



**COLLEGE OF MEDICINE AND HEALTH SCIENCES**  
**SCHOOL OF MEDICINE AND PHARMACY**  
**FACULTY OF MEDICINE**

**DETERMINANTS OF DELIVERY AMONG WOMEN WITH HISTORY OF PREVIOUS  
CESAREAN SCAR**

A Dissertation To Be Submitted In Partial Fulfillment Of The Requirements For The Award Of  
Degree of Master Of Medicine In Obstetrics And Gynecology Of The University Of Rwanda

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## DECLARATION

I declare that This Dissertation is The Result of my own work and has not been submitted for any other degree at The University of Rwanda and any other Institution.

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## **ABSTRACT**

**Objectives:** Delays in delivering pregnant women with history of prior Cesarean scar and increased rate of repeat CS together with low rate of VBAC are associated with maternal and neonatal morbidity and mortality. The objective of our study is to evaluate the determinants of timing and mode of delivery for women with history of previous cesarean scar.

**Methods:** This is a prospective descriptive cross-section study conducted from February to May 2021. Demographic and Clinical data from women with history of previous cesarean scar at gynecological department of Kigali University teaching hospital (CHUK) and Masaka district Hospital, were collected by patients interview and theater register review on a designed questionnaire.

**Results:** Four hundred women with history of previous cesarean scar were recruited, the rate of Cesarean delivery was 48.9% (CHUK: 59.50%, Masaka DH: 44.9%). 71 of the participants (17.7%) had delayed delivery (39.4%/CHUK, 60.6%/Masaka DH), this delay was due to lack of knowledge of the due date and/or waiting for spontaneous contractions (78.9%) followed by having had a wrong date (15.5%) and poor socio-economic issues (5.6%). The delay was influenced by the lack of education on timing and mode of delivery ( $P<0.001$ ), having had only one prior scars ( $P=0.008$ ), not living with one's partner ( $P=0.024$ ) ANC visits less than 4 ( $P=0.025$ ) and Nurse as ANC health care provider ( $P=0.012$ ). Among all participants, 66.2% Knew their Due Date, around a half 56.3% were educated on both the timing and mode of delivery and only 29.9% were educated on risks and benefits of TOLAC. The rate of Repeat CS in eligible for TOLAC group was 84.3% and 40.7% of them was due to health care provider influence, 32.3% due to maternal request and 27% due to obstetrical indication. TOLAC rate was 20% and VBAC rate was 15.7% (76% of the TOLAC). Successful VBAC was influenced by presentation at Health care facility with advanced stage of labor and/or a busy operating theater (50%), patient willing to TOLAC (44.7%) and IUFD (5.3%). The mode of delivery was influenced by number of scar ( $P=0.001$ ), Spontaneous labor ( $P<0.001$ ), history of vaginal delivery ( $P<0.001$ ), Delivery setting ( $P=0.002$ ), level of patient's education ( $P=0.001$ ), ANC health care provider ( $P<0.001$ ) and presence of comorbidities ( $P=0.002$ ).

**Conclusion:** The most common cause of delay was found to be the lack of knowledge of when and how women with prior CS scar should be delivered and of the fact that not all pregnant women should wait until the onset of spontaneous labor. In eligible for TOLAC group, health care provider influence and maternal request were found to be the main causes of repeat CS. Successful VBAC was influenced by presentation at advanced stage labor and patient's commitment to TOLAC. Delivery at referral hospital compared to district hospital was associated with less delayed deliveries but also with less TOLAC and VBAC. There is a need to foster education of pregnant women with prior CS scar on their early stage of pregnancy during ANC at all healthcare levels about timing and mode of delivery to improve maternal and neonatal outcome.

**Keywords:** Determinants of delivery; Reason for delay; Rate of TOLAC

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## **ACRONYMS AND ABBREVIATIONS**

**ANC** - Antenatal Care

**CBHI** - Community Based Health Insurance

**CHUK** - Centre Hospitalier Universitaire de Kigali

**CMHS** - College of Medicine and Health Sciences

**CS** - Cesarean Section

**DH** – District Hospital

**EDD** – Estimated Due Date

**ERCS** – Elective Repeat Cesarean Section

**IOL** – Induction of Labor

**IRB** - Institutional Review Board

**KUTH** - Kigali University Teaching Hospital

**LSCS** – Lower segment cesarean section

**OBGYN** - Obstetrics and Gynecology

**PRCD** - Planned Repeat Cesarean Delivery

**SDGs** - Sustainable Development Goals

**SD** - Standard deviation

**SPSS** - Statistical Package for the Social Sciences

**TOLAC** - Trial of Labor after Cesarean

**UR** - University of Rwanda

**VBAC** - Vaginal Birth after Cesarean

**WHO** - World Health Organization

## INTRODUCTION

Every year around 8 million women experience avoidable pregnancy complications and approximately five hundred thousand dies unnecessarily<sup>1</sup>. Skilled Health care providers at childbirth are needed to decrease maternal and neonatal morbidity and mortality, but still in developing countries they are still women delivering outside of health facilities, in inadequate settings or without skilled personnel help<sup>2</sup>. In a study done in Rwanda (2016), they found that around fifteen percent of all pregnant women experience a life-threatening complication that requires skillful emergency obstetric care<sup>3</sup>.

Maternal health improvement is the third goal of new Sustainable Development Goals (SDGs) to 2030, it is to reduce global maternal mortality ratio to less than 70 per 100,000 live births. The most important strategies used were good antenatal care, all births should be assisted by skilled health care personnel and the minimum recommended number of antenatal care visits should be four. WHO recommend at least an Ultrasound evaluation before 24weeks for pregnancy dating<sup>4-7</sup>

Cesarean section classified as elective or emergency, it is called elective when it is scheduled and done before the onset of labor to set up the best quality of multidisciplinary services (obstetrician, anesthesiologist, nursing and Neonatologist), all the remaining are emergency cesarean deliveries. Elective CSs are commonly done for previous uterine scars or fetal macrosomia and emergency ones are commonly done for fetal distress and labor on a scared uterus. The rate of maternal and fetal complications is higher for emergency CS delivery comparing to elective delivery, it's also influence by the timing of delivery. Early in the postnatal period women who underwent CS delivery should be educated on the timing and the mode of delivery for the subsequent pregnancy and this education should be continued during the antenatal contacts they should be taught about the risks and benefits of each route of delivery including the likelihood of having a successful VBAC. The final decision of the mode of delivery should be agreed and documented between the mother and the obstetrician before the due date<sup>8-17</sup>.



Uterine rupture is the major concern for women with prior uterine scars and can be fatal for both the mother and the fetus, it's very rare for unscarred uterus and occurs in 1/5700 to 1/20,000 pregnancies; for 1 prior lower segment incision, the incidence is 0.2-0.7%; for previous fundal/Vertical incision (classical, inverted T, J extension) range from 1-12%. After only one prior cesarean scar women are allowed to choose between elective repeat cesarean delivery (ERCS) and trial of labor after cesarean delivery (TOLAC) for the subsequent delivery. Planned trial of labor results in labor and successful VBAC or emergence intrapartum cesarean section, the success rate of VBAC for the qualified candidates is around 60-80%. The choice of mode of delivery is selected based on the patient's obstetrical history (including the type of previous uterine scar), patient's choice, settings and risks and benefits profile of the patient<sup>18,19</sup>.

The decision for timing of repeat cesarean delivery is controversial and a routine dilemma. clinicians and patients must balance the risks and benefits of delivery before 39 gestational weeks (to minimize neonatal morbidities) with maternal risks of delaying delivery after 39 gestational weeks(uterine rupture, post term stillbirth, spontaneous labor and emergent unscheduled surgery)<sup>3,4</sup>. Unless there is a clear indication, elective delivery should not be planned before 39weeks gestation to decrease the rate of neonatal respiratory complications. The most appropriate timing for delivery for women with multiple prior cesarean scars is a planned delivery at 39 weeks' gestation (39w0d to 39w6d). However, early term delivery (37-38 weeks' gestation) may be reasonable for specific patients like prior history of classical incision, myomectomy, or uterine rupture. Patients willing to TOLAC follows the rules on unscarred uterus(induction of labor at 41weeks if no spontaneous labor) and those who opt for ERCS follows the rules of multiple uterine scar <sup>2,12,18-21</sup>

The early recognition and planning for elective cesarean delivery for the high risk patients is the key points to reduce the rate of complications associated with emergency cesarean deliveries. Women should be educated on the risks related to multiple cesarean scars and encouraged to have a reliable contraceptive method like tubal ligation. The current WHO recommendation for prenatal care is 8 visits: 1<sup>st</sup> visit: up to 12weeks gestation, 2<sup>nd</sup> through 8<sup>th</sup> respectively at 20, 26, 30, 34, 36, 38, 40weeks gestation. Even if there is well established plan for ANC visits, there are still a considerable number of women who still don't abide to the

recommendation and just do very few number of visits or no visit at all or just consult very late with advanced gestation and ends up with emergency delivery or account complication that would be prevented by early delivery, among them are those with scared uterus who are at high risk of complications. In a study done in Ethiopia in 2016 about delay of women seeking emergent obstetrical care, lack of pregnant women autonomy in decision making was found to be the main reason<sup>19,21-26</sup>. In Rwanda there is no study done to evaluate the determinants of timing and mode of delivery among women with history of uterine scar.

## **MATERIALS AND METHODS**

This was a prospective cross sectional study conducted to assess the determinants of delivery for women with history of prior cesarean scar for four months' period from February to May 2021 at Kigali university teaching hospital (CHUK) and Masaka District hospital in Rwanda. Four hundred women with history of prior cesarean scar were recruited to be participants in the study. Data collection was performed using a predefined questionnaire after informed consent was obtained. Variables collected include: age, Level of education, Health Insurance, Marital status, Address, Health insurance, Employment, Gravidity, Number of scars, Knowledge of LMP and EDD, Gestational Age, Mode of delivery, indication of ERCS, Birth weight, reason for late delivery, Comorbidities, number of ANC, ANC settings, ANC health care provider, education on Risk and benefits of TOLAC, Education on timing and mode of delivery, presence of spontaneous labor, history of prior vaginal delivery, Gestational age and indication for the first CS delivery, inter-delivery interval and factor influencing mode of delivery for history of only one prior cesarean scar. All pregnant women with history of prior CS scar(s) delivering at our study sites was our inclusion criteria and exclusion criteria were Abortions, ectopic pregnancies, other scars other than CS, mental disorder and not consenting for our study. Delayed delivery was considered as delivery at gestational age  $\geq 40$  weeks for PRCD or  $\geq 42$  weeks for TOLAC. Eligible for TOLAC were all pregnant women with only one prior CS scar, inter-delivery interval of at least two years, assumable LSCS uterine scar and no history of uterine rupture. The sample size for our study was calculated using the sample size calculation formula for a cross-sectional study. Data was collected by patients' interview, review of patients' files and theater register using a pre-established questionnaire;

data entry using Excel and then exported in SPSS for analysis. Chi-square test was used and p value was set at <0.05 for statistical significant difference. No personal identifiable information was recorded. The study was approved by the Institutional Review Board (IRB) at the University of Rwanda, College of Medicine and Health Sciences, and the ethics committee of CHUK and Masaka DH.

## RESULTS

During our study period there were a total of 2575 deliveries and the overall rate of CS was 48.9% (59.5%/CHUK vs 44.9%/Masaka DH). The rate for VBAC was 15.2% (10.3%/CHUK vs 18%/Masaka DH) of all women with only one prior scar. A total of 400 women were enrolled and analyzed, equal number of participants were recruited from both sites, the mean age was  $34 \pm 15$  years the majority was 20-34 year (64.3%), 40.3% had either no formal education or only Primary level studies, the majority 80.3% had CBHI as health insurance, 73.3% were married, only 32.5% live in the same district as the delivery setting, the majority was either unemployed or farmers (78.8%), the majority had only one prior cesarean scar (60.3%), 28.8% had a history of one or more vaginal delivery and the majority had less than 4 ANC visits (79.5%). 15% of the patients had preterm deliveries, 10.8% unknown gestational age 2.2% post term. **Table 1.**

71 of the participants (17.7%) had delayed deliveries (39.4%/CHUK, 60.6%/Masaka DH), the most common cause of delay was unknown due date and/or waiting for spontaneous labor (78.9%) followed by having had a wrong due date (15.5%). The maximum gestational age was 44 weeks and 0 days and The minimum was 27 weeks and 2 days. **Table 2.** The factors associated with delay were not living with one's partner (35.9 vs 20.1%), only one prior scar (26.5 vs 14.5%), absence of comorbidities (23.7 vs 7.3%), number of ANC visits less than four (24.5 vs 12.7%), Delivering at District Hospital comparing to Referral Hospital (24.4 vs 16.2%) and lack of education on mode and timing of delivery (33.6 vs 14%). **Table 3.** More than a half were educated on timing of the delivery (66.2%), around a half (56.3%) were educated on both the timing and mode of delivery and only 29.9% were educated on risks and benefits of TOLAC. **Table 4.**

Among the 242 participants who only had one prior cesarean scar, only 50 (20.7%) tried labor and 76% of them had successful VBAC. The presentation at advanced stage of labor and

patient's commitment were the two most common reason contributed to successful VBAC (50% and 44.7% respectively), obstetrical indication and health care provider influence were the two most common reason for failed TOLAC (41.7% and 33.3% respectively). The ERCS was favored by the health care provider influence and maternal request (41.2% and 32.8%). Overall repeat CS for only one prior scar was 84.3%. **Figure 1.** VBAC was associated with lower level of education of the participant ( $P < 0.001$ ), only one prior cesarean scars (15.8 vs 5%), Nurse or Midwife as ANC provider (19.7 vs 5.7%), history of prior vaginal delivery (26.1 vs 5.6%), District hospital as delivering setting comparing to referral Hospital (16.5 vs 6.5%), and presence of spontaneous labor (20.7 vs 0.5%). **Table 5.**

## DISCUSSION

This is a first study done in Rwanda looking at the determinants of delivery among pregnant women with history of previous cesarean scar. It incorporated both a district and referral hospital to reflect a good picture of these determinants in the general population. Our results shows that there is still a considerable number of pregnant women who delay to deliver (17.7%) despite the well-organized health care system in Rwanda, This rate is higher than 6% of post term observed in a study done in northern Ethiopia in 2014 by H. Mengesha et al.<sup>27</sup> Forty-three of the participants (10.8%) did not have established gestational age (had emergent delivery without knowing their LMP nor having a pre-established gestational age by ultrasound). The most common cause of delay was lack of knowledge and this is supported by the finding that only around a half of respondents (56.3%) were educated on timing and mode of delivery and the fact that 5.1% of participants with multiple scars had VBAC. Of the delayed, 60.3% were consulted by only nurse or midwife at Health center and 87.2% of them had less than 4 ANC visits. These results are different from another study done in Ethiopia in 2016 on factors of maternal delays in seeking emergency obstetrical care which showed that lack of pregnant women's autonomy in decision making for their health was the main reason for delay<sup>25</sup>.

In our study, the overall rate of CS was 48.9%, this is more than three times the rate recommended by WHO(15%),<sup>3</sup> and the trend is still on rise, 48.9% in our study compared to 37.1% and 46.9% of studies done in Rwanda in 2017 by Nshimiyumuremyi E, et al. and in 2018 by Byiringiro E. et al respectively, and again higher than developed countries, 32.2% in

US (CDC) and 31% in Armenia, but comparable with other sub-Saharan countries (In a study done at the University Hospital of Cocody in Ivory Coast, the overall cesarean delivery rate was 42.8% and 42.4% at Kwazulu- Natal Hospital in South Africa).<sup>3,28-30</sup>. High rate of CS at CHUK can be explained by the fact that it is the largest referral hospital in Rwanda caring for the most complicated pregnancies and most of the patients with history of multiple prior CS scars ( $\geq 3$ ) are not being delivered at district hospital level. The higher rate of CS and lower rate of TOLAC is mainly due to health care provider influence and maternal request who also are influenced by the fear of risks associated with TOLAC (especially possibility of poor neonatal outcome), its legal implication and inadequate number of CTG and staff for close monitoring of labor, While in Armenia, The rate of cesarean delivery rose from 7.2 to 31% in 2000 to 2017 respectively and a qualitative study analysis showed that financial motivations, maternal request and lack of rules could be contributing to increasing cesarean rates.<sup>29-31</sup> The prevalence of denial of TOLAC is slightly increased (77.8% vs 79.3%) and the rate of VBAC has increased (10.8% vs 15.7%) for the previously mentioned study done in Rwanda by Nshimiyumuremyi E, et al. compared to our study, this rate is Similarly to a study done at Tuzla University Teaching Hospital in Tanzania (16.92%)<sup>30,31</sup>. Among the fifty patients who did TOLAC 38 (76%) had a successful VBAC and 24% underwent emergent CS for failed TOLAC. This rate is comparable to the finding of the study done by Nshimiyumuremyi E, et al. in 2017 (67% successful VABAC and 18.33% of failed TOLAC)<sup>30</sup>. The rate of successful VBAC was high because of the fact that the majority of the participants who did TOLAC presented in advanced stage of labor and some of them had been scheduled for repeat CS and got delivered before the operating theater was ready. The main cause of failed TOLAC was due to obstetrical indication (41.7%) and treating health care provider influence (33.3%). 192 of the participants (79.3%) went straightforward to PRCD, this mainly was the influence of the treating health care provider (41.2%) and maternal request 32.8%.

Most of the participants who had successful VBAC were either illiterate or had attended primary school (63%), had only one previous cesarean scar (82.6%), had ANC visit done by nurse or midwife (84.8%), had spontaneous labor (97.8%), 84.8% were qualified for TOOLAC, 71.7% delivered at district hospital, and 65.2% had previous history of vaginal delivery, all the above mentioned factors are considered to influence the success of TOLAC.

Our study limitation was poor documentation whereby the most significant one was that they were significant patient files with no documented gestational age. One weakness of our study is that it didn't include a private setting where also a considerable number of deliveries are taking place, especially patients of the moderate and high socio-economic status. Another weakness is that our study was unilateral, it did not incorporate the perception of health care providers on the cause of delayed deliveries and increasing trends of rate of CS and decline in TOLAC.

It is important that a lot of efforts should be made to reduce the prevalence of delayed delivery by focusing on education of pregnant women on timing and mode of delivery and to reduce the overall rate of CS by increasing the rate of TOLAC after education on its risks and benefits. All pregnant women should be encouraged to have a first trimester or Early second trimester ultrasound for pregnancy dating and establishment of the due date.

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## TABLES AND FIGURES

Table 1: Patient's Demography and Characteristic

	N	%
<b>Age</b>		
<20yrs Old	2	0.5
20-34yrs old	257	64.3
=>35yrs old	141	35.3
<b>Marital status</b>		
Married	293	73.3
Cohabitate	67	16.8
Single	35	8.8
Divorced	3	0.8
Widow	2	0.5
<b>Address</b>		
Same District	130	32.5
Different district	147	36.8
Different Province	123	30.8
<b>Employment</b>		
Unemployed & Farmer	315	78.8
Employed	85	21.3
<b>Health Insurance</b>		
CBHI	321	80.3
Other Insurances	77	19.3
No Insurance	2	0.5
<b>Level of Education Attended</b>		
Primary & Illiterate	161	40.3%
Secondary	139	34.8%
University	100	25.0%
<b>Gestational Age</b>		
< 37weeks	60	15.0
37-41w6d (62 delayed)	288	72.0
> 42 weeks	9	2.2
Unknown	43	10.8
<b>Number of Prior CS Scars</b>		
1	242	60.5
≥ 2	158	39.5
<b>History of Vaginal Delivery</b>		
No	285	71.3
Yes	115	28.8
<b>Number of ANC visits</b>		
0-3	318	79.5
4-7	79	19.8
≥ 8	3	0.8

*Table 2: Reasons for delayed deliveries*

<b>Variable</b>	<b>N</b>	<b>%</b>
Waiting for Uterine Contraction or Unknown Gestational Age	56	78.9
Had Wrong Due Date	11	15.5
Socio-economic Issues	4	5.6
<i>Total</i>	<i>71</i>	<i>100</i>
<i>Max. Gestational Age</i>	<i>44weeks 0day</i>	

Table 3: Determinants of timing of delivery

	<b>Delayed delivery</b>		
	No N(%)	Yes %	
<b>Living with the partner</b>			
Yes	254(79.9%)	64(20.1%)	0.024
No	25(64.1%)	14(35.9%)	
<b>Health Insurance</b>			
CBHI	214(76.4%)	66(23.6%)	0.160
Other Insurances	63(84.0%)	12(16.0%)	
<b>Number of Scars</b>			
1Scar	161(73.5%)	58(26.5%)	0.008
Multiple Scars	118(85.5%)	20(14.5%)	
<b>Knows her Due Date</b>			
No	80(85.1%)	14(14.9%)	0.057
Yes	199(75.7%)	64(24.3%)	
<b>Comorbidities</b>			
No	241(76.3%)	75(23.7%)	0.017
Yes	38(92.7%)	3(7.3%)	
<b>Number of ANC</b>			
< 4 ANC	210(75.5%)	68(24.5%)	0.025
=> 4 ANC	69(87.3%)	10(12.7%)	
<b>ANC health Care Provider</b>			
Nurse or Midwife	119(71.7%)	47(28.3%)	0.012
General Practitioner	54(79.4%)	14(20.6%)	
Gynecologist	106(86.2%)	17(13.8%)	
<b>Delivering Setting</b>			
District Hospital	121(75.6%)	39(24.4%)	0.014
Referral Hospital	165(83.8%)	32(16.2%)	
<b>Education on timing and mode of Delivery</b>			
No	95(66.4%)	48(33.6%)	<0.000
Yes	184(86.0%)	30(14.0%)	

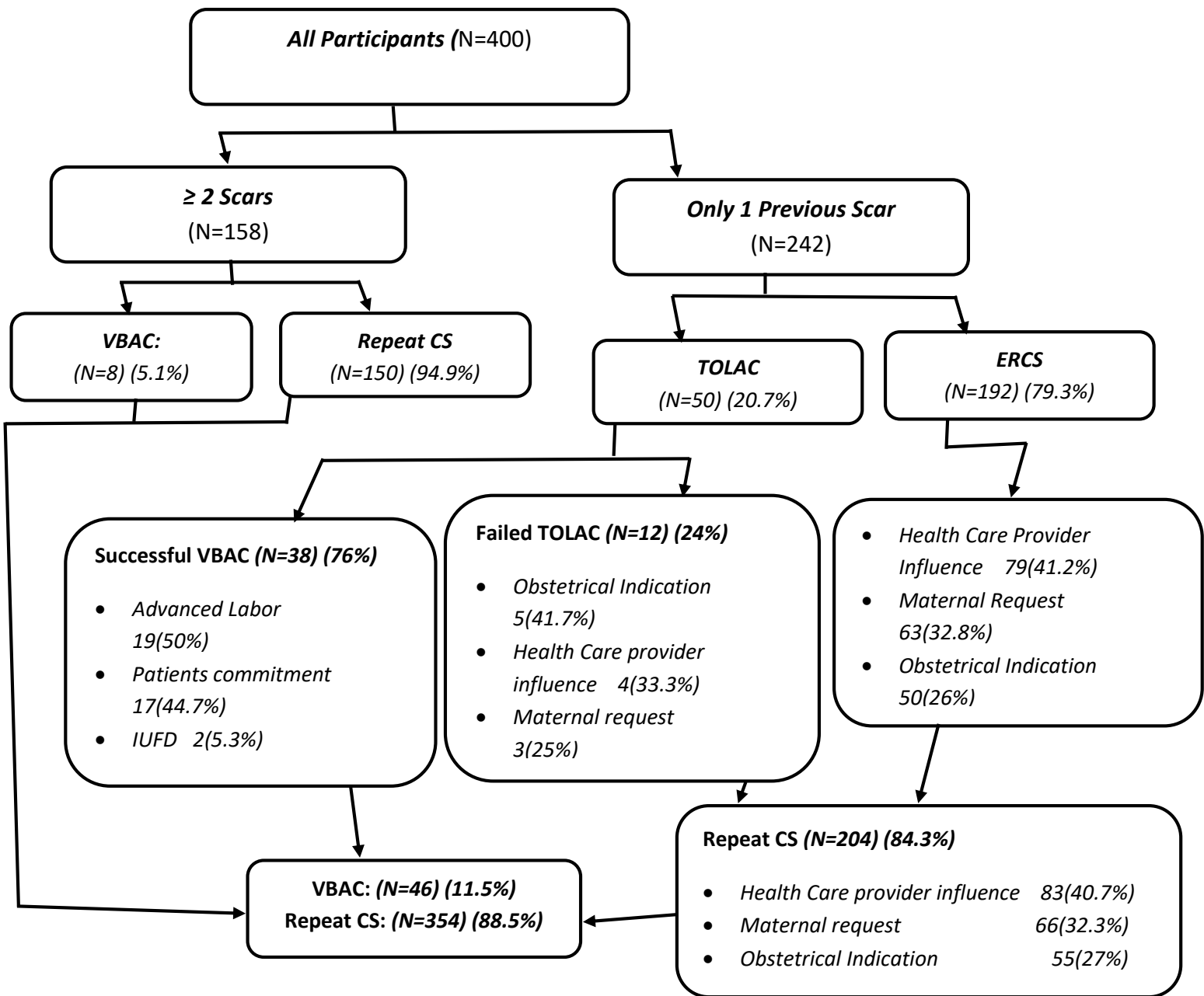
Table 4: Knowledge on TOLAC, timing and mode of delivery

<b>Variable</b>	<b>N</b>	<b>%</b>
<b><i>Knows her LMP</i></b>		
<i>No</i>	127	31.8
<i>Yes</i>	273	68.2
<b><i>Risks/Benefits of TOLAC</i></b>		
<i>No</i>	169	70.1
<i>Yes</i>	72	29.9
<b><i>Timing of Delivery (Due Date)</i></b>		
<i>No</i>	135	33.8
<i>Yes</i>	265	66.2
<b><i>Mode of Delivery</i></b>		
<i>No</i>	132	33.0
<i>Yes</i>	268	67.0
<b><i>Education on Timing and Mode of Delivery</i></b>		
<i>No</i>	175	43.8
<i>Yes</i>	225	56.3

Table 5: Determinants of mode of delivery

	<b>Mode of Delivery</b>		Sig.
	Caesarean Section N(%)	VBAC N(%)	
<b>Level of Education Attended</b>			
illiterate & Primary	132(82.0%)	29(18.0%)	0.001
Secondary & University	222(92.9%)	17(7.1%)	
<b>Number of Scars</b>			
1Scar	204(84.3%)	38(15.7%)	0.001
Multiple Scars	150(94.9%)	8(5.1%)	
<b>Comorbidities</b>			
No	317(89.3%)	38(10.7%)	0.161
Yes	37(82.2%)	8(17.8%)	
<b>ANC health Care Provider</b>			
Nurse or Midwife	159(80.3%)	39(19.7%)	<0,000
General Practitioner	71(95.9%)	3(4.1%)	
Gynecologist	124(98.4%)	2(1.6%)	
<b>History of Vaginal Delivery</b>			
no	269(94.4%)	16(5.6%)	<0,000
Yes	85(73.9%)	30(26.1%)	
<b>Birth Weight</b>			
<4 kg	328(88.2%)	44(11.8%)	0.454
=>4 kg	26(92.9%)	2(7.1%)	
<b>Delivery Setting</b>			
District Hospital	167(83.5%)	33(16.5%)	0.002
Referral Hospital	187(93.5%)	13(6.5%)	
<b>Knowledge of Risks/Benefits of TOLAC</b>			
No	146(86.4%)	23(13.6%)	0.159
Yes	57(79.2%)	15(20.8%)	
<b>Qualification for TOLAC</b>			
No	184(96.3%)	7(3.7%)	<0,000
Yes	170(81.3%)	39(18.7%)	
<b>Spontaneous labour</b>			
No	182(99.5%)	1(0.5%)	<0,000
Yes	172(79.3%)	45(20.7%)	
<b>Indication for 1st CS</b>			
Labour Dystocia	154(93.9%)	10(6.1%)	0.001
Fetal Distress	120(89.6%)	14(10.4%)	
Other Indications	80(78.4%)	22(21.6%)	

Figure 1: Overall determinants of mode of delivery



## **ANNEXES**

### **Annex 1. INFORMED CONSENT (English Version)**

#### **Title of Study:**

**DETERMINANTS OF TIMING AND MODE OF DELIVERY FOR WOMEN WITH PREVIOUS CESAREAN SCAR**

**Researcher's Name:** NTSINZI Bienfait

**Phone number (+ 250)783521561**

#### **INTRODUCTION**

My name is Bienfait NTSINZI; I am a student at the University of Rwanda, Undertaking a masters in obstetrics and Gynecology. One of the requirements for the Degree is to conduct a research project.

#### **PURPOSE OF STUDY**

The purpose of the study is to assess the determinants of timing and mode of delivery among pregnant women with prior Cesarean scar.

#### **DESCRIPTION OF THE STUDY PROCEDURES**

When you agree to participate in this study, Firstly, you will be asked to sign this consent form, then you will be explained about question, and you are thereby requested to answer a questionnaire. The investigator will fill the questionnaire with your responses. Also you will be given a signed and dated copy of the consent form to keep, along with any other printed materials deemed necessary by the researcher.

#### **RISKS/DISCOMFORTS OF BEING IN THIS STUDY**

There is no known risks. And there are no reasonable foreseeable (or expected) risks.

#### **BENEFITS OF BEING IN THE STUDY**

During this study you will benefit the follow up from the time of your enrolment till you deliver.

#### **CONFIDENTIALITY**

The questionnaire used in this study will not be collecting or retaining any information about your identity like your name. Also the researcher will not include any information in any report he may publish that would make it possible to identify you. The questionnaires will be destroyed after the study is complete. The records of this study will be kept strictly confidential. Research records will be kept in a locked cupboard and all electronic information will be coded and secured using a password Protected file.



## **PAYMENTS**

This study has academic purpose no any funds so there will be no payment to participate in this study.

## **RIGHT TO REFUSE OR WITHDRAW**

The decision to participate in this study is voluntary. If you refuse to take part in the study at any time, there will be no negative consequences for you. You have the right not to answer any single question or question you think concerns your dignity, as well as to disengage completely from the study at any point during the process.

## **RIGHT TO ASK QUESTIONS AND REPORT CONCERNS**

You have the right to ask questions about this research study and to have those questions answered by the research before, during or after the research. If you have any further questions about the study, at any time feel free to contact:

### **Contact details of researcher (for further information / reporting of study related adverse events).**

Bienfait NTSINZI

Tel :(+250) 783521561 Email: nbienf@yahoo.fr

If you have any other concerns about your rights as a research participant that has not been answered by the researcher, you may contact

### **1. Contact details of the research ethic committee of IRB (for reporting of complaints / problems).**

Chairperson of IRB College of medicine and health science

Dr Stefan Jansen: 0784575900

(Secretary: Francois Xavier Sunday: 0781884895)

### **2. Contact details of the research ethic committee of IRB (for reporting of complaints / problems).**

Chairperson of Kigali University teaching Hospital (CHUK) IRB Committee

Dr RUSINGIZA KAMANZI Emmanuel: 07854 66254

### **3. Contact details of the research supervisor number 1 (for further information on the Research and reporting of study related adverse events).**

Dr Diomed NTASUMBUMUYANGE: Tel: (+250)788334988 email:

muyangediomed@gmail.com

**4. Contact details of the research supervisor number 2 (for further information on the Research and reporting of study related adverse events).**

Dr DUSINGIZIZMANA Vincent: Tel: +250 788 214 231, email: vindus2005@gmail.com

DECLARATION OF CONSENT TO PARTICIPATE IN THE RESEARCH

I hereby confirm that I understand the contents of this document and the nature of the Research project, and I consent to participating voluntarily in the research project.

I understand that I am at liberty to withdraw from the project at any time, should I so desire.

Participant's Signature: ..... Date:

## **Annex 2: INFORMED CONSENT (Kinyarwanda Version)**

### **AMASEZERANO YO KUGIRA URUHARE MU BUSHAKASHATSI**

**Izina ry’ubushakashatsi:** IBIGENGENGA IGIHE NUBURYO BWO KUBYARA KUBABYEYI BEGEZE KUBYARA BABAZWE.

**Izina ry’umushakashatsi:** Dogiteri NTSINZI Bienfait  
**Nomero za telephone:(+250) 783521561**

### **IRI BURIRO**

Nitwa NTSINZI Bienfait nkaba ndi umunyeshuri muri koreji y’ubuvuzi, ndetse n’ubumenyi bw’ubuzima rya kaminuza y’u Rwanda.

Nkaba ndi gukora ubushakashatsi ku kureba “ibigenga igihe nuburyo bwo kubyara kubabyeyi bigeze kubyara babazwe.” Kimwe mubisabwa kugira ngo mbone impamyabumenyi ni ugukora ubushakashatsi.

### **INTEGO Y’UBUSHAKASHATSI**

Ubu bushakashatsi bugamije kureba igihe ababyeyi bigeze kubyara babazwe baza kubyarira, uburyo babyaramo (babazwe cg batabazwe), ubumenyi babifiteho, ndetse nimbogamizi bahura nazo.

### **IBIZAKORWA MURI UBU BUSHAKASHATSI**

Mu gihe wemeye kugira uruhare muri ubu bushakashatsi, bwambere usabwa kuzuza amasezerano yemera kugira uruhare mu bushakashatsi ndetse ukabazwa ibibazo binyuranye bijyanye nubu bushakashatsi, ukora ubushakashatsi akuzuza urupapuro rwikusanyamakuru, Kopi y’urupapuro rw’amasezerano urayihabwa n’izindi kopi zakenerwa mu bushakashatsi

### **INGARUKA/ KUTAGUBWANEZA ZO KUBA MURI UBU BUSHAKASHATSI**

Nta ngaruka zizwi, nta niziteganywa muri ubu bushakashatsi.

### **INYUNGU ZO KUBA MURI UBU BUSHAKASHATSI**

Ubu bushakashatsi bufite inyungu yo gukurikiranwa kuva ushyizwe mumubare wabari mubushakashatsi kugeza ubyaye.

### **KUGIRA IBANGA**

Amakuru yose tuzakura muri ubu bushakashatsi azaguma ari ibanga kandi nta zina rizagara ku rupapuro ruriho ibibazo n’ibisubizo.Nta makuru namwe akwerekeyeho tuzakubaza muri ubu bushakashatsi,amakuru yose azabikwa ahantu zihazewe kandi ntawundi muntu usibye

abari muri ubu bushakashatsi wemerewe kuyabona.

### **AGAHIMBAZAMUSYI**

Ubu bushakashatsi bufite intego kubijyanye n'amashuri nta nkunga y'amafaranga cyangwa indi ntego ifite inyungu bityo rero nta mafaranga cyangwa impano duteganya gutanga ku kwemera kugira uruhare muri ubu bushakashatsi.

### **UBURENGANZIRA BWO KWANGA CYANGWA KUVA MU BUSHAKASHATSI**

Umugambi wo kugira uruhare muri ubu bushakashatsi bushingiye kubushake bwawe bwose, Ufite uburenganzira ubwo aribwo bwose bwo kutagira uruhare muri ubu bushakashatsi kandi ntibigire icyo biguhungabanyaho. Ufite uburenganzira bwo kutagira ikibazo na kimwe usubiza cyangwa ikibazo waba wumva kirebena n'ubusugire cyawe. Kimwe nuko ufite uburenganzira bwo kuba wava cyangwa wahagarika ubushakashatsi igihe icyo aricyo cyose nubwo bwaba bwatangiye.

### **UBURENGANZIRA BW'UWO WABAZA IKIBAZO NO GUTANGA RAPORO Y'IBYO WUMVA BITAMEZE NEZA**

Ufite uburenganzira bwo kubaza ibibazo bijyanye n'ubu bushakashatsi no kuba cya subizwa n'umushakashatsi mbere. haramutse hari ikibazo ushobora kwifuza kuzabaza nyuma ushobora kukibaza wisanzuye igihe icyo aricyo cyose ukampamagara

NTSINZI Bienfait

kuri telephone (+250) 783521561 cyangwa ukaba wanyandikira kuri emeri: nbienf@yahoo.fr

Uramutse wifuza kumenya incamake y'amakuru y'ubu bushakashatsi. Kandi niba waba ufite ikintu cy'umwihariko cyo kubaza cyangwa uburenganzira bwawe butubahirijwe nkuwagize uruhare mu bushakashatsi kitabashije gusubizwa n'umushakashatsi wakigeza kuri aba bakurikira:

#### **1. Uhagarariye Kaminuza mu bushakashatsi wa mbere**

Dr Stefan Jansen: (+250) 0784575900

**Umunyamabanga:** Francois Xavier Sunday: 0781884895

#### **2. Uhagarariye Komite igenzura ubushakashatsi mubitaro bikuru bya kaminuza bya kigali**

Dr RUSINGIZA KAMANZI Emmanuel: (+250)07854 66254

#### **3. Uhagarariye ubushakashatsi wa mbere:**

NTASUMBUMUYANGE Diomedes: Tel: (+250)788334988 imeri:

muyangediomedes@gmail.com

#### **4. Uhagarariye ubushakashatsi wa kabiri:**

DUSINGIZIMANA Vincent: Tel: +250 788 214 231, email: vindus2005@gmail.com

**AMASEZERANO**

Njye numvise kandi nasobanuriwe neza ibigize ubu bushakashatsi n’urwego rw’ubushakashatsi

Nyuma yo kubyisomera, gusobanurirwa no kumva amakuru yose nahawe yavuzwe haruguru, Nemeye kugira uruhare muri ubu bushakashatsi kugiti cyanjye bikemezwa n’umukono wanjye.

Umukono wuwemeye kugira uruhare mubushakashatsi

Italiki

.....

...../...../.....

### Annex 3. DATA COLLECTION TOOL (English Version)

#### QUESTIONNAIRE

<b>1</b>	<b>Identification &amp; Demography</b>	Hospital:      o CHUK                      o Masaka DH									
		Initials:							Date:    /    /2021		
		Study ID:							Age:		
	Obstetrical Formula	G -            P -            -            -            -									
	Gestational Age	.....Weeks.....days.			By LMP		By U/S		Just delivered		
	Number of Scars	1	2	3	4	5	6	7	8	9	10
	Type of Scar	Lower transverse				Classical/Vertical				Not Known	
	Indication for the Prior CS (1 <sup>st</sup> and 2 <sup>nd</sup> )	1 <sup>st</sup> a. Fetal distress b. Obstructed/Protracted Labor c. Other obstetrical Indication						2 <sup>nd</sup> a. Obstetrical indication b. Dr's preference/influence c. Maternal Request d. Others .....			
	Any Pregnancy Complications or Co-morbidities? a. HTN, b. DM, c. Previa, d. Preterm labor, e. P/PROM, f. VTE/DVT g. other										
	ANC visits	1	2	3	4	5	6	7	≥8		
	H. care facility for ANC	HC			Private			DH		Referral	
	HC Provider	Nurse/Midwife			Gen Practitioner			Gynecologist			
	Address	Same District,				Different District/Province				(as the Hospital)	
	Level of Education	None,			≤ P6,		≤ S6,		≥Bachelor		
	Marital status	Married		Cohabitate		Divorced		Widow		Single	
	Health Insurance	CBHS			Other H. Insurance				None		
	Job	Employed					Unemployed				
<b>2</b>	<b>Knowledge on Prior CS delivery and Planning for the Subsequent</b>										
	What's the indication of the 1 <sup>st</sup> CS										

	Were you told to space pregnancy at least for two years?	Yes	No
	Did you use any contraceptive method after the previous pregnancy?	Yes	No
	If yes, Which? (Pills, Implant, IUD, BTL/BS, Other.....)		
	Interval between last delivery and current pregnancy. (.....Months)		
	History of Vaginal Delivery (Prior SVD or VBAC)	No	Yes, (How many?.....)
	Do you Know the Risks and Benefits of Trying Labor after cesarean delivery?	Yes	No
	Do you know that Delivery should be Planned?	Yes	No
	Do you know where you should deliver? (HC/DH/Referral)	Yes	No
	When Should you report there? a. If contraction.    b.At Certain (known date)    c.If any Other concern.    d.Doesn't know		
<b>3</b>	<b>Knowledge about timing</b>		
	Knows her LMP?	Yes	No
	What is you Gestational Age now?	Knows	Doesn't know
	Knows Her EDD?	Yes	No
	Knows her delivery date (CS or IOL)	Yes	No
	At which gestational age were you told that you'll be delivered? a.Before 39wks.    b.At 39wks.    c.At 41wks.    d.At 9months    e.Other. f.Not Discussed.    G.Don't remember.		
<b>4</b>	<b>Knowledge about Mode of delivery</b>		
	A. What is the agreed mode of delivery a. CS                      b.TOLAC                      c.Not Discussed                      d.Don't Remember		
	B. Do you know the Advantages and Disadvantages of each Mode?    Yes    No		
<b>5</b>	<b>End Result (To Be Filled After Delivery)</b>		
	<b>a. When did she delivery?</b>		

	<ul style="list-style-type: none"> <li>i. &lt;37wks. (if yes: Why?) .....</li> <li>ii. 37-38w6d. (if yes: Why?) .....</li> <li>iii. Scheduled delivery (CS) (39w0d-39w6d)</li> <li>iv. Scheduled delivery (IOL) (41kws)</li> <li>v. Emergency delivery at 39-39w6d (onset of labor)</li> <li>vi. Delayed/Emergency delivery (<math>\geq 40</math>wks/multiple scars, <math>\geq 41</math>w6d if 1scar) (If yes: why?) .....</li> </ul> <p><b>b. What is the undergone Mode of delivery and Circumstances?</b></p> <ul style="list-style-type: none"> <li>i. Planned CS</li> <li>ii. Emergency CS</li> <li>iii. Planned IOL (Mechanical) and Successful VBAC</li> <li>iv. Planned IOL (Mechanical) and Failed TOLAC (CS) (why?.....)</li> <li>v. Spontaneous onset of Labor and Successful TOLAC</li> <li>vi. Spontaneous onset of Labor and Failed TOLAC(CS) (why?.....)</li> </ul>
	<p><b>c. Birth weight</b>      a. &lt;2kg      b. [2-4kg[      c. <math>\geq 4</math>kg</p>



**Annex 4: DATA COLLECTION TOOL (Kinyarwanda Version)**

<b>1</b>	<b>Ibiranga umurwayi</b>	Ibitaro:           o CHUK   o Masaka DH	
		Inyugiti zibanza zamazina:	Itariki:       /       /2021
		Numero y'ubushakashatsi:	Imyaka:
	Amakuru kunda yabyaye nabana afite	G -           P -           -           -           -	
	Igihe inda imaze	1. ....ibyumweru .... Iminsi 2. yabyaye	<sup>1</sup> Uhereye kumihango <sup>1</sup> Uhereye kucyuma/Echo
	Inshuro yabazwe	1   2   3   4   5   6   7   8   9   10	
	Aho bakase kuri nyababyeyi	Bitambitse   Bihagaze   Ntibizwi	
	Icyo yabagiwe kubwa mbere ndetse nubwa kabiri	<b>Ubwambere</b> * Umwana yananiwe *Umwana yananiwe kumanuka *Impamvu yemewe yubuvuzi Ikindi:.....	<b>Ubwakabiri</b> *Impamvu yemewe yubuvuzi *Niko Muganga yabyifuje * Ninjye wabyisabiye *Ikindi.....
	Uburwayi/ibibazo Kunda	Umuvuduko w'amaraso,   Diabeti,   ingobyi muni yumwna, Isuha yamenetse,   ibise byaje mbere yigihe, kuvura kwamaraso mumutsi, ikindi....	
	Inshuro yasuzumishije inda	1   2   3   4   5   6   7   ≥8	
	Aho Yasuzumishirije	Ikigo nderabuzima, Ibitaro byigenga, Ibitaro by'akarere, Ibitaro Bikuru	
	Uwamusuzumye/uwamuvuye	Umubyaza/Umuforomo, Umuganga Rusange, Inzobere munrwaru zabagore	
	Aho atuye	Mukarere kamwe,   akandi karere/intara   (nibitaro yabyariyemo)	
	Amashuri yize	Munsi yabanza Abanza Ayisumbuye Kaminuza	
	Iranga mimerere	Yarashyingiwe           yatandukanye numugabo           Umupfakazi Ingaragu	
	Ubwishingizi mukwivuzi	Mituweri           ubundi bwishingizi           ntanabumwe	
	Akazi/imirimo	Afite akazi   Ntakazi	
<b>2</b>	<b>Ubumenyi kubijyanye nuko yabazwe ubushize ndetse nubumenyi kuburyo azabyara kubutaha.</b>		

	Wabagiwe iki bwambere? (.....)	
	Waba warigishijwe ko utagomba gutwita mbere y'imyaka ibiri?	Yego Hoya
	Nyuma yo kubwa waba warigeze ukoresha uburyo bwo kubonezaurubyo?	Yego Hoya
	Niba ari yego, Ubuhe? (utunini, agapira ko mukaboko, agapira ko muri nyababyeyi, gufunga burundu ...)	
	Intera iri hagati y'umwana uheruka kubyara n'uyu: (amezi.....)	
	Waba warigeze kubyara neza mbere?	Yego Hoya
	Waba uzi/warigishijwe ibyiza nibibi byokugerageza kubyara neza warabazwe?	Yego Hoya
	Waba waruzi ko kubyara bitegurwa?	Yego Hoya
	Wabwiwe aho ugomba kuzabyarira? Yego Hoya, Niba ari yego, nihe? (kukigo nderabuzima/ibitaro byakarere/ibitaro bikuru)	
	Wabwiwe ko ugomba kuhajya ryari? (ahuzabyarira) a. Ugize ibise b. Bampaye itariki	c. Igihe naggize ikibazo d. Ntabyo nabwiwe/ntabyo nzi
<b>3</b>	<b>Ubumenyi kugihe ugomba kuzabyarira</b>	
	Azi igihe aherukira imihango?	Yego Hoya
	Inda yawe ifite igihe kinganiki?	Ndabizi Simbizi
	Uzi umunsi inda yawe izabigeze igihe cyokuvuka?	Yego Hoya
	Uzi umunsi uzabyarira (kubgwa cg guterwa ibise)	Yego Hoya
	Wabwiwe ko uzabyazwa inda yawe ifite igihe kinganiki? a. Mbere y'ibyumweru 39 b. Kubyumweru 39 c. Kubyumweru 41	d. Kumezi 9 e. Ibindi (ikindi gihe) f. Ntabyo twavuganye g. Narabyibagiwe
<b>4</b>	<b>Ubumenyi kuburyo bwo kubyara</b>	
	A. Mwemeranyije na muganga ko uzabyara ute? a. Kubagwa (sezariyene) b. Kugerageza kubyara utabazwe	c. Ntabyo twaganiriye d. Simbyibuka
	B.Waba warasobanuriwe ibyiza nibibi bya buri buryo bwo kubyara (ubazwe cg utabazwe)? Yego Hoya	
<b>5</b>	<b>Uko byaje kugenda nyuma (byuzuzwa nyuma yokubyara)</b>	
	<b>d. Wabyaye ryari?</b> a. Mbere yibyumweru 37 (kubera?.....) b. Hagati yibyumweru 37-38 n'iminsi 6. (kubera?) ..... c. Nabyariye kuri gahunda nahawe (kubagwa, ibyumweru 39-39 n'iminsi 6)	

- d. Nabyariye kuri gahunda nahawe (guhabwa ibise/agapira ko munkondo yumura, ibyumweru 41
- e. Nabazwe ibise byizanye kubyumweru 39-39 n'iminsi 6
- f. Naratinze mbyara nyuma yibyumwe 40(kubabazwe) cg nyuma yibyumweru 41 kubahawe ibise. (impamvu.....)

**e. Uburyo yabyayemo/ Uko byagenze**

- a) Yabagiwe igihe cyagenywe/cyateganyijwe/Cyateguwe
- b) Yabazwe bitunguranye
- c) Yahawe ibise(agapiara komunkondo) abyara neza
- d) Yahawe ibise(agapiara komunkondo) birangira abazwe (impamvu.....)
- e) Ibise byarizanye abyara neza yarigeze kubagwa
- f) Ibise byarizanye birangira abazwe (Impamvu?.....)

**f. Ibiro umwana yavukanye**

< 2kg,            2-4kg,            ≥ 4kg

## Annex 5. IRB APPROVAL



UNIVERSITY of  
RWANDA

COLLEGE OF MEDICINE AND HEALTH SCIENCES  
DIRECTORATE OF RESEARCH & INNOVATION

### CMHS INSTITUTIONAL REVIEW BOARD (IRB)

Dr NTSINZI Bienfait  
School of Medicine and Pharmacy, CMHS, UR

Kigali, 9<sup>th</sup> /December/2020

#### Approval Notice: No 355/CMHS IRB/2020

Your Project Title "*Determinants of Timing and Mode Of Delivery For Women With History Of Previous Cesarean Scar*" has been evaluated by CMHS Institutional Review Board.

Name of Members	Institute	Involved in the decision		
		Yes	No (Reason)	
			Absent	Withdrawn from the proceeding
Prof Kato J. Njunwa	UR-CMHS	X		
Dr Stefan Jansen	UR-CMHS		X	
Dr Brenda Asimwe-Kateera	UR-CMHS	X		
Prof Ntaganira Joseph	UR-CMHS	X		
Dr Tumusiime K. David	UR-CMHS	X		
Dr Kayonga N. Egide	UR-CMHS	X		
Mr Kanyoni Maurice	UR-CMHS		X	
Prof Munyanshongore Cyprien	UR-CMHS	X		
Mrs Ruzindana Landrine	Kicukiro district		X	
Dr Gishoma Darius	UR-CMHS	X		
Dr Donatilla Mukamana	UR-CMHS	X		
Prof Kyamanywa Patrick	UR-CMHS		X	
Prof Condo Umutesi Jeannine	UR-CMHS		X	
Dr Nyirazinyoye Laetitia	UR-CMHS	X		
Dr Nkeramihigo Emmanuel	UR-CMHS		X	
Sr Maliboli Marie Josee	CHUK	X		
Dr Mudenge Charles	Centre Psycho-Social	X		

After reviewing your protocol during the IRB meeting of where quorum was met and revisions made on the advice of the CMHS IRB submitted on 9<sup>th</sup> December 2020, **Approval has been granted to your study.**

Email: [researchcenter@ur.ac.rw](mailto:researchcenter@ur.ac.rw)

P.O Box 3286 Kigali, Rwanda

[www.ur.ac.rw](http://www.ur.ac.rw)

Please note that approval of the protocol and consent form is valid for **12 months**.

You are responsible for fulfilling the following requirements:

1. Changes, amendments, and addenda to the protocol or consent form must be submitted to the committee for review and approval, prior to activation of the changes.
2. Only approved consent forms are to be used in the enrolment of participants.
3. All consent forms signed by subjects should be retained on file. The IRB may conduct audits of all study records, and consent documentation may be part of such audits.
4. A continuing review application must be submitted to the IRB in a timely fashion and before expiry of this approval
5. Failure to submit a continuing review application will result in termination of the study
6. Notify the IRB committee once the study is finished

Sincerely,



Date of Approval: The 9<sup>th</sup> December 2020

Expiration date: The 9<sup>th</sup> December 2021

**Dr Stefan Jansen**  
Ag. Chairperson Institutional Review Board,  
College of Medicine and Health Sciences, UR

Cc:

- Principal College of Medicine and Health Sciences, UR
- University Director of Research and Postgraduate Studies, UR