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Decision to Delivery Interval and its Associated Factors Among Emergency Caesarean Section Deliveries at Tibebe Ghion Specialized Hospital, Bahirdar, þÿNorthwest Ethiopia, Cross Se Study, 2023gc.

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BY; WASSIHUN TAFERE.   (MD, OBGYN RESIDENT)

AUGEST, 2023

BAHIRDAR, ETHIOPIA

BAHIRDAR UNIVERSITY

COLLEGE OF MEDICINE AND HEALTH SCIENCE SCHOOL OF MEDICINE

DEPARTMENT OF GYNECOLOGY AND OBSTETRICS

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A THESIS TO BE SUBMITTED TO BAHIR DAR UNIVERSITY COLLEGE OF MEDICINE AND HEALTH SCIENCES SCHOOL OF MEDICINE DEPARTMENT OF OBSTETRICS AND GYNECOLOGY FOR PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR SPECIALTY CERTIFICATE IN GYNECOLOGY AND OBSTETRICS.

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DECLARATION

This is to certify that the thesis entitled " Decision To Delivery Interval And Its Associated Factors Among Emergency Caesarean Section Deliveries At Tibebe Ghion Specialized Hospital ,Bahirdar,Northwest, Ethiopia, submitted in partial fulfillment of the requirements for specialty certificate in obstetrics and gynecology Bahir Dar University, is a record of original work carried out by me and has never been submitted to this or any other institution to get any other degree or certificates. The assistance and help I received during the course of this investigation have been duly acknowledged.

Dr.Wassihun Tafere   30/8/2023   ------------------------

Name of the candidate   Date   Signature

APPROVAL OF DISSERTATION

I hereby certify that I have supervised, read and evaluated this thesis titled "Decision to delivery interval and its associated factors among emergency caesarean section deliveries at Tibebe Ghion Specialized Hospital, Bahirdar, Northwest Ethiopia" by Dr.WassihunTafere Mulatie ,Prepared under my guidance. I recommend the thesis be submitted for oral defense.

Advisor's name   Signature   Date

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BAHIR DAR UNIVERSITY

COLLEGE OF MEDICINE AND HEALTH SCIENCES, SCHOOL OF MEDICINE, DEPARTMENT OF OBSTETRICS AND GYNECOLOGY

DECISION TO DELIVERY INTERVAL AND ITS ASSOCIATED FACTORS AMONG EMERGENCY CAESAREAN SECTION DELIVERIES AT TIBEBE GHION SPECIALIZED HOSPITAL, BAHIRDAR, NORTHWEST ETHIOPIA,2023.

Approval of Dissertation/thesis for defense result

As members of the board of examiners, we examined this dissertation/thesis entitled 'Decision to Delivery Interval and Its Associated Factors among Emergency Caesarean Section Deliveries at Tibebe Ghion Specialized Hospital, Bahirdar, Northwest Ethiopia 'by Dr.Wassihun Tafere. We hereby certify that the thesis/dissertation is accepted for fulfilling the requirements for the award of the degree of "Speciality in Obstetrics and Gynecology".

Board of Examiners

External examiner name   Signature   Date

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Internal examiner name   Signature   Date

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Chair person's name   Signature   Date

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ACKNOWLEDGEMENT

ABBREVIATIONS

ACOG---American College of Obstetricians and Gynecologists

CS--- Cesarean delivery

DDI---Decision to delivery interval

EDHS---Ethiopian demographic health survey

EMCS---Emergency Cesarean section

FHCS---felege-hiowot compressive hospital

LM-HDI--- low and medium human development index

NICE--- National Institute for Health and Clinical Excellence

RCOG--- Royal College of Obstetricians and Gynecologists

TGSH---Tibebe Ghion Specialized Hospital

WHO---World Health Organization

OBGY….Obstetrics And Gynecology

ABSTRACT

BACKGROUND: Decision to delivery interval (DDI) is the time line between a decision to conduct an emergency caesarean section and actual delivery of the baby. Prolong DDI constitute a third phase delay in provision of emergency obstetric care. Intervention designed to minimize DDI are vital, in attempt to prevent maternal morbidity and neonatal morbidity and mortality. The feasibility and practicability of the recommended DDI in recent studies have been questioned especially in limited resource setting and therefore the objective of this study was to determine the DDI and its associated factors.

OBJECTIVE: To asses Decision to Delivery Interval and its associated Factors among Emergency Caesarean Section Deliveries at Tibebe Ghion Specialized Hospital Northwest Ethiopia.

METHODS: cross-sectional study was conducted at Tibebe Ghion Specialized Hospital Bahir Dar city, Ethiopia, from February 1/2023- to –JUNE30, 2023 GC. A total of 244 mothers who had emergency cesarean section were included in the study. Systematic sampling was used. The collected data was cleaned, coded and entered into coded and entered into SPSS version 25 for analysis and bivariate analysis was computed. Binary logistic regression using bi-variate and multi-variable regression analysis was done. Statistical significance was considered at P value of less than 0.05 and the strength of association was assessed by odds ratio (OR) and respective confidence intervals (CIs).

Result: only 24.3% of participants had a decision to delivery interval of ≤30minutes. The overall mean of DDI was 46 ± 16 minutes. The mean duration for anesthesia time was 13.4 ± 7 minutes. Anesthesia time [AOR = 5.8, 95%CI = 2.6–12.9] and anesthesia type [AOR=12.8, 95%CI=2.4-6.9] were the predictors of prolonged decision to delivery interval.

Conclusion: in most cases decision to delivery interval was achieved within the recommended time interval. In this study anesthesia time and anesthesia type has statistically significant association with prolonged DDI.

Keywords: emergency cesarean section, decision to delivery interval .

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1 INTRODUCTION

1.1 Background

Cesarean section is a procedure through which the birth of a fetus via laparotomy followed by hysterotomy (1). This definition is not applied to removal of the fetus from the abdominal cavity in the case of uterine rupture or with abdominal pregnancy. Emergency caesarean section is a type of surgical procedure which is performed when there is an immediate threat to the life of fetus or woman during delivery(1). According to Royal College of Obstetricians and Gynecologists (RCOG),American Academy of Pediatrics (AAP) and American College of Obstetricians and Gynecologists (ACOG), the recommended decision to delivery interval (DDI) for Emergency caesarean section is delivery of the fetus within 30 minutes since there is an immediate risk to the life of the mother or newborn, or both during delivery(2). The National Institute for Health and Clinical Excellence (NICE) also recommends that in cases of confirmed or suspected acute fetal compromise, loosely equivalent to grade 1 procedures but also including some grade 2 procedures, delivery should be accomplished within 30 minutes where possible .Globally, it is generally accepted that the DDI should be kept to the minimum achievable time because preventing adverse feto-maternal outcomes is critically time-dependent (2).

The DDI is measured as the time from the time of notification of the procedure to the delivery of the new born (3).Recent evidence indicates that the goal of the World Health Organization (WHO) for secure access and quality of care for pregnant women and newborns in Africa has not yet been achieved(4). Depending on the severity of the fetal and/or maternal condition, a new classification for caesarean section was developed and this categorization of CS can help to prioritize patients. Emergency (classification I), urgent (classification II), scheduled (classification III), and elective (classification IV) were the four-category classification schemes proposed by Lucas et al(5). Each year in the United States, approximately one third of more than 4 million neonates are born by cesarean delivery(6). Indeed, the operation is the most commonly performed major surgery in this country in women aged 18 to 44 years. More than 85 percent of these operations are performed for four reasons prior cesarean delivery, Dystocia, fetal jeopardy, or abnormal fetal presentation(6).

The WHO has opined that a rate of 1 to 5 percent is necessary to avoid severe maternal morbidity and mortality, whereas a rate beyond 10 percent does not lower neonatal mortality rates. This would indicate that a minimum cesarean delivery rate should be 5 to 10 percent .In 1985, the WHO recommended that the upper limit be 15 percent(7).

The 2016 EDHS found that 2% of live births in the 5 years before the survey were delivered by CS. One percent of the CS were decided after the onset of labor pains, compared to the less than 1% that were decided before onset of labor pains. EmCS is delivery of the fetus within 30 minutes since there is an immediate risk to the life of the mother or newborn, or both during delivery(8). Despite global initiatives for improvement, there remains considerable complexity in increasing obstetrics resource availability in LM-HDI settings (9, 10).National guidelines in the USA and UK suggest a target of 30 min after the decision to deliver by emergency cesarean section is established (11, 12). Such guidelines, however, are not well evidenced(13) and may not be feasible even in well resourced obstetric settings (14). Furthermore, whilst globally it is generally accepted that the decision-to-delivery interval should be kept to the minimum time achievable (15), there are currently no context-appropriate targets intended to minimize adverse outcomes in low and medium human development index countries.

1.2 Statement of problem

Preventing adverse perinatal outcomes is often critically time-dependent; however, demand can exceed capacity for prompt intervention in the settings well(8, 9).

CS can improve infant and/or maternal outcomes only when used appropriately (7).Therefore, hospitals providing obstetric care should be able of respond to obstetric emergencies within the recommended time (16). Despite this, in developing nations, reviews reported that difficulty in achieving the recommended 30 min DDI and fetal deaths occurred while waiting for EmCS(16). In Ethiopia, the EmCS access is high (17, 18). However, similar to other developing nations, poor neonatal outcomes after delivery by EmCS are high (19). This results in psychological and physical trauma to the mother. In case of an emergency cesarean section, DDI must be considered to be completed in the target. DDI remains an important indicator for evaluating the quality of maternity Care in EmCS.

All facilities that provide comprehensive obstetric care should respond to obstetric emergencies within the time limit (20). However, EmCS might take time to initiate in developing countries,

and the resources needed may not be adequate. In many developing countries, maternal and neonatal morbidity and mortality rates are high(3, 21). For example, in Ethiopia, the neonatal mortality rate is 29 deaths per 1,000 live births (21). In particular, after EmCS, neonatal mortality and morbidity were high. In addition, up to 14% of newborn loss has-been reported after delivery by EmCS(19). Therefore, only access to EmCS is insufficient, and the quality of the service is necessary for a better perinatal outcome(22).

Previous studies at teaching hospitals on DDI and associated factors shows discrepancy from country to country . Few studies in our region were done at primary hospitals and others were multicenteric where majority of samples taken from non-teaching hospitals. So due to differences in human power and other facilities, the results may not represent teaching hospitals. Therefore setup based information in the study area is very important.

1.3   Significance of the Study

Knowing the DDI and associated factors will help us to propose possible evidence based interventions based on the findings. Having this research will guide providers and the facility to have better preparedness in advance and ready for rapid emergency action.

It will result in a better patient outcome and satisfaction by allowing health care provider to prepare on preventive mechanisms for unnecessary delay in DDI, Perinatal outcomes and avoid modifiable factors. The result will also help the hospital, department, maternal and child health office to propose interventions for a better feto-maternal outcome.

2   Literature review

Due to overcrowded and fragile health care systems in developing nations, the total DDI is often extended to 75 minutes without significant morbidity (23).

Retrospective research performed in the United States has also shown that there is no major improvement in the proportion of intensive care enrollment in babies born within 30 minutes compared to those delivered over 75 minutes.However, if the DDI is pushed past 75 minutes, substantial maternal and neonatal morbidities and mortality are likely to occurs(23).

A recent study in Nigeria reported that 5.1% perinatal mortality and 1% fresh stillbirth is statistically significant with an increase in DDI beyond 75 minutes(24).
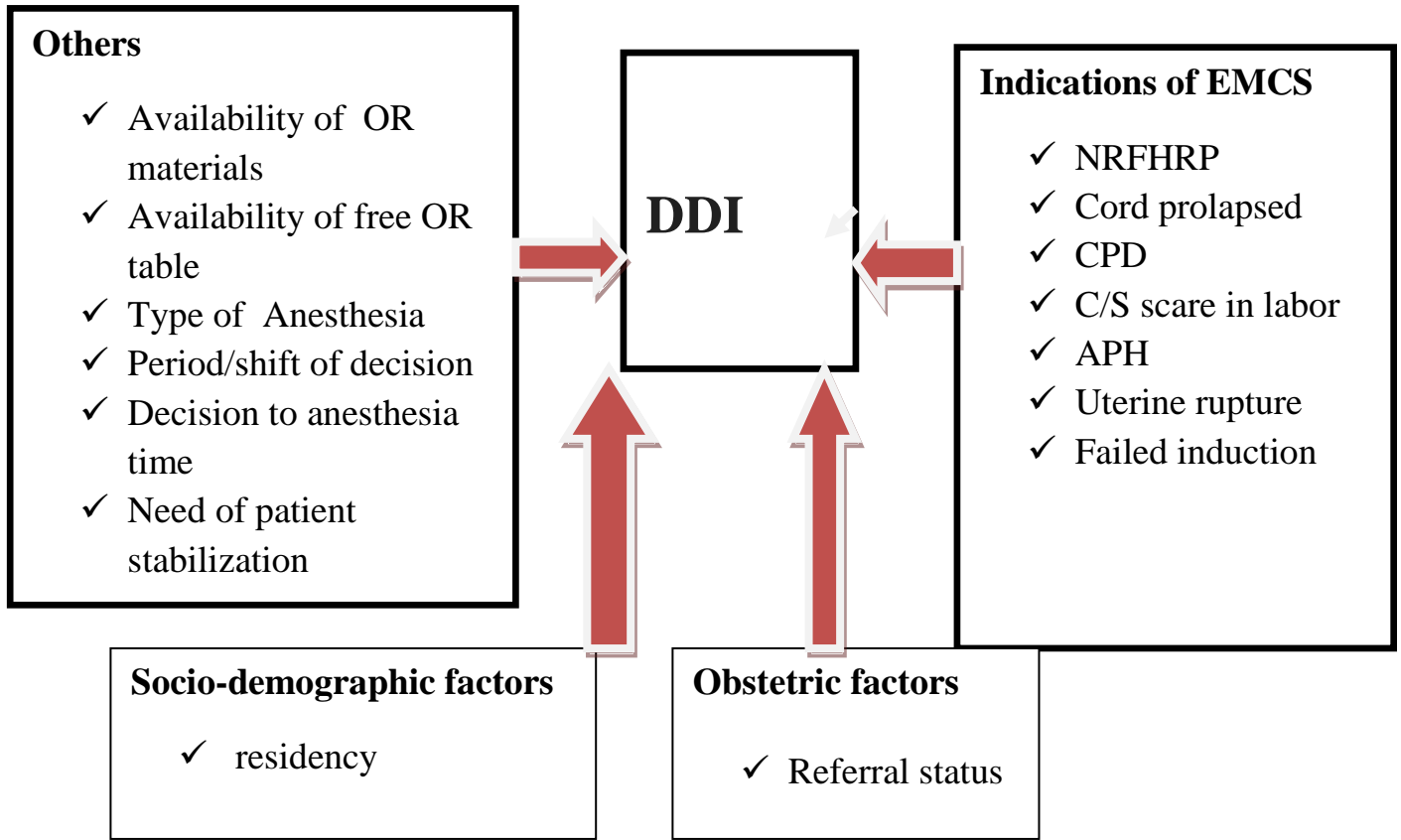
In A 1-year prospective audit in a tertiary care hospital,india,on '''Evaluation of decision-to-delivery interval in emergency cesarean Section'' A total of 453 emergency CSs were evaluated, with a mean DDI of 36.3 ± 17.2 min for Category 1 CS and 38.1 ± 17.7 min for Category 2 CS . Only 42.4% emergency CSs confirmed to the 30 min DDI while 57.6% had a DDI of more than 30 min. In this study factors found to be Reasons for Failure to achieve the desired DDI resulted from delay in obtaining consent, sending blood for grouping, cross matching, delay in shifting to OT, non-availability of OT degree of clinical urgency not being perceived by the obstetric team, anesthesia factors, and lack of resources or manpower and procedural delay during induction of anesthesia(25).

A study in Tanzania was done on decision delivery interval in emergency caesarean section and it's associated maternal and fetal outcomes retrospective cross-sectional study from January to September 2014. A total of 598 women who underwent emergency caesarean section were recruited. The median Decision Delivery Interval was 60 min. Only 12% were operated within 30 min from decision time. Shortest DDI was seen in patients with Cephalopelvic Disproportion (CPD) and uterine rupture (40 min and 45.5 min) as compared to other conditions. Cases with impending uterine rupture, cord prolapse, APH and fetal distress showed to have shorter DDI. There was no significant association between DDI and neonatal transfer, 1st and 5[th]minute Apgar score, maternal blood loss and hospital stay. Here it is found that the prolonged decision to anesthetic time influenced DDI but factors that caused the delay were not determined as it was a retrospective study. Previous studies conducted elsewhere have reported factors that influenced delay in decision to anesthetic time. In the present study, the anesthesia to delivery of the baby was also prolonged. This may be explained by the fact that many patients had previous scars and adhesions can cause delay before extracting the baby. It is also a teaching hospital whereby anesthetic students get trained for induction of anesthesia which could also prolong the anesthesia to delivery of the baby time(26).

In a study done in south Gondar zone hospitals on Decision to Delivery Interval, Fetal Outcomes and Its Factors among Emergency Caesarean Section Deliveries, A total of 510women were included. Only 17.5% of women attained a decision-to-delivery interval ≤ 30 minutes. The average median of decision to delivery interval was 54 minutes with range of 48– 80 minutes. Significant fetal adverse outcomes were not observed in a decision to delivery interval higher than 30 minutes. In this study availability of materials, time of decision, type of anesthesia, the decision to anesthesia time, experience of surgeons, and experience of anesthetists had a statistically significant influence on DDI(3).

A cross-sectional study was done on ''Decision to delivery interval and associated factors for emergency cesarean section'' in 2020 in bahirdar. The result showed that Decision-to-delivery interval below 30 min was observed in 20.3% of emergency cesarean section. It also showed that referral status, time of day of emergency cesarean section, status of surgeons, type of anesthesia and transfer time were factors significantly associated with the decision to delivery interval(16). A prospective cohort study on ''Effect of decision to delivery interval on perinatal outcomes during emergency cesarean deliveries'' was conducted from May to July 2020 at Bahir Dar City Public Hospitals and total of 182 participants were enrolled. The average decision to delivery interval was 43.73 ±10.55 minutes. Anesthesia time and category of emergency cesarean section were predictors of decision to delivery interval. The prolonged decision to delivery interval had a statistically significant association with composite adverse perinatal outcomes(27) .

FIGURE 1CONCEPTUAL FRAMEWORK FOR THE STUDY ON DECISION TO DELIVERY INTERVAL AND ITS ASSOCIATED FACTORS AMONG EMERGENCY CAESAREAN SECTION DELIVERIES AT TIBEBE GHION SPECIALIZED HOSPITAL ,BAHIRDAR,NORTHWEST ETHIOPIA, CROSS SECTIONAL STUDY , 2023 GC.

Others
- ✓ Availability of OR materials
- ✓ Availability of free OR table
- ✓ Type of Anesthesia
- ✓ Period/shift of decision
- ✓ Decision to anesthesia time
- ✓ Need of patient stabilization

DDI

Indications of EMCS
- ✓ NRFHRP
- ✓ Cord prolapsed
- ✓ CPD
- ✓ C/S scare in labor
- ✓ APH
- ✓ Uterine rupture
- ✓ Failed induction

Socio-demographic factors
- ✓ residency

Obstetric factors
- ✓ Referral status

3 OBJECTIVE OF THE STUDY

3.1 General objective

➢ To asses Decision to Delivery Interval and its associated Factors among Emergency Caesarean Section Deliveries at Tibebe Ghion Specialized Hospital Northwest Ethiopia, from FEBRUARY 1/2023 –JUNE 30/2023GC.

3.2 Specific objective

➢ To calculate Decision to Delivery Interval among Emergency Caesarean Section Deliveries at Tibebe Ghion Specialized Hospital Northwest Ethiopia,

➢ To identify factors associated with decision to delivery interval among Emergency Caesarean Section Deliveries at Tibebe Ghion Specialized Hospital Northwest Ethiopia,

➢ To determine the association   between decision to delivery interval and composite adverse perinatal outcomes.

4 METHODS AND MATERIALS

4.1 Study design and period

A cross-sectional study design was done from FEBRUARY, 1/2023 to June 30/2023

4.2 Study area

➢ The study was conducted at Tibebe Ghion Specialized Hospital, Bahirdar, Northwest Ethiopia,BahirDar city which is the capital city of Amhara region. It is located 565 km Northwest to Addis Ababa. According to a survey in 2021, the total population of Bahir Dar is estimated to be 168,899.

➢ The city had two tertiary hospitals, 1 primary Hospital, four private hospital, 6 health centers, 13 private clinics, 2 Non government clinics, one Fistula center and one regional public health institute.

➢ TGSH is one of tertiary hospital (teaching) located 7 km to the south of Bahir Dar giving service for both the town and satellite areas around it. It was started in 2018G.C, giving service in different areas. . There are 1 Maternal and Fetal Medicine specialist, 2 Gynecology Oncologist, 3 Maternal and Fetal Medicine fellow, 2 Gynecology Oncologist fellow, 3 Uro Gynecology fellow, 10 general gynecology and obstetrics consultants, 58 Gynecology and obstetrics resident and 76 Midwife currently working in the department of gynecology and Obstetrics.

4.3 Source population

All laboring Mothers who was admitted at TGSH .

4.4 Study population

➢ All Mothers who had emergency cesarean section in the time period from February 1/2023 to June 30/2023GC.

4.5 Inclusion and Exclusion criteria :

All mothers who undergone EmCs at TGSH during the study period were included.

Those unable to give information due to seriously sick/mentally disability will be excluded.

4.6   Sample size determination

Sample size determined using Epi info for single population proportion with using a prevalence value (P) of 17.5% marginal error (d) 5% and 95% confidence interval (CI)..

P= percent of mothers who gave birth within the recommended time (decision to delivery interval ≤30minutes) with EmCS (expressed as decimal 0.175 taking from study done at south Gondar zone hospitals ,Amhara region, Ethiopia.

d= 5% of marginal error was taken.

We were obtained 244 to be the sample size (including 10% nonrespondant)

4.7   Sampling procedure

Using a baseline data of EmCS in the last 5 month which was 491,the sample was collected by using systematic random sampling technique using a calculated K value of 2 and the 1st client was selected by lottery method..

4.8   Variables of the study

4.8.1   Dependent variables

Decision-to-delivery interval

4.8.2   Independent variables

Socio-demographic characteristics such as

Age

Marital status

Educational status

Occupation status

residence

Educational status

Obstetric factors such as

Gravidity, parity

Antenatal follow up

Referral status

Previous history os CS

An indication of EMCS

Anesthesia time and

Anesthesia type

4.9   Operational definition

Decision-to-delivery interval.

A time range from the decision for EMCS to delivery of a newborn. After calculating to the nearest minute, 30min was used as the cutoff point(20).

Anesthesia time

The time taken from arrival at operation theater to skin incision time and 10 minutes used as a cutoff point to say delayed or not(25).

Composite adverse perinatal outcome.

Presence of one of the following perinatal outcomes: fifth minute APGAR score of less than seven, admission to the neonatal intensive care unit (NICU), and need of advanced resuscitation(27) .

4.10 Data collection methods and instrument

Interview administer quaistionare and checklist was prepared in consulting with advisor, literatures reviewed and referring different recent guidelines and other documents on decision to delivery interval and its associated factors among emergency caesarean section deliveries. Checklist was used to collect data from patient chart not answered by interview quaistionare.

Data collection was done by 4 bachelor degree midwives and 3 year three residents supervised the data collectors.

Training on methods of data collection was given for one day for the data collectors and for the supervisors. The data was collected from clients and charts. The questionnaire included the socio-demographic variables, and obstetric variables.

Pre-test was conducted on 5% of the cases that had CS at FHRCH then the checklist will then be modified based on the pretest results.

The final checklist to be used was checked by data collectors & supervisors on daily basis for completeness, accuracy, validity and consistency of data.

4.11 Data quality control

From the very beginning, data collectors and supervisor was given a full course of training regarding the basic principles of data collection procedure. The principal investigator and supervisors were making day to day onsite supervision during the whole period of data collection. At the end of each day, the questionnaires were reviewed and checked for completeness, accuracy and consistency by the supervisor and principal investigator and corrective measure were taken together with the data collectors. Following the discussion corrective directions were given on how to minimize errors.

4.12 Data processing and analysis

After all the necessary data collected, the data was coded on pre-arranged coding sheet by the principal investigator. Data was coded and entered into SPSS version 25, to get the descriptive figures on major variables. And the degree of association between the dependent and independent variables was assessed by using bi variable logistic regression with 95% confidence interval and p value of 0.05. Multivariable logistic regression used to identify the relative importance of each predictor to the dependent variable by controlling for the effects of other variables. Those variables which was significant on bivariate analysis (P-value <0.25) was entered to multivariable logistic regression analysis. The association between dependent and independent variables was determined using odds ratio (OR) with 95% confidence interval (CI). The level of significance was taken at $\alpha \leq 0.05$.

4.13 Ethical consideration and consent

Before the data collection, ethical clearance were obtained from the Ethical committee of Bahir Dar University School of medicine. Then formal letter of cooperation was written to TGSH to obtain consent. Study participants were informed about purposes of the study and its procedures. Oral consent were obtained from each participant and information kept confidentially.

4.14 Dissemination of result

After completion of the research the result will be submitted to TGSCH, Bahir Dar University CMHS and to the regional health bureau. So as to use results for planning and implementation of programs, attempt will also be made to present it at the regional & national meetings and conferences. It will also be tried to submit for scientific publications.

5 Result

Socio-demographic characteristics

A total of two hundred forty three women were included in this study, with a response rate of 99.6%. Almost one-third, 86(35.4%) of the participates were between the ages of 25−29 years (table 1).

Table 1; Socio-demographic characteristics of participants (n=243).

Variable	Categories	n(%)
AGE in Years	<20	21(8.6)
	20-24	62(25.5)
	25-29	86(35.4)
	30-34	43(17.7)
	>=35	31(12.8)
Marital status	Single	1(0.4)
	Married	232(95.5)
	Divorced	10(4.1)
Educational status	Cant read	79(32.5)
	Elementary	72(29.6)
	High school-preparatory	49(20.2)
	Diploma and above	43(17.7)
Occupational status	House wife	136(56)
	Employee	36(14.8)
	Merchant	65(26.7)
	Student	6(2.5)
Place of residence	Urban	138(56.8)
	Rural	105(43.2)

Obstetrical characteristics of participants

The result showed that 41.2% of the respondents were multiiparous and 33.3% were nulliparous.
83.5 % of the participants had four or more antenatal care (ANC) visits and 3.3% of participants
had no ANC follow up.43 (17.7%) of respondents had a previous history of cesarean section .

Table 2: obstetrical characteristics of participants (n=243)

Characteristics	Categories	n (%)
Gravidity	Primigravidae	70(28.8)
	Multigravid	173(71.2)
Parity	Nullipara	81(33.3)
	Primipara	59(24.3)
	Multipara	100(41.2)
	Grand multipara	3(1.2)
ANC follow up	No ANC follow up	8(3.3)
	One visit	2(0.8)
	Two visit	1(0.4)
	Three visit	29(11.9)
	Four and above	203(83.5)
BPCR®(n=235)	No	9(3.8)
	Yes	226(96.2)
Referral	No	98(40.3)
	Yes	145(59.7)
Previous history of C/S⊕	No	200(82.3)
	Yes	43(17.7)

® Birth Preparedness and Complication Readiness Plan

⊕Cesarean Section

Indications for emergency cesarean section

In this study non reassuring fetal heart rate pattern (NRFHRP) were the most common indication
, accounted for about 65(26.7%) of cases. The lowest decision to delivery time was seen for
NRFHRP which was 15 minutes ,where as the highest was for failed induction.

Table 3: indications for emergency cesarean section (n=243)

Indications	Decision to delivery interval		Total, n (%)
	<=30 minute	>30 minute	
CPD	10	29	39(16)
NRFHRP	27	38	65(26.7)
Failed induction	5	29	34(14)
1 c/s scar in labor opted for c/s	5	21	26(10.7)
>=2 c/s scar in labor	9	13	22(9.1)
LFSOL +G-3 MSAF	1	18	19(7.8)
PLFSOL +G-2 MSAF	0	22	22(9.1)
Obstructed labor	0	9	9(3.7)
Others	2	5	7(2.9)

Operative and Pre-operative related characteristics

Among the study participants ,12(4.9%) need stabilization before the operation and for about 3(1.2%) cases there were a delay in obtaining consent. material needed foe operation were available for 213(87.7%) cases and operation table were busy for 1(0.4%) case.

Proportion of recommended decision to delivery interval

Three fourth of participants 184(75.7%) has a DDI of longer than 30 minutes but 59(24.3%) of deliveries were done within the recommended DDI, ≤30 minutes. Regarding to the proportion of deliveries done within the recommended DDI ≤30 minutes, there was a difference   in relation to the period/shift of the day, 20.5% on duty time and 28.8% on working hours. The overall mean of DDI was 46 ± 16 minutes. The mean time for anesthesia time was 13.4±7 minutes.

Factors associated with DDI

Binary logistic regression was employed to evaluate association between different socio demographic, obstetric, Operative and Pre-operative related variables with decision to delivery interval. In the Bivariable analysis, period/shift of the day of decision, indication, type of

anesthesia, anesthesia time, need of patient stabilization before operation and lack of OR material for operation were statically significant at p-value <0.25 level of significance. In multivariable logistic regression analysis anesthesia time and anesthesia type remained significant. Women who had Anesthesia time ≤10 minutes were 5.8 times more likely to have decision to delivery interval within 30minutes than women who had Anesthesia time >10minutes [AOR = 5.8, 95%CI = 2.6–12.9]. Beside this, women whose operation was performed under general anesthesia were 12.8 times more likely to have decision to delivery interval within 30minutes than women who were performed under regional anesthesia [AOR=12.8, 95%CI=2.4-6.9]. As compared to easily available OR materials, the odds of having longer DDI (More than 30minutes) were 4.6 times higher in OR materials which are not available (AOR=4.6, 95%CI 9.10-23.40)

Table 4; Bivariate and Multivariate logistic analysis of factors affecting decision to delivery interval (n=243)

Variables	Category	Decision to delivery time		P-value	COR (95%CI)	P-value	AOR (95%CI)
		≤30Minute ,n	>30 minute, n				
Anesthesia type	GA	14	9	**0.000**	**6(2.4-14.9)**	0.003	12.8(2.46.9)
	SA	45	175	**1**		1	
Anesthesia time	≤10 minute	48	74	**0.OO1**	**6.4 (3-13)**	0.000	5.8(2.612.9)
	>10 minute	11	110	**1**		1	
Lack of OR material	No	57	149	**1**		1	
	Yes	2	35	**0.11**	**6.7(1.55-28.7)**	0.045	4.6(9.10-23.40
shift of the day of decision	Duty hour	28	104	**1**			
	Working hour	31	80	**0.22**	**1.44 (0.8-2.6)**		
Patient needs stabilization	Yes	1	11	**0.21**	**3.7 (0.4-29)**		
	No	58	173	**1**			
Referral	Yes	31	114	**0.20**	**1.47 (0.8-2.7)**		
	No	28	70	**1**			
Indications	CPD	10	29	**1**			
	NRFHR	27	38	**0.10**	**0.48(0.2-1.1)**		
	Failed induction	5	29	0.254			
	1cs scar	5	21	0.55			
	≥2cs scar	9	13	**0.22**	**0.5(0.17-1.5)**		
	LFSOL +G-3 MSAF	1	18	**0.094**	**6(0.7-52)**		
	Obstructed labor	0	9	0.999			
	PLFSOL +G-MSAF	0	22	0.998			
	Others	2	5	0.87			

Newborn results of study participants

Newborn Findings that was identified in this study were 5th minute Apgar score, need of advanced resuscitation, and admission to neonatal ICU.Among 243 deliveries, newborns with 5th minute Apgar < 7 was documented in 9(3.7%) of cases ,9 ((3.7%) of newborns need advanced resuscitation and 8(3.3%) of newborns admitted to NICU.

Among newborns who had 5th minute Apgar score <7, only 22.2% were delivered within the proposed decision to delivery interval, ≤30minutes. As we do not have adequate evidence, it is rather difficult to ascribe cause and effect.

6   Discussion

This study found that 59(24.3%) of emergency cesarean deliveries were done within the proposed DDI of ≤30 minutes. The overall mean of DDI was 46± 16 minutes. this result was in parallel with a study done at university of Gondar specialized hospital which conclude that 19.6% of participants who undergoes emergency CS were born within the recommended DDI of ≤30 minutes(28). The reason for these results may be similarity in the trend and experience of professionals and similarity in accessibility of logistics in the hospitals. This outcome is also in line with the study done at Bahir Dar City Public Hospitals which showed that 20.3% of participants who undergoes emergency CS were born within the recommended DDI of ≤30 minutes [16].

On the contrary, our result is higher than research done at in south Gondar zone hospitals which found that 17.5% of respondents who undergoes emergency CS were born within the recommended DDI of ≤30 minutes [3].   The accessibility of logistics in hospitals and the practice and Experience of professionals may contribute for this difference. Our findings are also higher than research done in Tanzania which found that only 12.3% of cases who undergoes emergency CS achieved A DDI of ≤30minutes(26) .

 But this finding is less than the   study done in India which found that 42.4% of cases who undergoes emergency CS had the recommended DDI of ≤30minutes (25). This difference may be due to general infrastructure and Economic differences.

According to the finding of this study anesthesia time longer than 10 minutes has statistically significant relationship with prolonged decision to delivery interval (AOR =5.8, 95%CI, 2.6-12.9). This finding was consistent with study findings in India, south Gondar zones and university of Gondar, Ethiopia [3.25.28].

The result of this study showed that women whose Emergency CS was performed under general anesthesia were 12.8 times more likely to have recommended DDIs than women who were performed under regional anesthesia (AOR=12.8,95% CI=2.4-6.9).This finding is in line with the studies done at Bahir Dar City Public Hospitals and south Gondar zone Hospitals(Ethiopia), India, and Norway [3,25,16,29]. This   may be due to a delay in regional anesthesia as a

Result of technical problems in inducing, and stabilization of clients before regional anesthesia is needed.

As compared to easily available OR materials, the odds of having longer DDI (More than 30minutes) were 4.6 times higher in OR materials which are not available (AOR=4.6, 95%CI 9.10-23.40). The result is consistent with the studies done at of the specialized hospital at the University of Gondar and south Gondar zone hospitals (3, 28)

7   Conclusion

In majority of cases decision to delivery interval was not achieved within the recommended time interval. In this study anesthesia time ,anesthesia type and lack of OR material has statistically significant association with prolonged DDI.

Limitation and Strength of the Study

The strength of this study is that, we used interview and direct observation, so, it decrease missing information.

 On the other hand; this study does not include long term effect of decision to delivery interval on fetal and maternal outcomes.

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Part I: Question on socio-demographic characteristic

S.R	Question	Possible answer
101	Age in year	
102	Marital Status	Single
		Married
		Divorced
		Widowed
103	Educational status	Can't read and write
		Elementary
		High school- Preparatory
		Diploma and above
104	Occupation	House wife
		Farmer
		Employed
		Merchant
		Other(specify)_____
105	Place of residence	Urban
		Rural

Part II: Obstetrics related

201	Gravidity	
202	Parity	
203	Did you have ANC follow-up in your current pregnancy?	Yes
		No
204	Where was your ANC follow up?	Health center
		hospital
		Private clinic
204	How many times did you visited ANC clinic?	One
		Two
		Three
		Four and above
205	Were you counseled on Birth preparedness and complication readiness plan during ANC follow up?	Yes
		No
206	Are you referral	Yes
		No
207	Did you have history of delivery by cesarean section?	Yes
		No

Part III: Decision to delivery interval related questions

S.N	Question	Possible answer
301	Period /shift of the day of decision for emergency cesarean section	Duty time
		Working time
302	Indication for cesarean section(from surgeons note)	
303	Time of decision for emergency cesarean section	

304	Time while women arrival at Operation room.	
305	Type of anesthesia	General anesthesia
		Regional anesthesia
306	Incision starting time	
307	Baby out time in minutes	
308	Is there any Delay in obtaining consent?	Yes
		No
309	Is there lack of OR material for preparations?	Yes
		No
310	Is the OR table Free & functional?	Yes
		No
311	Where was the operation done?	Obstetrics OR
		Major OR
312	Is there any need to stabilize the patient before operation?	Yes
		No

Part IV-Neonatal outcome

	Outcome		
1	5th min Apgar score		
2	Is there need for advanced resuscitation	Yes	
		No	
3	Is the newborn admitted to NICU	Yes	
		No	