.10.2 Flow of participants during data collection

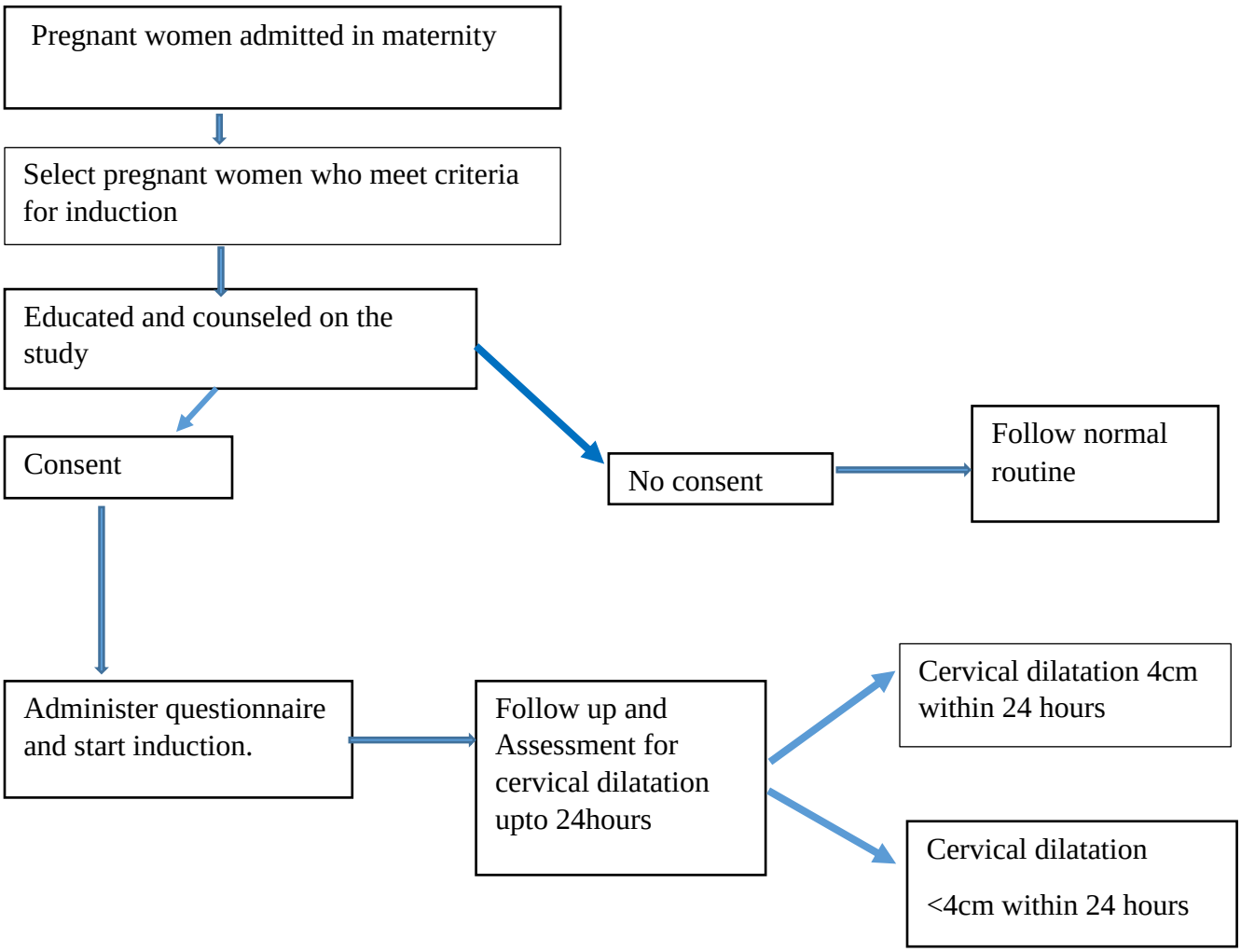


Figure 2: Flow chart for patient flow during the period of data collection

3.11 Study Procedure

A prospective cohort study was undertaken. A convenient sample of 152 pregnant women at 28 or greater completed weeks of gestation who meet the inclusion criteria were identified.138 consented and were recruited. Study participants were followed up from time of induction till delivery.

Once selected for the study, each participant completed the process of informed consent and signed the consent form. Data was collected using a face to face interview.Relevant maternal history and demographic data was collected using pretested questionnaire by interviewer administered approach and a check list intergrated into the questionnaire used to collect data regarding the induction process through observation and document reviews . A thorough physical examination (including body mass index calculation and obstetric examination) was performed including assessment for Bishop score, women who had their Bishop score <6 had their cervix ripened and the induction procedure started by the clinician on duty.

The hospital induction protocol was followed strictly. Intrapartum management of the patient was done by the clinician on duty and patients sent to the postnatal ward once delivered.

There the principal investigator and research assistants followed them up and consolidated information on delivery outcomes on a predesigned checklist. Those who failed to enter into labour or will not deliver within 24hours of completing the induction process were followed up every day to evaluate their subsequent management, until delivery (casearean section or otherwise) and routine postnatal follow up done.

The information from the maternity booklet, induction chart, and delivery records was used to help with the study. STATA version 14.2 was used for an analysis to evaluate research characteristics linked to unsuccessful induction.

Information pamphlets explaining the the study benefits were given to study participants in both Lusoga and English. Written informed consent was acquired, and individuals who chose not to participate were not penalized but rather excluded.

Confidentiality concerns were addressed with the participants, and each consent form had written information. The Jinja Regional Referral Hospital Institutional Ethics Board, Bishop Stuart University's Institutional Research and Ethics Committee (IREC), and the Medical Research Council of Uganda were consulted for ethical approval.

3.12 Data presentation and analysis

Data from questionnaires was entered into Microsoft excel version 2010 and then transported to STATA version 14.2. Data analysis and presentation was carried out according to specific objectives.

3.12.1 Objective One: Incidence fIOL was presented as a percentage.

3.12.2 Objective Two: Using binary logistic regression, socio-demographic and obstetrics parameters related to failure of induction of labor was evaluated. Performance of both a bivariate and a multivariate logistic regression analysis was done. The significance of the relationship between the variables was established by computing the chi-square test then biologically plausible variables and those with a p-value less than 0.2 were considered for multivariate analysis. A significance level of 5% was used and a p-value less than 0.05 indicated as statiscally significant association between the variables. The odds ratios (ORs), with associated 95% CI and p-value, was used to report the association's strength. STATA version 14.2 was used for all statistical studies.

3.12.3 Objective Three: correlation between duration of latent phase and preinduction bishop score among women who had successful induction at Jinja Regional Referral Hospital was presented in linear regression model using Pearson correlation.

3.13 Study limitations and delimitations

Only the expectant mothers present at the time of data collection was accessible to us.

Obstetrical complication other than known recognized criteria for failed induction of labor was not used to determine fIOL as described in the study.

The study was be a single center experience using a non-randomised study design.

Sample size was small and study carried in an urban environment so the results cannot be generalized.

3.14 Quality control

The inclusion and exclusion criteria was strictly followed. A structured questionnaire which consisted of 2 sections was prepared in English and translated into Lusoga. Data collectors were trained regarding purpose of study, data collection procedures and data handling. A pretest was conducted on 11 mothers (5% of total sample) to ensure validity of the tool and corrections made before actual data collection.

The principal investigator checked on the spot and reviewed the questionanaires for completeness and consistency of information and immediate action taken accordingly. Double entry of data was done in Microsoft excel and consistency of entered data cross-checked

3.15 Ethical consideration

3.15.1 Informed consent and autonomy for participants

A signed informed consent was obtained before any voluntary recruitment takes place. Participants' informed consent was sought after being properly briefed on the study's specifics in both English and their native languages (copy attached at Appendices III and IV). Participants who chose not to enroll themselves were not be required to do so. Participants were free to leave the study whenever they want, without being forced or having their right to care violated.

3.15.2 Risks and adverse events to study participants

Since the study closely followed the eligibility requirements and appropriate doses, it was not anticipated that consumers will be exposed to serious risks. The work was done in conformity with the Declaration of Helsinki, the World Medical Association's code of ethics for research involving human subjects.

3.15.3 Benefits of the research

The participants had close monitoring and appropriate management during the study. Upon completion of the study, the findings will guide stakeholders in formulating guidelines and policies basing on the evidence and recommendations from the study.

3.15.4 Privacy and Confidentiality

Numerical codes was used to identify the participants. For reasons of privacy and confidentiality, information about respondents was kept secret throughout the research process. There was careful adherence to the respondents' rights and fair treatment, minimizing any injury and inconvenience to them. No participant's name was made public, and all identifiers were erased from the data before release.

3.15.5 Criteria for Selection of Participants

To find participants for the study, a consecutive random sampling approach was employed. The eligibility requirements was carefully followed. There was no any bias expressed regarding a person's race, ethnicity, or religion.

3.15.6 Incentives and Reimbursement

The participants received no financial or other kind of incentive, although where appropriate, they were compensated and reimbursed for whatever money they had to spend in order to participate in the study.

3.15.7 Approval Procedure

The department of obstetrics and gynecology, the faculty and postgraduate directorate, and lastly the Bishop Stuart University Research Ethics Committee (BSU-REC) gave their approval before the study could be carried out (KIU-REC). The work was registered with the Uganda National Council for Science and Technology (UNCST) after receiving approval from the BSU-REC. Prior to collecting data, the UNCST certificate was given to JRRH to obtain their authorization to carry out the study in the study site.

3.15.8 Respect for community

The methods used in this study did not conflict with the customs, traditions, or culture of the surrounding area. In order for the community to benefit, the study's results was shared with the heads of the obstetrics and gynecology departments of JRRH as well as the offices of the district health officers in Jinja.

3.16 Dissemination

The findings of this study will be presented to the obstetrics and gynecology departments of JRRH, as well as the offices of the district health officers for Jinja districts, in formal feedback. A copy will also be published in a peer-reviewed academic journal.

CHAPTER FOUR

RESULTS

4.0: Study profile

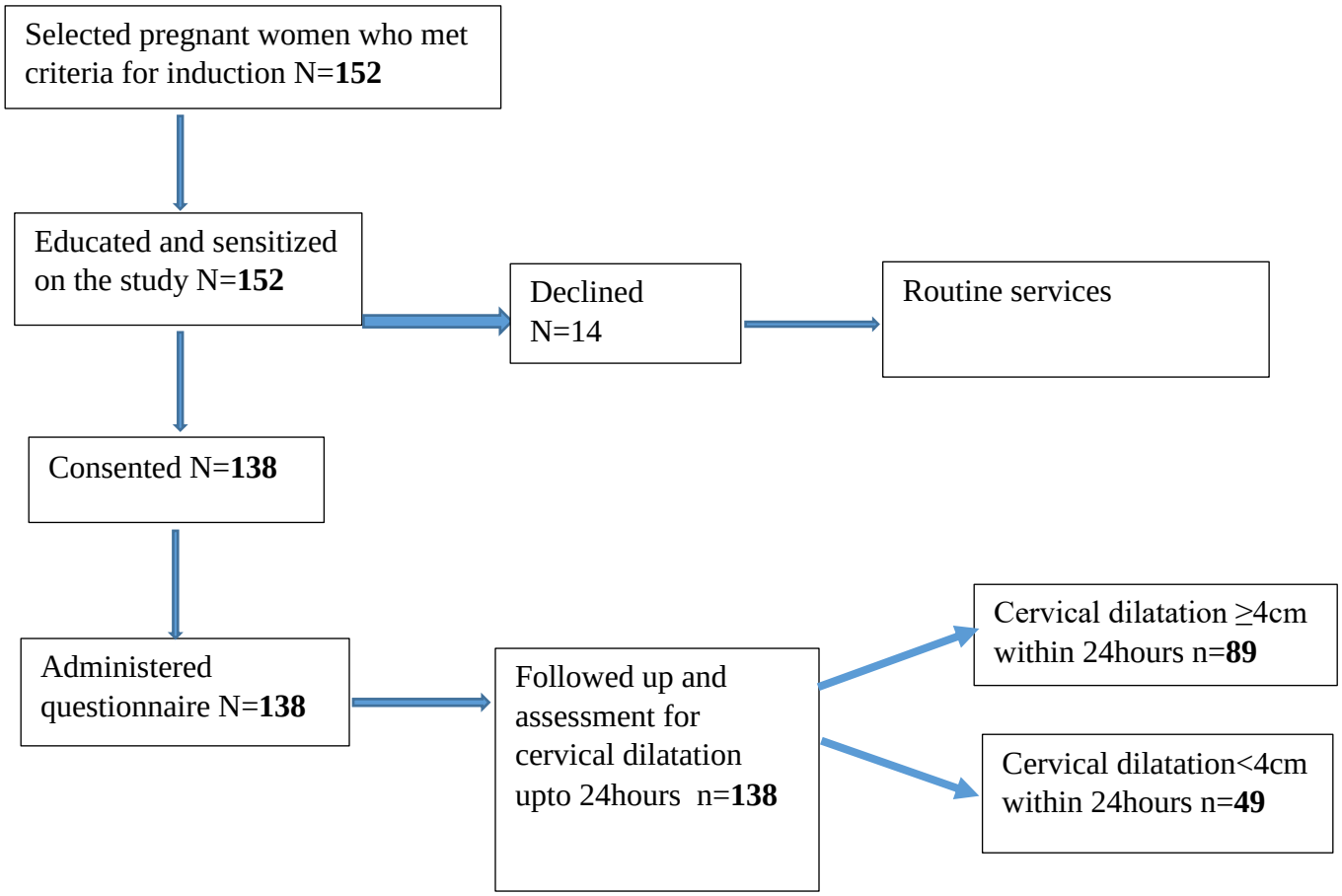


Figure 3: Study profile

4.1 Descriptive statistics of socio-demographic characteristics of study participants

Variable	Category		
		Frequency (N=138)	Percent (%)
Age	<20	12	8.70
	20-25	54	39.13
	25-30	34	24.64
	>30	38	27.54
Marital status	Single	25	10.14
	Married	113	89.86
Religion	Christian	116	84.06
	Muslim	22	15.94
Education level	No formal education	6	4.35
	Primary	81	58.70
	Secondary	31	22.46
	Tertiary	20	14.49
Employment	Unemployed	42	30.43
	Business	30	21.74
	Informal	49	35.51
	Formal	17	12.32
Residence	Rural	59	42.75
	Urban	79	57.25

Table 1: Socio-demographic characteristics of study participants

Table 1 summarizes the socio-demographic characteristics of study participants. After performing necessary inclusion and exclusions, a total of 138 women met the inclusion criteria. The mean age of the mothers was 26.48 ±5.98 years with the majority being between ages 20 and 24 years (39.13%). This provides insight into the spread of ages and suggests that most participants were in their twenties, with a smaller number falling outside this range .About 58.7% had primary education and most participants were married at 89.86%. Regarding womens' place of residence 57.25% were from urban areas. The highest number at 35.51% were informally employed and 84.06% identified as christians

4.2: Descriptive statistics of obstetrics characteristics of study participants

Variable	category		
Obstetric characteristics		**Frequency (N=138)**	**Percent (%)**
Gestational Age	<37 weeks	72	52.17
	37-40weeks	42	30.43
	40weeks and above	24	17.39
Parity	Nullipara	57	41.30
	Multipara	81	58.70
Pre induction Bishop score	<6	48	34.78
	≥6	90	65.78
BMI	<30 kg/m2	113	81.88
	30 kg/m2	25	18.12
Birth-weght	<3.5kg	118	85.51
	≥ 3.5kg	20	14.49
ANC visits	<2	9	6.52
	2-4	102	73.91
	>4	27	19.57
Indications for induction	HDIP	46	33.33
	PROM	31	24.46
	Postterm	19	13.77
	IUFD	18	13.04
	Others	24	17.39

Table 2: Obstetrics characteristics of study participants

Table 2 summarizes the Obstetrics characteristics of study participants. Among the 138 women who underwent induction, 58.7% were multiparous. The mean gestational age was 36.53 ±3.60 weeks with the commonest gestational age range being <37weeks (52.17%). With respect to BMI was 25.86 ±4.67 kg/m2 with majority 81.88% had their BMI <30 kg/m2. Most women had a newborn weight of <3.5kg (85.51%) and the mean BWT was 2.83 ± 0.75kg. The mean for ANC visits was 3.87 ± 1.51 with majority of 73.91% attending between 2 and 4 visits.

The institution uses misoprostol frequently for induction of labor. The most common indication for induction was hypertensive disorders in pregnancy at 33.33%. Majority of the women had their preinduction Bishop's score ≥ 6 (65.78%)

4.3: Incidence Of Failed Induction Of Labor In Women Delivering At Jinja Regional Referral Hospital

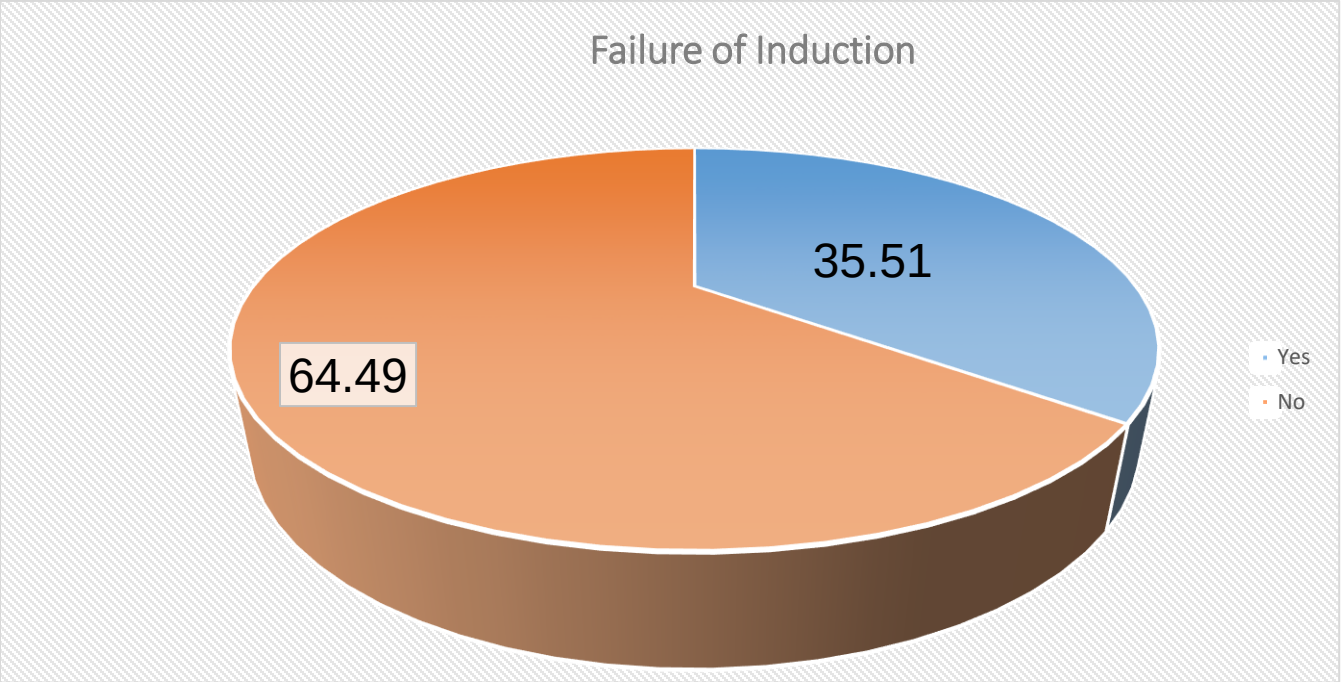


Figure 4: Pie-chart showing incidence of failed induction of labor

Among the 138 total mothers induced 89 (64.49%) achieved a cervical dilation of 4cm within 24hours and 49 (35.51%) did not, experiencing failure in IOL intervention. Therefore the incidence of failed induction of labor is 35.51%, with a 95% Cl (0.27-0.44).

These findings suggest that a significant proportion of women who underwent induction of labor at Jinja RRH had failure of the intervention, and the confidence interval help to estimate the precision of these prevalence estimates.

4.4: Bivariate analysis of factors associated with failed induction of labor

		Failed induction					
		YES		NO			
Variable	Category	n=49	%	n=89	%	**cOR (95% CI)**	**p-value**
Parity	**Multipara**	**23**	**28.40**	**58**	**71.60**	**Ref**	
	Nullipara	26	45.61	31	54.39	2.11 (1.04-4.30)	0.039
BMI	**<30**	**34**	**30.09**	**79**	**69.91**	**Ref**	
	30 and above	15	60.00	10	40.00	3.49 (1.42-8.53)	0.006
Gestational age	**<37 weeks**	**22**	**30.50**	**50**	**69.94**	**Ref**	
	37-40weeks	19	45.24	23	54.76	1.18 (0.85-4.12)	0.117
	≥41 weeks	8	33.33	16	66.67	1.14 (0.42-3.05	0.779
Indications for induction	**HDIP**	**21**	**45.54**	**25**	**54.76**	**Ref**	
	PROM	8	25.81	23	74.19	0.41 (0.15-1.12)	0.081
	Others	20	32.79	41	67.21	0.95 (0.15-6.09)	0.177
Age	**<20years**	**7**	**58.33**	**89**	**41.67**	**Ref**	**Ref**
	20-24years	22	40.74	32	59.26	0.49 (0.14-1.75)	0.770
	25-29years	5	14.71	29	85.29	0.12 (0.28-0.55)	0.891
	≥30years	15	39.47	23	60.53	0.47(0.44-0.41)	
BWT	**<3.5kg**	**35**	**29.66**	**83**	**70.34**	**Ref**	
	≥3.5	14	70.00	6	30.00	5.53 (1.97-15.17)	0.001
Preinduction Bishop Score	**≥6**	**19**	**21.11**	**71**	**78.99**	**Ref**	
	<6	30	62.50	18	37.50	6.23 (2.87-13.49)	0.000

Table 3: Bivariate Analysis Of Factors Associated With Failed Induction of labor.

Table 4 shows bivariate analysis of obstetric factors with cOR, 95% CI and P-values. Statistically significant factors were 4: Parity cOR (95% CI), 2.11 (1.04-4.30) and P value=0.039; BMI cOR (95% CI), 3.49 (1.42-8.53) and P-value=0.006;Birth Weight cOR (95%CI) 5.53(1.97-15.17), P-value=0.001; Pre-induction Bishop score cOR (95% CI) 6.23 (2.87-13.49) and P-value 0.000. Age, Gestational age and indication for induction were not statistically significant. All factor with P-value <0.2 including non-significant factors were considered for multivariate analysis.

4.5: Multivariate analysis of factors associated with failure of induction

Characteristic		Crude Analysis		Adjusted Analysis	
		cOR (95% CI)	P	aOR (95% CI)	P
Variable	Category				
Parity	**Multipara**	**Ref**		**Ref**	
	Nullipara	2.11 (1.04-4.300	<0.001	2.26 (1.01-5.06)	0.049
BMI	**<30**	**Ref**		**Ref**	
	30 above	3.49 (1.42-8.53)	0.006	2.67 (0.91-7.15)	0.051
Pre-induction Bishop Score	**≥6**	**Ref**		**Ref**	
	<6	6.23 (2.87-13.49)	0.000	4.82 (2.14-10.87)	0.000
BWT	**<3.5kg**	**Ref**		**Ref**	
	≥3.5kg	5.53 (1.97-15.57)	0.001	2.60 (0.76-8.98)	0.130

Table 4: Multivariate Analysis Of Factors Associated With Failure Of Induction

The table 5 displays the results from multivariable regression from association between failed IOL and its predictors, the variables were parity, BMI, birth weight and preinduction Bishop Score.

In adjusted analysis women who were nulliparous with (aOR:2.26; 95% CI:1.01-5.06; P value=0.049), were statistically significant compared to the reference group, the multiparous.They were seen to have twice increased risk of failing in induction of labor. This reinforces the substantial association.

We found a strong association between the pre-induction Bishop score and fIOL. Participants who had a score of <6 had a more likelihood of failing induction of labor as an intervention. Specifically Bishop score <6 with adjusted analysis of (aOR: 4.82 ; 95%CI:2.14-10.87; P-value=0.000) was associated with 5 times increased risk of fIOL compared with reference values of ≥6.

4.4 Correlation between duration of latent phase and preinduction Bishop score in successful induction

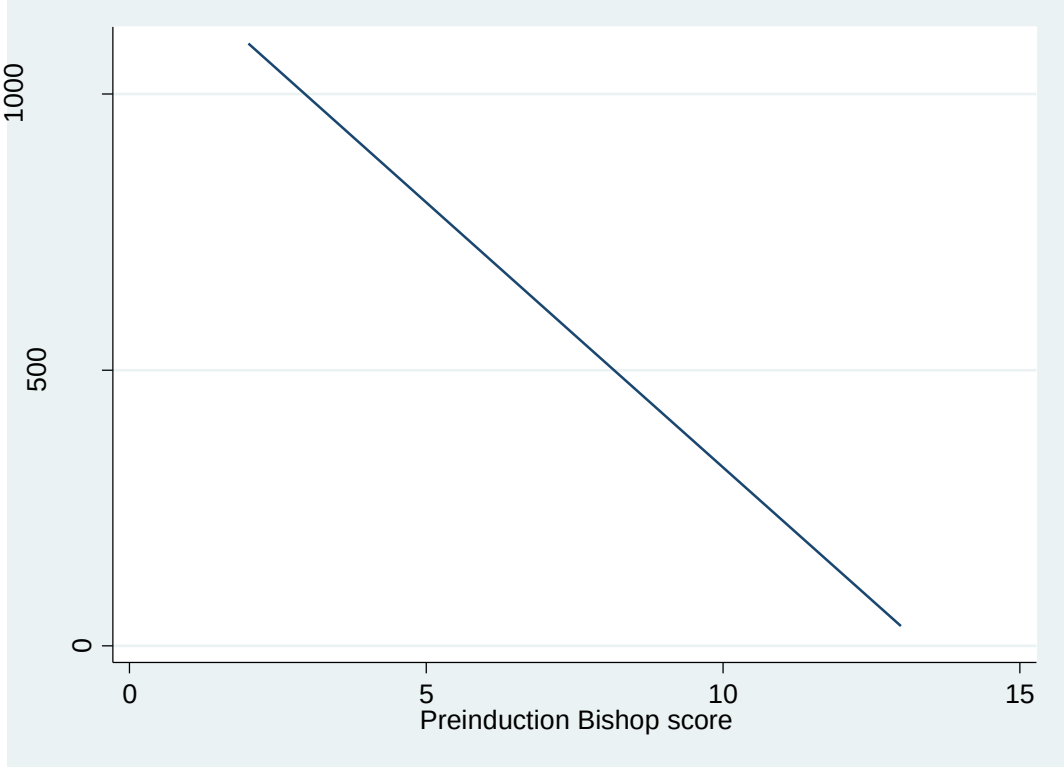


Figure 5: Bar graph showing correlation between duration of latent phase and preinduction Bishop score

From the above figure, increasing bishop score was associated with a shorter time to achieving a 4cm cervical dilation, with a strongly negative correlation (Pearson correlation of -0.804) by a linear regression model.

CHAPTER FIVE

DISCUSSIONS, CONCLUSION AND RECOMMENDATIONS

5.1 Discussion

5.1.1 Incidence of failed induction of labor

The study has found the incidence of failed induction of labor in women delivering at Jinja Regional Referral Hospital to be 35.51%. This is consistent with incidence range of 38% of a study done in Kenyatta National Hospital, Kenya (Masan, 2013),equally it's in line with the pooled incidence of a WHO study report in eight Latin American countries at 30% (WHO, 2010) and a result in Kathmandu Medical College at 34.6%. (Pushpa, 2020)

However it is higher than than that carried out in Mbarara Regional Referral Hospital, Western Uganda 22.7% (Kajabwangu, 2021), a study conducted at Harare Maternity Hospital at 11% (Mateveke, 2015) another one in Northern Tanzania at 19% (Tarimo, 2019). This variance may be explained by differences in selection criteria in which the study defined failure of induction only if the mother failed to achieve active phase of labor within 12hours in Mbarara RRH study; and differences in the study design coupled with sample size in Harare and Tanzania study respectively. Further, in this study it could be explained by the fact that definition of failed induction was very restrictive to cervical dilation rather than delivery by cesarean section in comparison to Tanzania and Harare study.

Similarly, the magnitude of failed IOL found in this study is higher than that done in Jimma University Specialized Hospital at 21.4% (Mulualem, 2020) and Dessie Referral hospital (Mulualem, 2020). This is can be attributed to discrepancy in study settings and variations in methods used for inductions including combinations methods with ARM and oxytocin in the mentioned studies while misoprostol was the commonest and only induction method used in the institution of study.

Some 11 mothers among the 49 that were considered failed induction had repeat induction with administration of misoprostol done using a different route depending with the initial route of administration. Among these only 3 (36%) managed to deliver vaginally but were still included among those who failed the intervention.

Apart from the 3 that delivered after repeat induction most of the women who failed induction were delivered by cesarean section. Among the 89 who were considered successful, 5 were delivered by cesarean section for obstetric reasons including 3 for non reassuring fetal status and 2 for poor progress of labor. This resulted in a cesarean section rate of 36.23% among the women that had undergone induction of labor. Of note, the time for cervical ripening was included in calculating the length of induction and hence diagnosis of failed induction of labor.

5.1.3 Factors associated with failed induction of labor

Factors associated with failed induction of labor can provide a valuable insight as a determinant of probability of success in induction of labor. Health care providers should review and document these factors to identify the risk groups. In this study parity and pre-induction Bishop score were found to be independent predictors of fIOL.

5.1.3.1 Parity

The findings in this study shows that nulliparous women were twice are at increased proportion and more at increased risk of fIOL compared to multiparous women (aOR=2.11). This is comparable to previous studies aOR=2.34 (Kajabwangu, 2021), aOR=1.79 (Tarimo, 2019), aOR=1.5 (Tadese, 2022). This may be due to the fact that nulliparous pre-induction cervical status is unfavourable and immature due to a lack of labor experience, as a result achieving appropriate rate of cervical collagen fibre dissolution takes longer leading to inadequate cervical stimulation compared to multiparous who have previous exposure, therefore they respond poorly to ripening methods. Similarly, increased parity increases myometrial sensitivity and contractility hence the uterine muscle of multiparous women is more receptive to oxytocin and easily stimulates and contracts.

5.1.3.2 Pre-induction Bishop score

In the final model of multivariate analysis, fIOL increased in women with low pre-induction Bishop score.

This finding is consistent with previous findings in studies conducted in Uganda (Kajabwangu, 2021), Ethiopia (Tadese, 2022), Tikrit Ciry (Sulaiman e. a., 2020) and (Mateveke, 2015). This might be attributed to the fact that the cervical status is a fundamental parameter in Bishop score. In low Bishop score the cervix is in unfavourable state which increases the likelihood of induction

failure. Most studies have found significant correlation between pre-induction Bishop Score and achievement of 4cm cervical dilation.

5.1.2 Correlation between duration of latent phase and Preinduction Bishop score in successful inductions

A linear relationship was found between duration of latent phases and pre-induction Bishop score in successful induction of labor. In our findings the mean duration of latent phase of labor, defined as interval from initiation of induction with misoprostol to cervical dilation of 4cm in women who had successful induction was 9.76 hours. This was consistent with a study done in Ethiopia mean 12hours and Uganda 12hours (Kajabwangu, 2021)

However it was uncomprable to a study done in Karachi (Pushpa, 2020)the mean duration of latent phase 16.0±4.7 and a study done in Harare 14.7hours hours (Mateveke, 2015). This might be attributed to sample size and geographical variations.

It was concluded that continuation of misoprostol administration for women who had not achieved atleast a 4cm cervical dilation was not unreasonable, but the benefit was unclear.

Further with a Pearson correlation of -0.804 indicates that women with lower Bishop scores required a significant amount of time to attain cervical dilation of 4cm.

5.2 Study Strength

Use of cervical dilatation as a measure of successful induction.

It was a prospective cohort study.

5.3 Study Limitations

The study period was limited , single centre experience and non randomized study design.

The study was carried out in urban setting

5.4 Conclusion

- The incidence of failed IOL is high at 35.51%.It indicates significant burden especially in resource limited settings like Jinja RRH.
- Factors significantly associatesd with increased likelihood for fIOL included Parity and pre-induction Bishop score.
- There is a negative linear relationship between latent phase and pre-induction Bishop Score in successful induction of labor.

5.5 Recommendations

- Combination methods of induction such as oxytocin and Arttificial Rupture of Membrane (ARM) should be employed during the labor induction process to improve outcome.
- Review the execution of IOL services taking into consideration parity and pre-induction Bishop Score that highly predicts failure before performing IOL and eventually be in a position to prepare for emergency.
- Pre-induction cervical assessment in the setting of induction with misoprostol is necessary as a guide to duration of latent phase even though misoprostol does induce cervical ripening and uterine contractions.

REFERENCES

Abboud, C. J. (2017). Elective induction of labor (1955) by Edward Bishop.

Abdusalam, Z. (2021). Induction of Labor Using Vaginal Misoprostol or Combined with Intracervical Foley Catheter. *The Egyptian Journal of Hospital Medicine*, Vol. (85) Pg. 3125-3129.

Cunningham, F. G. (2022). Induction and Augmentation Of Labor. In *Williams Obstetrics 26th Edition* (pp. 491-492).

Debelo, B. T. (2022). The magnitude of failed induction and associated factors among women admitted to Adama Hospital Medical college: A crosssectional study. *10.1371/Journal.pone.0262256*.

Drife, J. O. (2012). The History of Labor induction: How did we get here?

Drife, J. O. (2021). The History Of Labor Induction: How did we get here?

Hertog, E. C. (2015). History of use of oxytocics.

Kajabwangu, R. (2021). Factors associated with dlayed onset of active labor induction with vaginal misoprostol. *Vol 153, Issue 2*, 268-.

Kamlungkea, T. (2022). Factors predicting successful vaginal delivery following induction of labor at term. *Free PMC article*.

Masan, J. (2013). Outcome of induction of labor in Women who delivered at Kenyatta National Hospital.

Mateveke, B. (2015). Factors associated with failed induction of labor in patients undergoing induction of labor vaginal misoprostol at Harare maternity hospital. *American Research Journal of Gynecology*, Vol. 1, Issue 1.

maveteke. (n.d.).

Mebratu, A. (2022). Faileed induction of labor and associated factors amomg women delivered at Jigjiga University Sheikh Hassan Yabare Referral Hospital:. *Current medical research and opinion article ST-0020R2/2103959*.

Mitchell, P. H. (1998). Quality Health Outcome Model. *Journal of Nursing Scholarship*, 43-46.

Muhdin, M. (2022). Prevalence and factors associated with failed induction of labor in Warabe Comprehensive Specialized Hospital, Southern Ethiopia.

Mulualem, T. D. (2020). Incidences of Cesarean delivery after induction of labor with intravenous oxytocin drip among women undergoing induction of labor at Dessie Referral Hospital, North East Ethiopia. *International Journal of Scientific Report*, p/SSn 2454-2156/eISSN 2454-2164.

Shrestha, D. B. (2019). Prevalence and outcome of induction in a tertiary Care Centre Of kathmandu, Nepal. *Nep. J Obstet Gynecol* , 54-56.

Tarimo, C. S. (2019). prevalence and Predictors of failure in labor induction among pregnant women delivered in Northern Tanzania. *Open access Journal*.

WHO. (2010). *WHO recommendation for induction of labor.*

APPENDICES

APPENDIX I: WORK PLAN

Month → / Task ↓	Jan-Feb 2023	March 2023	April 2023	May 2023	June 2023	July 2023	Aug 2023	Sept 2023	Oct 2023	Nov 2023	Dec 2023
Concept development	■										
Proposal writing		■	■								
Proposal Approval				■							
Data collection					■	■					
Data analysis							■				
Report writing								■	■	■	
Submission of dissertation											■

APPENDIX II: BUDGET

S/N	Item	Quantity	Unit Cost (Ushs)	Total Cost (Ushs)	Comment
1	Internet	6GB	1	50,000	For Proposal development
2	Printing Proposal	25	6,000	150,000	Includes printing and binding
3	Pre-Testing	30	1,200	36,000	Print Questionnaires
4	Questionnaires	142	1,200	170,400	Data collection
5	Consent forms	142	700	99,400	Data collection
6	Punching Machine	1	20,000	20,000	Organising Questionnaires
7	Paper Stapler	1	15,000	15,000	For stapling questionnaires
8	Stapling wires	3	3,000	9,000	3 Boxes of stapling wires
9	Stapler remover	1	8,000	8,000	For removing staples
10	Box Files	5	5,000	25000	For keeping filled questionnaires
11	Paper bags	5	1,000	5000	For water proof storage
12	Pens	1	15,000	15000	1 Box of blue pens
14	Research assistants	3	150,000	450000	Data collection
15	Printing Thesis	14	12,000	168000	Includes printing and binding
16	Publication	1	500,000	500000	For submission for peer review
17	Contingency			461,500	For emergency or underestimates
	Grand Total			**2,182,300**	

APPENDIX III: INFORMED CONSENT DOCUMENT (English Version)



KAMPALA INTERNATIONAL UNIVERSITY (KIU) WESTERN CAMPUS (WC)
RESEARCH ETHICS COMMITTEE (REC)
PO Box 71, Bushenyi, Uganda; Tel: +256 758 096 775
E-mail: kiurec2017@kiu.ac.ug; Website: www.kiu.ac.ug

INFORMED CONSENT DOCUMENT

PART 1: CONSENT FOR STUDY

Study Title: Incidence and Factors Associated with Failed Induction of Labor in women delivered at Jinja Regional Referral Hospital.

Principal Investigator(s): Dr. Ephraim Oluoch Onanga is a postgraduate student in the Department of Obstetrics and Gynecology at Kampala International University Teaching Hospital.

Qualifications: Bachelor of Medicine and Bachelor of Surgery (Moi University – Kenya).

INTRODUCTION

What you should know about this study:

- You are being asked to join a research study.
- This consent form explains the research study and your part in the study.
- Please read it thoroughly and take as much time as you require.
- You are a volunteer. If you do not want to participate in the study or decide to withdraw in the middle of it, you will not lose any benefits to which you are entitled.

Leave blank (for REC Office only):	**For REC Office use only:**
NAME OF REC CHAIR: TELEPHONE: KIU REC STAMP:	APPROVAL DATE: APPROVED CONSENT REC VERSION NUMBER: PI's NAME: REC NO:

Version: One

Brief background to the study

Induction of labor is the artificial stimulation of uterine contractions with the intention to achieve delivery of the fetus. This is done by health workers in the hospital using drugs or other means which do not involve use of drugs. Failed induction of labor is when a mother fails to deliver vaginally due to various reasons after the induction process is attempted. Failed induction of labor is on the increase and this study attempts to determine the magnitude of failed induction of labor and assess the various reasons including the maternal and fetal attributes that can contribute to failed induction of labor. This will enable clinicians to better counsel mothers undergoing induction of labor and offer them best mode of delivery.

.

Purpose of the research project:

Generally, the proportion of induced deliveries is increasing steadily among referral hospitals of Uganda. However, there is limited information regarding the failure rates of this important obstetric intervention. Factors that are associated with failure rate have also not been well documented.

The purpose of this project is to assess and provide this vital information to practicing clinicians as it may help to understand some maternal and fetal characteristics that contribute to failure in labor induction and thereby provide women with timely alternative modes of delivery. This may reduce morbidities and mortalities related to emergency cesarean deliveries following induction of labor.

Why you are being asked to participate:

You were chosen at random to participate because you meet the recruitment criteria for this study. All women who meet the inclusion criteria have been given an equal opportunity to participate in the study.

Leave blank (for REC Office only):	**For REC Office use only:**
NAME OF REC CHAIR: TELEPHONE: KIU REC STAMP:	APPROVAL DATE: APPROVED CONSENT REC VERSION NUMBER: PI' s NAME: REC NO:

Version: One

Procedures:

You will be informed about the study and its benefits, and your permission to participate in the study will be obtained. The principles of confidentiality and autonomy will be upheld. In case you accept to take part in this study, you will be requested to answer questions regarding the topic on an investigator structured questionnaire. You will also undergo induction of labor as necessary, managed accordingly and monitored using institution protocol.

Risks / discomforts:

We do not expect any other risks due to the study. You may experience labor pain associated with the process and may have discomfort and pain during the process of vaginal examination for giving the drugs and monitoring labor, during operation and postoperatively consequently. The study itself will take a few minutes of your time.

Benefits:

During the study, hospital protocol will be followed. You will also be monitored closely to avoid any complications. Results of this study may help to formulate polices at the institutional and government to guide labor induction as a way of enhancing quality of care.

Incentives / rewards for participating:

You will not be compensated for taking part in this study. Any form of recognition you receive should not be regarded as part of the research protocol.

Leave blank (for REC Office only):	**For REC Office use only:**
NAME OF REC CHAIR: TELEPHONE: KIU REC STAMP:	APPROVAL DATE: APPROVED CONSENT REC VERSION NUMBER: PI’ s NAME: REC NO:

Version: One

Protecting data confidentiality:
You are assured that any information given will not be linked to you directly and your personal details will not be shared with any person. These results shall not be disclosed to anyone without the consent of the research participant.

Protecting subject privacy during data collection:
Data shall be obtained from an enclosed place designated in the Maternity ward. We shall also ensure privacy is adhered to during physical examination and treatment administration.

Right to refuse / withdraw:
Your participation in the study is entirely voluntary, and failure to participate will result in no loss of benefits to which you are entitled.

What happens if you leave the study?
You are cordially invited to take part in the study. It is important to note that you have the right to accept or decline the offer, and that your refusal will not interfere with the services provided to you at Jinja Regional Referral Hospital.

Who do I ask/call if I have questions or a problem?
For any questions or problems, please contact the KIU REC Office at the following address:

The KIU REC Chair
P.o Box 71, Bushenyi
Mobile: +256-772601482
Office Tel: +256- 758 096 775
Email: kiurec@kiu.ac.ug

Leave blank (for REC Office only):	**For REC Office use only:**
NAME OF REC CHAIR: ***Dr. Patrick Mbyemeire***	APPROVAL DATE:
TELEPHONE:	APPROVED CONSENT REC VERSION NUMBER:
KIU REC STAMP:	PI' s NAME:
	REC NO:

Version: One

What does it signify if you sign (or thumbprint/mark) this consent form?

Your signature on this form indicates that:

- You have been informed about the purpose, procedures, potential benefits, and risks of this study.
- You have had the opportunity to ask questions before signing.
- You have voluntarily chosen to participate in this study.

……	……		……
Print name of participant	Signature of participant/legally authorized representative	Thumb print	Date
……	……		…….
Print name of person obtaining consent (Researcher)	Signature	Thumb print	Date
…….	……..		…….
Full names of witness	Signature or Thumb print of witness	Thumb print	Date

Leave blank (for REC Office only): NAME OF REC CHAIR: ***Dr. Patrick Mbyemeire*** TELEPHONE: KIU REC STAMP:	**For REC Office use only:** APPROVAL DATE: APPROVED CONSENT REC VERSION NUMBER: PI' s NAME: REC NO:

Version: One

APPENDIX IV: INFORMED CONSENT DOCUMENT (Lusoga version)

KAMPALA INTERNATIONAL UNIVERSITY (KIU) WESTERN CAMPUS (WC)
RESEARCH ETHICS COMMITTEE (REC)
PO Box 71, Bushenyi, Uganda; Tel: +256 758 096 775
E-mail: kiurec2017@kiu.ac.ug; Website: www.kiu.ac.ug

EKIWANDIKO EKYOLEKA NTI OMANISIIBWA MEGHEIKILIZA
EKITUNDU EKISOOKA : OKWIIKILIZA OMUSOMO

Omutwe Ogwomusomo: Obungi bwa bakazi abatekebwaku eyidagala lyebisa balemelerwa okuzaala mudwaliro eyikulu eyidinda

Omunooneleza Omukulu: Dr. Ephraim Oluoch Onanga omitikile alikukenkuka mubya obukyaala nebyabaana okukula munda ku ilwalilo elisomesa elya Kampala International University.

Obusomi: Diguli yabwa dokita (Moi University – olusaga olwebugwanduba).

OKWANDULA:
KYOLINA OKUTEGELA KUMUSOMO GUNO:

- Osabibwa okweyunga kumusomo ogwokunooneleza.
- Eno ebaluwa ekutegeeza me oikikize, einonola omusomo ogwokunooneleza nikyolina okukula mumusomo.
- Osabibwa okugisoma mubwiduvu ate otwale obwile bwonabwona bwewetaaga.
- Okola kyeyendere. Bwoba toyenda kweyunga mumusomo oba wosalawo oguvilamu wagati waagwo, toida kufirwa muganulo gwolina kufuna.

Leave blank (for REC Office only):	**For REC Office use only:**
NAME OF REC CHAIR: ***Dr. Patrick Mbyemeire***	APPROVAL DATE:
TELEPHONE: ***+256 772601482***	APPROVED CONSENT REC VERSION NUMBER:
	PI' s NAME:
KIU REC STAMP:	REC NO:

Version: One

Ebitontono ebigemagana kumusomo

Okukuuangawirizi okuzaala. Nakuletera ebisa munabaana nekigendhererwa kyo'kuzaala amwana. Kino kikolebwa omukozi muwebyobula mwedhaliro ngho.

Akozesha eidhagala oba engheri edhindhi edhitelaghisa eidhaghala. Okulemelerwa akutandika okulumwa ngha omukyala tusobwaire kusindhika lwengosa edhendhawulo.

Oluvainuma lwokwanghuwirizaku okuzaala ngha kuleibwa. Okulemererwa okwokwanghuwiriza okuzaala ngha kulikweyonghera no'kwendha akusoma ebiretera okulemererwa. okukwanghuwirizaku okuzaala no'kwekebeedha ensongha edhendowula nebikolwa byomukyala nomwana alimundha ebireta okulemererwa akwakwanghuwirizaku okuzaala.

Kino kisobezesha omusawa okutegeera bino ebikolwa byomukyala no'mwana alimundha okuwabula omukyala alimukwanghuwiribwaku okuzaala amuteeraghwo enghiri enunghi eyokuzala.

Omugaso ogwokunooneleza kuno:

Okutualiza aghalala ekitundhutundhu ekyenzaalo edhannghuwirizibwa kyeyonghiale mumadhwaliro amanene mu Uganda. Aye waliwo obumanirivu butono kubilemeseibwa abkgala okwekebedha nga balimabundha wabula ensongha edhighemaghana kukulemesebwa okwabakyala bakaali kutamubuwandike.

Walabula omulamwa ghwensongha enho gwa kurekebedha abkyala kyotaire nobubaka abakulu obubaghemaku. Buyambeku abasowa okutegheeraebighema kubakyal namabundha ghaibwe kino kiretera okulemesebwa mukwanngunyiza okulila nolwensongha eyo abakyala bafana emitendheira ejindha eghozaliramu. Kino kyikenheziza omwendho ghabakyala abaffa ngho balikutongosebwa mukwanghuyirizebwa okuzaala.

Leave blank (for REC Office only):	**For REC Office use only:**
NAME OF REC CHAIR: ***Dr. Patrick Mbyemeire***	APPROVAL DATE:
TELEPHONE: ***+256 772601482***	APPROVED CONSENT REC VERSION NUMBER:
	PI' s NAME:
KIU REC STAMP:	REC NO:

Version: One

Rwaki osabibwa okweyuga mumusomo:

Walondebwa kibwatukira okweyunga mumusomo kuba watuukiliza emitendera egyokulondebwa kulwo omusomo guno. Abakyaala bonabona abatuukiliza emitendera egyokuyungibwa mumusomo baweleibwa omukisa ogwagayaga okweyunga mumusomo.

Bwebinatabula:

Ogakuteghezebwa mukusoma emighaso egyemitendhera jino nolukusa okwenighira mukusoma oidhakutuna. Amatake ghokukuma ebyama ne'kitibwa ghajatukirizibwa. Bwokireza akwetaba mukusoma kuno ojasabibwa okwaramu okweibibuzo. Ogyakwetaba mukwanghuyiza ozaala nakubirira no'kughobirera no'kulabirira akusinzira kumateka.

Ebisobola okuleeta ebuzibu/ Ebiteteganya:

Abeyunze mumusomo beida kuwulila obulumi obutontono aga balikufumitibwa akapiso; aye engeli eyookutolebwaaku akasaayi eida kukolebwa n'obwikeikamu n'obukugu okukendeeza obuzibu bwobulumi n'okulwaala.

Emiganulo:

Abali muusomo beida kumanha omuwendogwa vitamin D gwebalina ne okubbibula oba okubba n'ebizimba byanabaana mukeire k'omusomo. Wekinazulibwa nti waliwo enkolagana ni vitamin D omutono mumubili, ebinaava mumusomo ne ebinasalibwaawo, webinateebwa munkola bekigemaku, biida kwongera kubwiidandabi bw'ebizimba byanabaana, ela kikendeze n'obirweire ebijiraku ne emiwendo ejaweigulu mukwiidanadabba ebizimba.

Leave blank (for REC Office only):	**For REC Office use only:**
NAME OF REC CHAIR: ***Dr. Patrick Mbyemeire***	APPROVAL DATE:
TELEPHONE: ***+256 772601482***	APPROVED CONSENT REC VERSION NUMBER:
	PI' s NAME:
KIU REC STAMP:	REC NO:

Version: One

Ebisikiliza / ebirabo kurwokwetabba:
Toja kuliyilibwa kulwakwetabba mumusomo guno. Kyoojofuna kyona kyona tikilina kutwalibwa nga ekitundu kunteeka teeka d'okunooneleza.

Obukuumi kukuzibira ebyaama:
Bamugumu nti byootukobye tibiida kuyungibwa kwiiwe,ela neebikugemaku tibiida kugabanibwa namuntu wundi. Awazira kugana kwoyo eyeyunze mumusomo, bino ebizuulibwa tibiida kwandulwa eli muntu wundi.

OBukuumi obweekyama kuyeyunze mumusomo nga ebimugemaku bilikusoloozebwa:
Ebigema kumuntu biida kusolozebwa mukifo ekigarwe awakubirwa ebifananye by'obutiivi n'ekifo awatukirwa abenda obwidandabi kubyensonga dekikyaala.

Eidembe okudeema/ okuvaamu:
Kyeyendere okweyunga mumusomo, n'obuteyunga mumusomo tikiida kuvaamu kufiirwa miganulo gyotekwa kufuna.

Ki ekituukawo bwoova mumusomo?
Oyanilizibwa okweyunga mumusomo. Kyamugaso okumanha nti oliweidembe okuganha oba okudeema, ate bwodeema tikiida kuteteganya buwereza bukuweebwa kumalwalilo ga Kampala International University agasomesebwaamu (Idhindha, Lira or Fort-Portal regional referral hospitals).

Leave blank (for REC Office only):	**For REC Office use only:**
NAME OF REC CHAIR: ***Dr. Patrick Mbyemeire***	APPROVAL DATE:
TELEPHONE: ***+256 772601482***	APPROVED CONSENT REC VERSION NUMBER:
	PI' s NAME:
KIU REC STAMP:	REC NO:

Version: One

APPENDIX V: INVESTIGATOR ADMINISTERED QUESTIONNAIRE(English Version)

Participant serial number _____ Date _____

Ethnicity _____

Residence _____

Telephone contact _____

Last Normal Monthly Period (LNMP)…… Expected Date of Delivery (EDD)…….

Weeks of Amenorrhea…….

Part A: Socio-demographic factors

1. Age in years _____
2. Height (cm) …….
3. Weight (kg) …….
4. BMI (kg/m$_2$) …….....

FOR THIS SECTION, TICK APPROPRIATELY ☑

5. Marital status:
   a. Married ☐
   b. Single ☐
   c. Divorced ☐

6. Occupation:
   a. Unemployed ☐
   b. Student ☐
   c. Informal ☐
   ☐

d. Formal

e. Business ☐

f. Others (specify) _____

7. Education:

a. Uneducated ☐

b. Primary ☐

c. Secondary ☐

d. Tertiary ☐

8. Religion:

a. Christian ☐

b. Muslim ☐

c. Traditionalist ☐

d. None ☐

e. Others (specify) _____

9. Social class

a. Low ☐

b. Middle ☐

c. High ☐

PART B: Assessing Obstetric factors

10. Gravidity ……..……

11. Parity ……..…….

12. ANC visits

a. Yes

b. No

If yes, how many times……

13. Gestational age……...
14. Mode of induction
    a) Mechanical
    b) Pharmacological
    - If pharmacological, dosage of the uterotonin……
15. Indication for induction……..
16. Symphysis-Fundal Length (cm)……..
17. Dating ultrasound if any…….....
18. Bishop score …….
19. Mode of delivery
    a) Vaginal
    b) Cesarean section

    If cesarean section, specify reason…….
20. Birth weight……
21. Duration of labor at delivery……
22. Duration of latent phase of labor……

Thanks for your time

APPENDIX VI: INVESTIGATOR ADMINISTERED QUESTIONNAIRE (Lusoga Version)

Namba yooyo eyeyunze mumusomo_____ Enaku d'omwezi_____

Ensibuko _____

jaabba _____

eisimu _____

Omwezi gwasemba okuja munsonga…… Olunaku olusuubilwa okuzaliraku …….

Wiiki endha dhe yakamala…….

Ekitundu A: Ebigema kumbeera d'omubantu nhi jaabba

1. Obukulu mumyaaka _____

KINO EKITUNDU, TA TIIKI WEGWANIRE ☐ ✓

2. Ebwo obufumbo:
    a. Ndi mufumbo ☐
    b. Mba zenka ☐
    c. twayawukana ☐
3. Omulimo:
    a. Nzira ☐
    b. Nsoma ☐
    c. Gwabataasoma ☐
    d. Gwabasoma ☐
    e. Busubuzi ☐

f. Gundi (oguliwa) _____

4. Obusomi:

a. Tyasoma ☐

b. Primary ☐

c. siniya ☐

d. byamikono ☐

5. Eidiini:

a. Bukulisitaayo ☐

b. Busiraami ☐

c. Bwabuwangwa ☐

d. Nzira ☐

e. Lindi (Eliliwa) _____

6. Bobaamu

a. Bawansi ☐

b. Bawagati ☐

c. Bakolowo ☐

PART B: Okwekebedha ensonga dha bakyala nga balimabundha

7. Wankafuna endha imeka …….……

8. Ndha imeka endhakaweza emyezi omusanvu ku dhewakafuna ……

9. Okukyaalaku mwidwalilo okunwa eidhagala lya mabunda

c. Nakyaalaku

d. Tikyaalangaku

Bwoba wakyaalaku, emilundi emeka……

10. Endha ya Mweezi emeka……...

c) Wakozesaku eidhagala lyekisoga

d) Bakukubye eidhagala lyekisoga

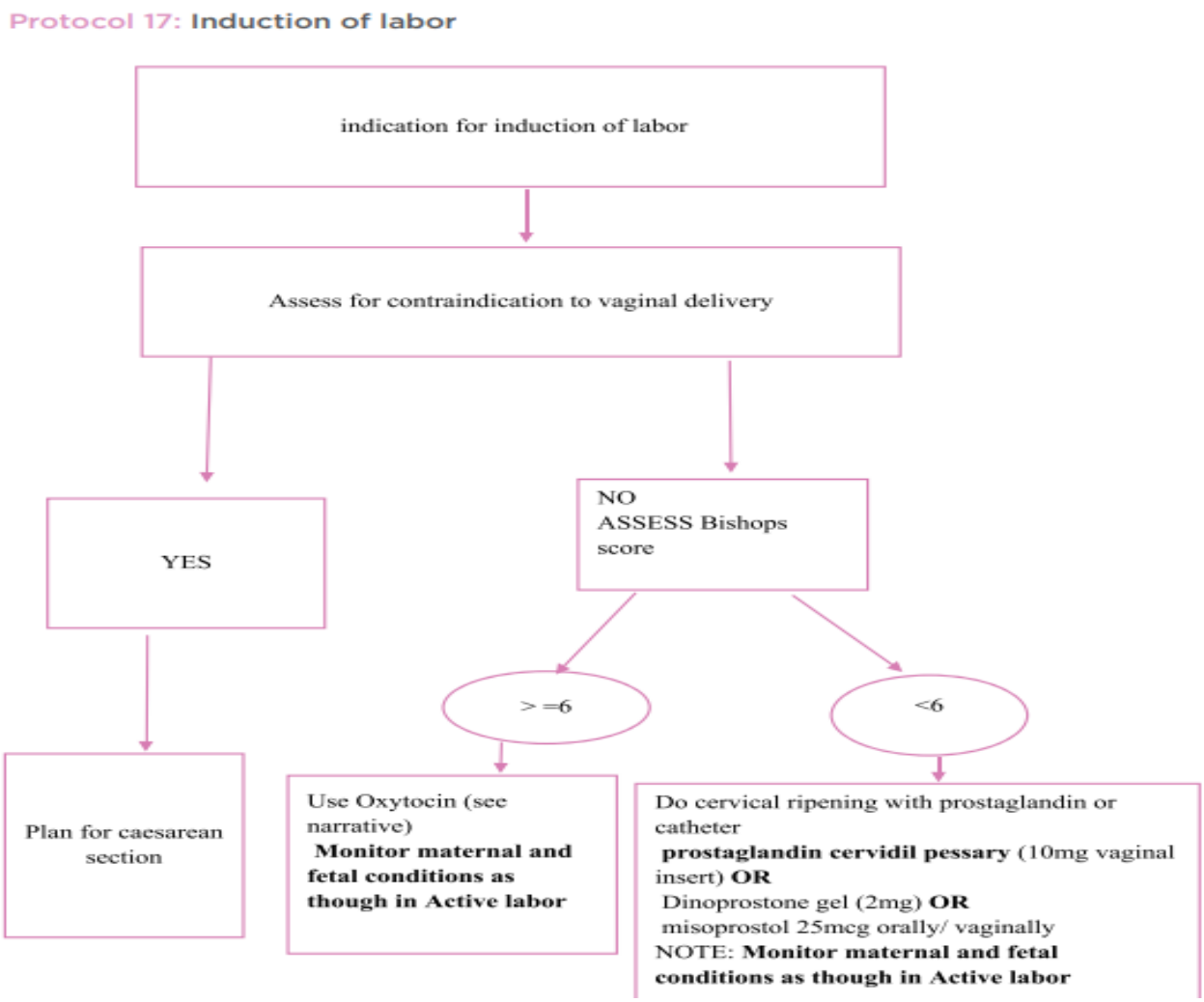
- Bwebabanga bakukubye, iyakigero kyi……

11. Ebituleela okutandika ebisa……..
12. Obuwanvu bwendha (cm)……..
13. Wakolaku sikani era wakumeka…….....
14. Okwiika kwo'mutwe gwo'mwana…….
15. Enghiri omwana ghazalibwamu
    c) Kusindhika
    d) Kulonghosa

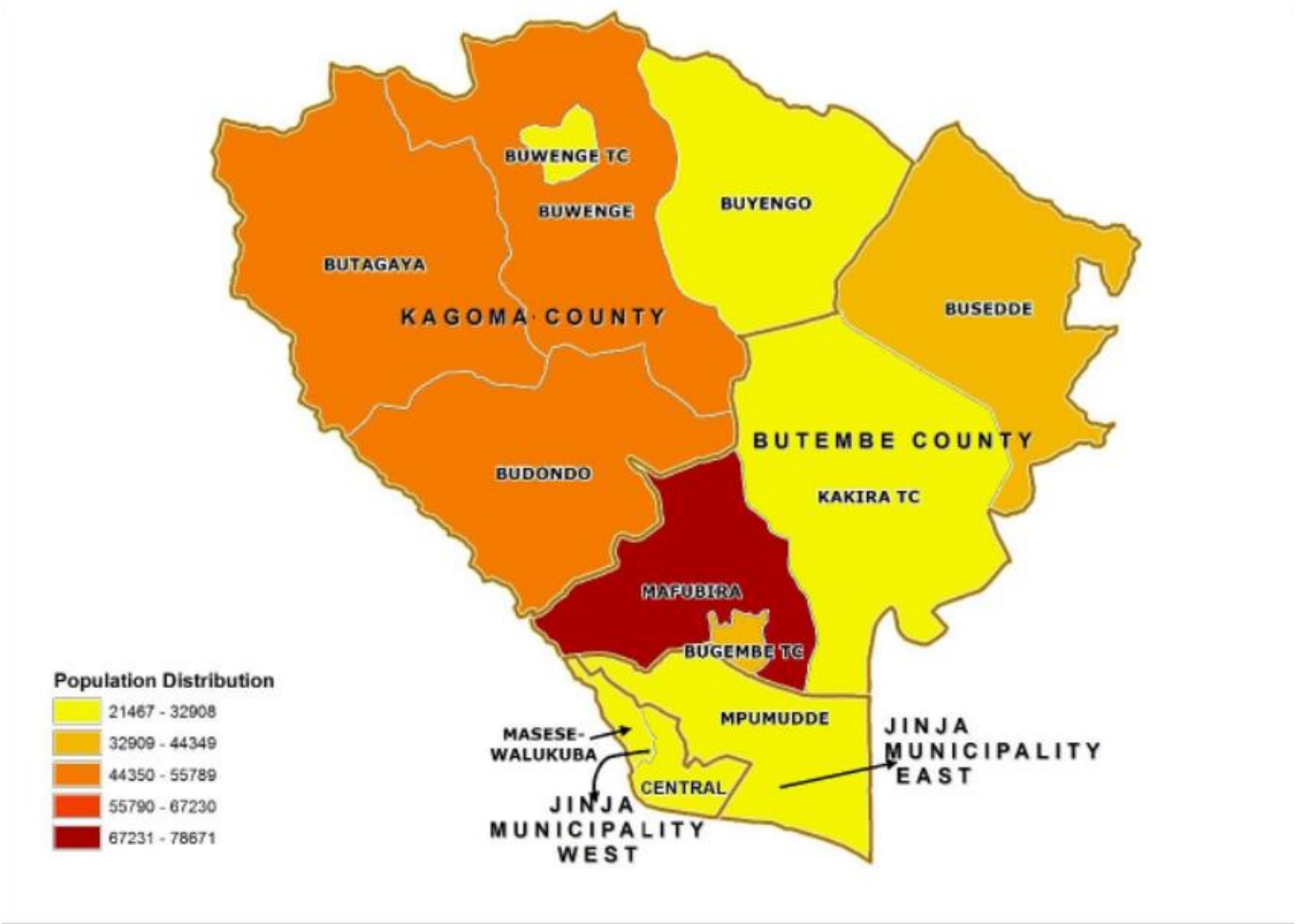
    Wekuba Kulonghosa, ensongha…….
16. Kilo dho mwana……
17. Ebiseera byokulumwa mukuzaala……
18. Ebiseera ngha okulumwa tikulija mumaiso……

Thanks for your time

APPENDIX VII: UGANDA INDUCTION OF LABOR PROTOCOL

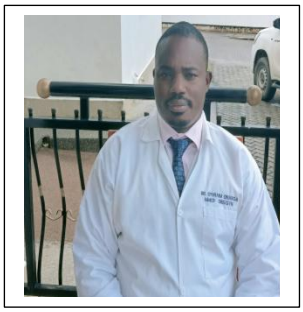


APPENDIX VIII: MAP OF JINJA DISTRICT



APPENDIX IX: CURRICULUM VITAE

A) Personal Information



Name: Ephraim Oluoch Onanga
Nationality: Kenyan
Date of Birth: 13.03.1983
Current Post: Resident
Contact: Kampala international university
Mobile: +254720896051
E-mail: onangash@gmail.com

Academic History

Institution	Degree	Completion Date	Field of study
Kampala International university-western Uganda	MMED Obstetrics and gynecology	Ongoing	Obstetrics and Gynecology
Moi University, School of Medicine	MBChB	December, 2011	Medicine and surgery
Sawagongo High School	Kenya Certifcate of Secondary Education	December 2001	English, Kiswahili, Mathematics, Chemistry, Biology, History, Geography, Economics
Lukong Luduha Primary School	Kenya Certificate Of Primary School	December 1997	English, Kiswahili, Mathematics, Geography, History, Civics, Arts & Craft, Music

B) Professional Background and Experience

Position	Year	Institution
Assistant Lecturer	April, 2021 -to date	Kampala International university
Medical Officer of Health	December, 2017-April, 2021	Rachuonyo North Subcounty.
Medical Officer of Health and Medical Superitendent	April, 2014-December, 2017	Rangwe Subcounty and Rangwe Subcounty Hospital respectively
Medical Officer	April, 2013-April, 2014	Homa-Bay County Referral Hospital
Intern Doctor	2012 April- April, 2013	Homa-Bay County Referral Hospital

I) Assistant lecturer, Kampala international university(summary of duty details):

- As Resident**;** teaching of medical undergraduates students both in classrooms and wards.
- Participate in research and scientific presentations.
- Participate in examination process of undergraduates(setting, conducting, marking and compiling results)
- Carry out clinical work of both out and in-patient management in the hospital.

II) Medical officer of Health(summary of duty details)

- Head of Subcounty Health Management team
- Principal signatory of Subcounty financial accounts
- Routine supervision of facilities in the Subcounty
- Coordinating health activities in the subcounty e.g health days, disease surveillance, reports, management of outbreaks.

III) Medical officer(summary of duty details)

- In charge of the facility including conducting meetings, regular performance assessment and relations with other facility.
- Providing holistic, ethical medical and surgical consultation services to patients including safe motherhood procedures and comprehensive emergency maternal and child health interventions.
- Routine patient management both out-patient and in-patient management.

IV) Medical Intern(summary of duty details)

- Working under the supervision of consultations in different medical disciplines in routine patient management.
- Providing Basic and essential medical diagnosis and treatment to the community.
- Participating in continuous medical education presentations within the hospital.

C) Trainings and Workshop attended

- **February 11th – March 16th ,2019**: Indoor Residual TOT training
- **10th – 14th October 2016**: Programme Based Budgeting in Health sector
- **13th- 17th October, 2015**: IMCI Case Management Training
- **1st -4th September,2015**: Certificate in Forensic Medical Assessment and Documentation
- **June 2015**: Certificate in Quality Improvement and MPDSR
- **June 2015**: certificate in monitoring and evaluation
- **22nd April**: Certificate in management of Cholera outbreak
- **15th -19th December, 2014**: Certificate in Health Communication
- **November, 2014**: Certificate in Emergency Obstetrics Care Neonatal Care
- **19th – 20th May, 2014**: Certificate in certification of Death
- **22nd-24th May, 2012**: Certificate in safe phlebotomy

D) Awards

- **1997:** 2nd Best pupil in Kenya Certificate of Secondary Education, Ugunja Division.
- **2001: 2nd Best Student in Mock Exams,Siaya District.**
- 2001: Best student in Kenya Certificate of Secondary Education, Sawagongo High School.

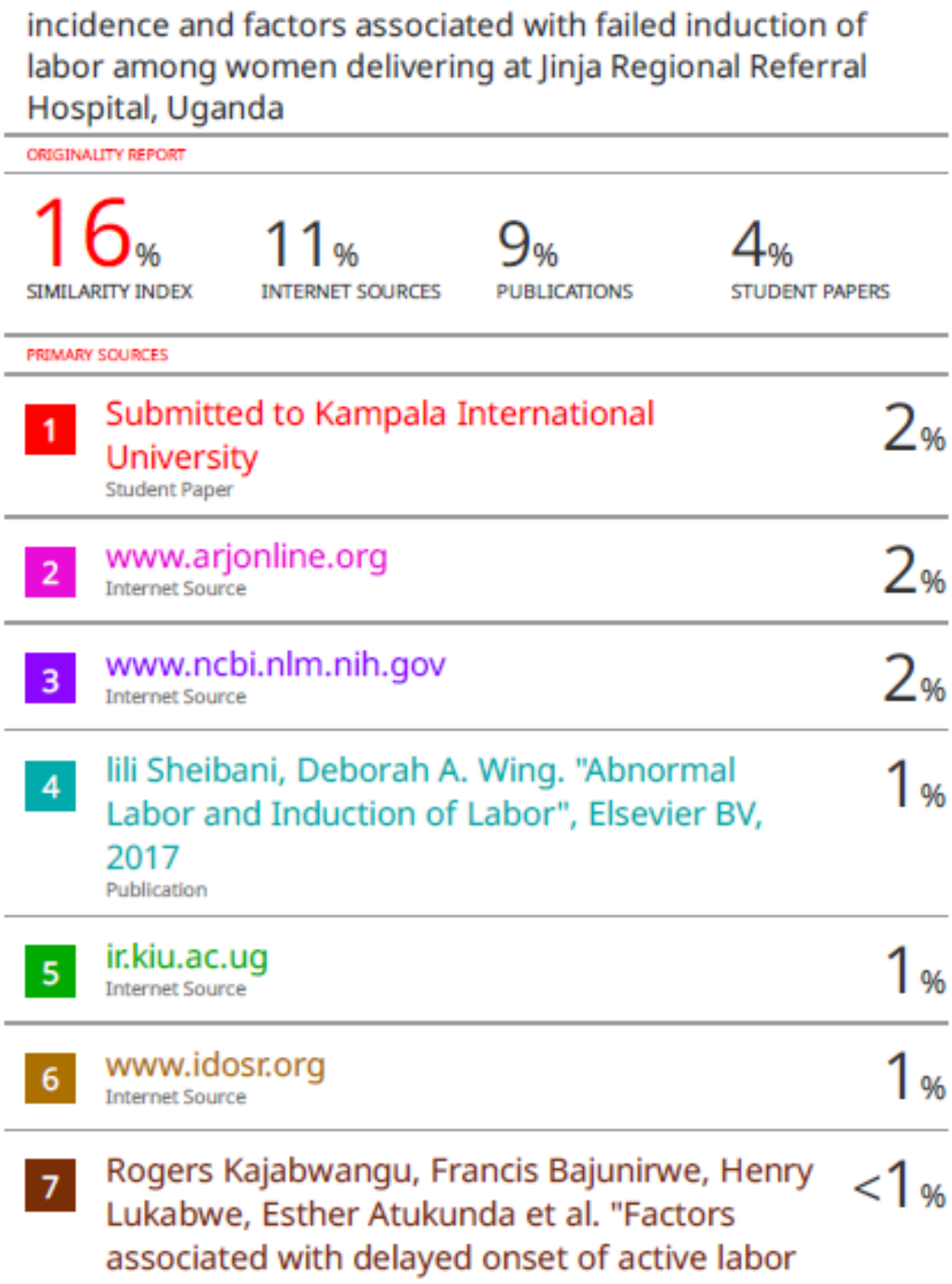
E) Professional Memberships

- Member of Kenya Medical Practitioners Medical and Dentist Council
- Associate member of association of obstetrician and gynecology of Kenya.

F) Referees

Name	Position	Contact
Dr. Maxwell Okello	Dean of the faculty of clinical medicine at Kampala international university-western Uganda. P.O. Box 71 Bushenyi	**Email**: okellomax@gmail.com +25677684503
Dr. Simon Omuok	Consultant Pathologist, Kenyatta National Hospital	**Email**: omuoks@yahoo.com +254723548035

APPENDIX: X: ORIGINALITY REPORT



incidence and factors associated with failed induction of labor among women delivering at Jinja Regional Referral Hospital, Uganda

ORIGINALITY REPORT

16%	11%	9%	4%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Submitted to Kampala International University Student Paper	2%
2	www.arjonline.org Internet Source	2%
3	www.ncbi.nlm.nih.gov Internet Source	2%
4	lili Sheibani, Deborah A. Wing. "Abnormal Labor and Induction of Labor", Elsevier BV, 2017 Publication	1%
5	ir.kiu.ac.ug Internet Source	1%
6	www.idosr.org Internet Source	1%
7	Rogers Kajabwangu, Francis Bajunirwe, Henry Lukabwe, Esther Atukunda et al. "Factors associated with delayed onset of active labor	<1%