A PROSPECTIVE OBSERVATIONAL STUDY ON DECISION TO DELIVERY INTERVAL AND PERINATAL OUTCOME IN EMERGENCY CAESAREAN SECTION IN TERITARY CARE HOSPITAL

By

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Under the Guidance of

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Dr KONDAREDDY RADHIKA

LIST OF ABBREVATIONS

DLHS : District Level Household and Facility Survey

ACOG : American College of Obstetricians and Gynecologists

ASA : American Society of Anesthesiologists

RCOG : Royal College of Obstetricians and Gynecologists

WHO : World Health Organization

VBAC : Vaginal Birth After Caesarean

DDI : Decision to Delivery Interval

ASHRM : American Society of Health Care Risk Management

OT : Operation Theatre

IV : Intravenous

BT : Bleeding Time

CT : Clotting Time

ECG : Electrocardiogram

ICU : Intensive Care Unit

NICU : Neonatal Intensive Care Unit

NH : National Hospital, Federal Capital Territory, Abuja, Nigeria

UNTH : University of Nigeria Teaching Hospital (UNTH) Enugu,South

Eastern Nigeria

UCMS : University College of Medical Sciences, Delhi

min(s) : minute(s)

LR : Labor Room IIPS : International Institute of Population Science

CS : Caesarean Section

HSV : Herpes Simplex Virus

HIV : Human Immunodeficiency Virus

DIC : Disseminated Intravascular Coagulation

ANOVA : Analysis Of Variance

HIE : Hypoxic Ischemic Encephalopathy

LSCS : Lower Segment Caesarean Section

NST : Non Stress Test

SAB : Subarachnoid Block

GA : General Anesthesia

ABSTRACT

A PROSPECTIVE OBSERVATIONAL STUDY ON DECISION TO DELIVERY INTERVAL AND PERINATAL OUTCOME IN EMERGENCY CAESAREAN SECTION IN TERITARY CARE HOSPITAL

INTRODUCTION: In a life-threatening context, the American College of Obstetrics and Gynecology and the Royal College of Obstetrics and Gynaecology recommended a maximum delay of 30 min between the decision to perform an emergency caesarean delivery and the infant's birth. This limit is usually not met in a rural tertiary centre in a developing country. If this delay in decision to delivery interval had any effect on perinatal outcome was studied in this study.

AIMS AND OBJECTIVES:

- To identify the factors causing delay in decision to delivery interval for emergency caesarean section
- To assess the effect of decision delivery interval on perinatal outcome.
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METHODS: This is a prospective cross-sectional observational study conducted in R.L.Jallapa Hospital and Research centre, Department of Obstetrics and Gynecology, attached to Sri devaraj urs Medical College, Kolar during January 2017 to May 2018.

A total of 200 pregnant women posted for emergency caesarean delivery were included during the study period.

RESULTS: Among 200 participants, 39 (19.5%) belonged to category 1, 82(41%) to category 2 and79(39.5%) to category 3 . The mean DDI in the study participants was 79.28 ± 28.66 mins. Mean DDI for category 1, 2, and 3 caesarean deliveries were 47.23 ± 13.35 mins, 64.83 ± 11.83 mins and 110.1 ± 13 mins respectively. Interval 1 contributed to majority of DDI. Most common indication for caesarean section was fetal distress among the study participants. Most important factors causing delay in the study were delay in obtaining consent from patient bystanders in 45.5% cases. In category 1 caesarean delivery, in 46.15 % of cases the delay was due to time spent in arranging for cross matched blood products in cases of placenta praevia, placental abruption or as the patients were immediately unfit (severe anemia, fever, hypotension, DIC etc.) and required some resuscitative measures to withstand anaesthesia .Among study cases, 72,5% babies were shifted to mother's side after caesarean delivery, 27% babies were shifted to NICU and 0.5 % were stillborn.

CONCLUSION: Neonatal outcomes did not differ significantly in between those caesarean deliveries with DDI≤30 mins and those with DDI>30 mins. It is difficult to achieve 30 minute goal in every emergency caesarean delivery and it is also not an indispensible measure to prevent maternal or neonatal morbidities. But DDI of ≤30 mins is not unachievable in case of urgent indications like cord prolapse. Hence it is necessary for each emergency obstetric unit, to effectively triage emergency caesarean deliveries and develop the capability of commencing such cases as fast as possible.

KEYWORDS: **DDI, Emergency Caesarean section, Neonatal outcome**.

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Introduction

INTRODUCTION

Caesarean delivery is defined as the delivery of a fetus through surgical incisions made through the abdominal wall and the uterine wall. There are two general types of caesarean delivery—*primary* refers to a first-time hysterotomy and *secondary* denotes a uterus with one or more prior hysterotomy incisions. Neither definition includes removal of the fetus from the abdominal cavity in the case of uterine rupture or with abdominal pregnancy.

Caesarean delivery rate in the year 2009 and 2010 in US was 32.9% and 32.8% respectively.[1]In India, caesarean delivery rates are 12% for public institutions and 28% for private institutions according to DLHS3 2007-08 data.[2]

In modern obstetrics caesarean delivery is offered electively to women for variety of indications, or performed in emergency maternal or fetal complications or both. The operation of caesarean delivery has witnessed evolution from it being done in desperate situation to separate the fetus from moribund mother in an attempt to save the child, to the present times where it has become a surgical procedure to resolve maternal or fetal complications not amenable to vaginal delivery.

Decision to delivery interval means duration from the time decision for emergency caesarean delivery is made to the time of extraction of the baby. This term is not synonymous with decision to incision time which is the time, decision for emergency caesarean delivery is made to the time at which incision is made on the maternal abdomen.

The American College of Obstetricians and Gynecologists (ACOG) Committee on Professional Standards established in 1989, that hospitals with obstetric services should have the capability to begin a caesarean delivery within 30 minutes of the time that the decision is made to perform the procedure.[3]

Examples of conditions cited by the American Academy of Pediatrics and ACOG that may require delivery within 30 minutes include hemorrhage from placenta previa, placental abruption, umbilical cord prolapse, and uterine rupture.[4] There is little published information, and no prospective studies, describing the relationship between caesarean response times for these emergencies and subsequent maternal and infant outcomes.[4] In spite of such limited

data, the 30-minuteresponse time has become a medical–legal benchmark for adequacy of obstetric care when caesarean delivery is indicated.[5]

The American academy of pediatrics and the American college of obstetricians and gynecologists (2012) recommend that facilities giving obstetrical care should have the ability to initiate caesarean delivery in a time frame that best incorporates maternal and fetal risks and benefits. [1]According to the fifth Edition of Guidelines for Perinatal Care [4] published jointly by the American Academy of Pediatrics and ACOG: "Any hospital providing an obstetric service should have the capability of responding to an obstetric emergency. No data correlate the timing of intervention with outcome, and there is little likelihood that any will be obtained.

However, in general, the consensus has been that hospitals should have the capability of beginning a caesarean within 30 minutes of the decision to operate." We emphasize that this guideline does not establish the 30-minute interval to be a *requirement* but rather a *capability*. The distinction between these two terms is important and we believe it is often overlooked. For example, not effecting caesarean delivery within 30 minutes is a common reason that obstetric malpractice claims are perceived to be indefensible [5]. The implication of such perception is that the 30-minute interval is a requirement or standard for acceptable obstetric practice. Intrinsic to this perception is the belief that delivering within 30 minutes necessarily would prevent untoward infant outcomes.

Achieving this 30 minute decision to delivery interval in a tertiary care hospital in a developing country like India is challenging owing to large number of patients, lack of facilities, shortage of personnel etc. And if failure to achieve the 30 minute decision to delivery interval has any implications on maternal and neonatal outcome has not been studied extensively in our country.

Hence this study was done to evaluate the factors affecting the decision delivery interval and the effect of this delay on the maternal and fetal outcome.

Objectives

OBJECTIVES

1) To identify the factors causing delay in decision to delivery interval for emergency caesarean section

2) To assess the effect of decision delivery interval on perinatal outcome.

Review of Literature

REVIEW OF LITERATURE

Caesarean delivery is defined as the delivery of a fetus through surgical incisions made through the abdominal wall and the uterine wall. Caesarean deliveries were initially performed to separate the mother and the fetus in an attempt to save the fetus of a moribund patient. This operation subsequently developed into a surgical procedure to resolve maternal or fetal complications not amenable to vaginal delivery, either for mechanical limitations or to temporize delivery for maternal or fetal benefit. The caesarean delivery has evolved from a vain attempt performed to save the fetus to one in which physician and patient both participate in the decision-making process, striving to achieve the most benefit for the patient and her unborn child. Currently, caesarean deliveries are performed for a variety of fetal and maternal indications.

NOMENCLATURE

The origin of the word 'caesarean' is unclear. There are three different explanations about the origin of the name of the operation.

In 715 BC, the King of Rome, Numa Pompilius, codified the Roman laws. According to the law, it was forbidden to bury a dead pregnant woman before the fetus was excised. If the child was alive, it was called a "caeson". This law, Lex Caesaris or Lex Caesarea, is assumed to be the origin for the name of the procedure "caesarean section".

It has also been stated, that Julius Caesar has been delivered by this method, and gave the name for the operation. This is considered unlikely, because his mother is known to have been alive during Julius Caesars adulthood. During his reign about 100 BC no woman is known to have survived the operation.

A third explanation is that the name is simply derived from the Latin verb caedare, to cut.The word "section" is also derived from the latin verb secare, to cut. [6]

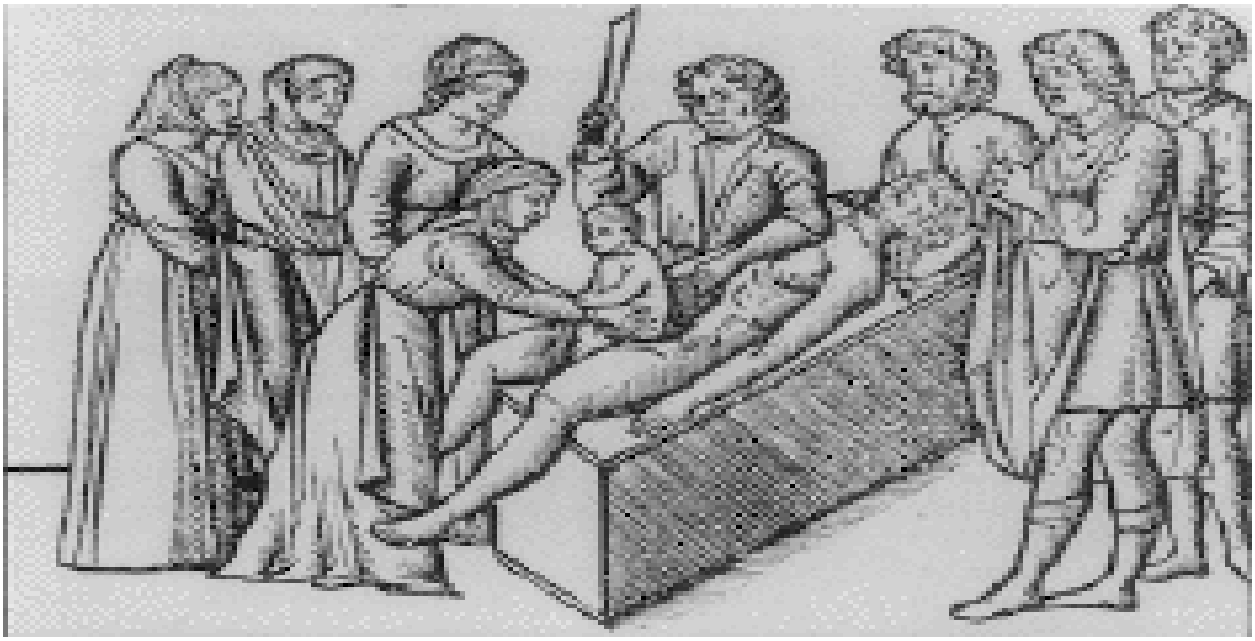

Fig 1 **One of the earliest printed illustrations of Caesarean section. The birth of Julius Caesar. A live infant being surgically removed from a dead woman. From Suetonius' Lives of the Twelve Caesars, 1506 woodcut.**

HISTORICAL BACKGOUND AND DEVELOPMENT OF MODERN OPERATIVE OBSTETRICS

Caesarean section is almost certainly one of the oldest operations in surgery with its origins lost in the mists of antiquity and mythology. Ancient myth and legend has it that Aesculapius and Bacchus , the Gods of Medicine and Wine respectively, were born by caesarean section.

Caesarean section performed by lay persons also has a long history. One of the earliest reported cases in 1500 was by Jacob Nufer, a swine gelder , who delivered his wife after several days of apparent labor.

The first medical textbook advocating caesarean section before the mother was in extremis was published in 1581 by French physician Francois Rousset. He advised caesearean section in living woman , when it was obvious that she could not deliver vaginally,and before she became so moribund that her death and that of her baby was inevitable.

The reason for high mortality in pre anaesthetic era was that caesarean sections were usually performed after prolonged labor on women who were dehydrated, exhausted and infected. In addition ,after removal of fetus the uterus was not sutured.

Jean Lebas first advocated suturing the uterus in 1769 but his advice was not followed for a century.In 1876 an Italian obstetrician Edoardo Porro (1842-1902) described an operation consisting of subtotal hysterectomy after delivery of the baby. This stopped the primary hemorrhage and decreased the risk for a sepsis, reduced the maternal mortality by about half from its usual rate of 80-90% (O'Sullivan 1990, Todman 2007)[7]. This technique evoked worldwide interest.

Ferdinand Keher (1837-1914) of Hiedelberg is one of the under-appreciated contributors to the development of modern caesarean section. In 1881 he performed a transverse lower segment caesarean section, virtually as it is done today. About a year later Max Sanger emphasized the need for careful suturing of the uterine incision which he performed longitudinally in the uterus and called the classical caesarean incision.

The classical caesarean section was adopted in Britain, most notably by Murdoch Cameron in Glasgow. Cameron was confronted by a great demand for the procedure because his city had seen an enormous growth of population. In 1888 he began a series of elective caesarean sections on rachitic dwarfs which was successful.

Some other important steps in preventing maternal death due to CS were anesthesia by Jackson and Morton in 1846 in Boston, aseptic techniques by Semmel weiss in 1861, who started the practise of hand washing before operations in Vienna, and antisepsis by Lister in 1867, who introduced carbolic spray to keep the atmosphere above the wound free from bacteria[7].

In 1926, James Munro Kerr introduced the transverse uterine incision instead of the longitudinal incision in USA. This form of incision had the advantages of less haemorrhage and a lower risk of uterine rupture in future pregnancies[8].

In 1995, Stark and colleagues at the hospital Misgav-Ladach introduced a new CS technique, described in the paper by Holmgren et al.[9]A transverse skin incision 5 cm above the symphysis, proposed by Joel-Cohen, was combined with blunt division of tissues, single layer closure of the uterus and non-closure of the peritoneal layers. The new CS technique, concomitantly referred to as Stark, Misgav-Ladach or Joel-Cohen technique, was further modified with a lower skin incision level and was introduced in Sweden from 1996-1999.[9,10,11]

Fig 2: The first 3 cases in Murdoch Cameron's historic series of elective classical caesarean section performed on rachitic women with pelvic deformities.The photograph was taken outside Glasgow Royal Maternity Hospital and the Windowsill on which flowerpots stand is approximately one metre from ground

TRENDS OF CAESAREAN SECTION DELIVERIES

Rates of caesarean section deliveries have been rising worldwide in the past few decades and are of concern in both developed and developing countries. To address this concern the World Health Organization (WHO) issued a consensus statement in 1985, stating there is no justification or additional health benefits to be gained by any region having caesarean section rates below 10% or higher than 15%.

From 1970 to 2010, the caesarean delivery rate in the United States rose from 4.5 percent of all deliveries to 32.8 percent. In 2010, this rate actually declined from a peak of 32.9 percent

in 2009. The other, albeit brief, decline was between 1989 and 1996. This more profound decrease was largely due to a significantly increased rate of *vaginal birth after caesarean (VBAC)* and to a closely mirrored decrease in the primary rate. These trends were short lived, and in 2007, the primary caesarean delivery rate was above 30 percent, whereas VBAC rates had dropped to 8 percent.

Betran and her colleagues (2007) estimated that at the beginning of 21st century, the average caesarean delivery rate was 3.5 per cent in Africa, 14.9 per cent in Oceania and in all other continents, it was above the 15 per cent mark (15.9 per cent in Asia, 19 per cent in Europe, 24.3 per cent in North America and 29.2 per cent Latin America and the Caribbean). However, they observed striking variations in the rate of caesarean delivery among the countries of the same continent[12]. In Brazil, caesarean delivery rate has jumped from 15 per cent in 1974 to 45.9 per cent in 2008.[13,14] Many of the developing countries (e.g., China , Nigeria, Bangladesh etc.) have seen rapid increase in caesarean birth in the past two decades.[15] In developing nations like China, one important reason of growing rate of caesarean deliveries can be attributed to the increase of institutional births.[16]

The reasons for the continued increase in the caesarean delivery rates are not completely understood, but some explanations include the following:

1. Women are having fewer children, thus, a greater percentage of births are among nulliparas, who are at increased risk for caesarean delivery.

2. The average maternal age is rising, and older women, especially nulliparas, are at increased risk of caesarean delivery.

3. The use of electronic fetal monitoring is widespread. This technique is associated with an increased caesarean delivery rate compared with intermittent fetal heart rate auscultation. Caesarean delivery performed primarily for "fetal distress" comprises only a minority of all such procedures. In many more cases, concern for an abnormal or "non reassuring" fetal heart rate tracing lowers the threshold for caesarean delivery.

4.Most fetuses presenting as breech are now delivered by caesarean due to concern for fetal injury, as well as the infrequency with which a breech presentation meets criteria for a labor trial, almost guarantee that most will be delivered by caesarean.

5.The frequency of forceps and vacuum deliveries has decreased.

6.Rates of labor induction continue to rise, and induced labor, especially among nulliparas, increases the caesarean delivery rate.

7. The prevalence of obesity has risen dramatically, and obesity increases the caesarean delivery risk.

8.Rates of caesarean delivery for women with preeclampsia have increased, whereas labor induction rates for these patients have declined.

9. Vaginal birth after caesarean—VBAC—has decreased from a high of 28 percent in 1996 to 8 percent in 2007.

10. Elective caesarean deliveries are increasingly being performed for a variety of indications including concern for pelvic floor injury associated with vaginal birth, medically indicated preterm birth, reduction of fetal injury risk, and for maternal request.

11. Malpractice litigation related to fetal injury during spontaneous or operative vaginal delivery continues to contribute significantly to the present caesarean delivery rate.[1]

Among other reasons, demographic profiles of mothers[13,17], fear of litigation among care givers[18,19] physician's convenience[20], insurance facility and mode of hospital payment[21] and profit-oriented private health care system[13] are found to be associated to the rise of caesarean delivery. Patients' preference for caesarean delivery is regarded as a common cause behind increasing elective caesarean delivery rate.[22] However, a number of studies have found that caesarean cases on maternal request are actually rare[23,24] and many personal and societal reasons including fear of labour pain and future sexual dissatisfaction, perceived unsympathetic and inadequate care during vaginal delivery underpinned these requests.[25,26]

CAESAREAN DELIVERY IN INDIA

In India the rate of caesarean delivery has increased from 3 per cent to 10 percent between 1992-93 and 2005-06 (IIPS, 2007). According to DLHS3(2007-08) data, caesarean delivery rate in India for public institution is 12% and for private institutions is 28%[2] .This is lower compared to some developing nations like Brazil and China. But as India is the second most populous country in the world, a small percentage increase affects a huge number of people.

At national level the present rate of caesarean delivery does not seem to be alarming but at regional level the scenario is quite opposite. They also found that private sector deliveries had a higher odds ratio of a primary caesarean delivery in comparison with public sector after covariate adjustment.[27,28]

Figure 3- spatial varation in caesarean section delivery in india

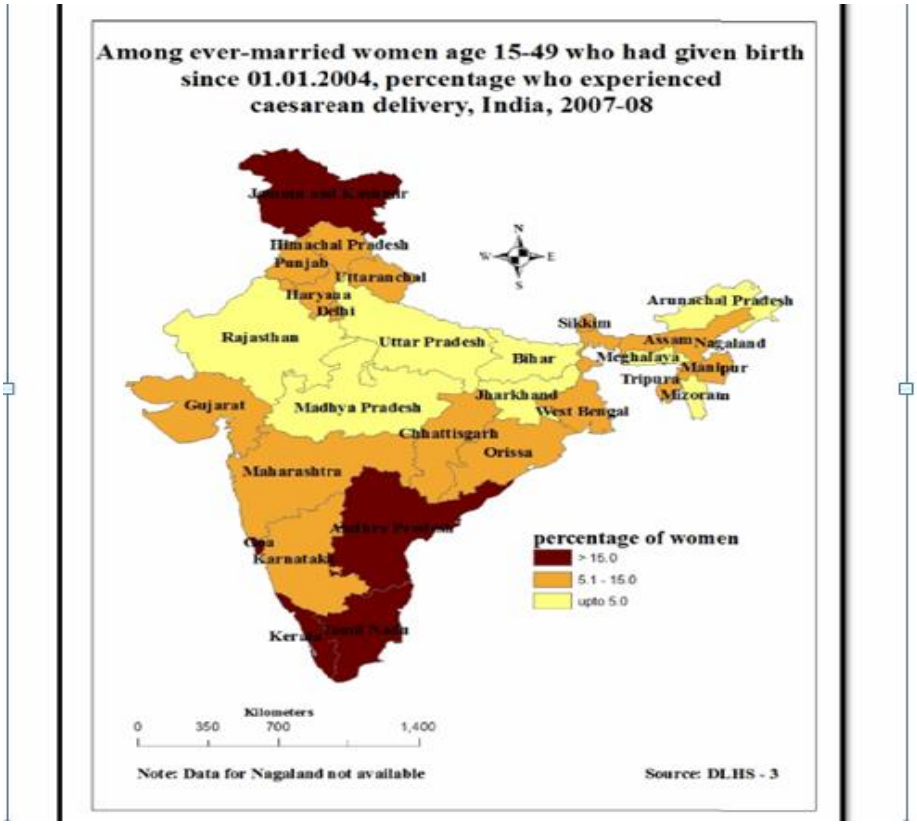

Table 1: Rate of caesarean deliveries to total institutional deliveries in large states of India (2007-08)

State/Country	Percentage of women* who have experienced CS		
	Public institution	Private institution	Difference between private & public institution
India	12.0	28.1	16.1
Jammu & Kashmir	25.9	36.3	10.4
Punjab	18.6	24.2	5.6
Haryana	14.0	23.8	9.8
Delhi	15.2	27.6	12.4
Rajasthan	5.2	17.0	11.8
Uttar Pradesh	9.4	22.8	13.4
Bihar	3.8	20.9	17.1
Assam	10.5	40.5	30.0
West Bengal	15.9	55.6	39.7
Orissa	15.1	35.4	20.3
Madhya Pradesh	4.6	29.3	24.7
Gujarat	7.7	17.3	9.6
Maharashtra	10.7	20.5	9.8
Andhra Pradesh	20.5	50.2	29.7
Karnataka	15.2	27.5	12.3
Kerala	27.8	34.2	6.4
Tamil Nadu	15.0	35.3	20.3

Source: Computed from unit level data DLHS-3
Note: Percentages are calculated for the last birth
* Women who have given birth since 01.01.2004 are included in the analysis

TIMING OF CASEAREAN SECTION

According to the time of Caesarean it can be divided into elective when a clear indications prevails , so that Caesarean section planned before the patient goes into labour. Emergency caesarean section when during labour a complication ensure which mandates abdominal delivery either to save the fetus to avoid or treat maternal complications.

CONSENT FOR CAESAREAN SECTION

Consent for CS must be requested after providing the pregnant women with evidence based information in a manner that respects the woman's privacy, views and culture whilst taking into consideration the clinical situation.

- Consent should be taken in the language understood by the patient and never implied. Patient should be explained that though techniques of anesthesia and surgery are advanced, yet there may be complications due to anesthesia , procedural complications like hemorrhage, infection, soft tissue injuries and injury to the baby. However all possible precautions will be taken by the performing team of doctors to minimize the complications.

- In case a patient is unable to sign, a left thumb impression is taken. If the patient is not in a position to give a consent and consent should be obtained from relatives. In case of minors < 18 years, guardian consent is necessary.
  A 100 % favorable outcome of the mother and the baby is never guaranteed.

- Patient may opt for refusal of CS being oblivious of benefits to her and her baby's health. She has to be counseled again. Despite this If there is a refusal of consent it must be documented on paper. If the procedure is life saving, CS is performed without valid consent.

An informed written consent [29] for caesarean delivery must include following details:

- Name of the proposed procedure
- Indication for the procedure
- Need for anaesthesia, type of anaesthesia, risks associated with anaesthesia
- Brief description of the procedure that will be performed.
- Risks and complications associated with the procedure. It is recommended for the clinicians to separate the serious risks from the frequently occurring risks.

PREOPERATIVE MANAGEMENT

Guidelines recommend a minimum preoperative fasting time of at least 2 hours from clear liquids, 6 hours from a light meal, and 8 hours from a regular meal [30]. However, patients are usually asked not to eat anything for 12 hours prior to the procedure.[31]

The following are also included in preoperative management:

• Placement of an intravenous (IV) line

• Infusion (eg, lactated Ringer solution or saline with 5% dextrose)

• Placement of a Foley catheter (to drain the bladder and to monitor urine output)

• Placement of monitors for the patient's blood pressure, pulse, and oxygen saturation

• Preoperative antibiotic prophylaxis (decreases risk of endometritis after elective caesarean delivery by 76%, regardless of the type of caesarean delivery [emergent or elective][32]

• Evaluation by the surgeon and the anesthesiologist

LABORATORY TESTING

The following laboratory studies may be obtained prior to caesarean delivery:

• Complete blood count

• Blood type and screen, cross-match

• Screening tests for human immunodeficiency virus, hepatitis B, syphilis

• Coagulation studies (BT, CT for all patients, prothrombin and activated partial thromboplastin times, fibrinogen level when indicated.)

ANAESTHESIA CARE[33]

Preanaesthetic evaluation

In emergency caesarean delivery, the urgent nature of the situation allows limited time for evaluation before induction of anesthesia and commencement of surgery; nonetheless, essential information must be obtained, and risks and benefits of anesthetic management decisions should be discussed.

A focused pre anesthetic history and physical examination includes

1. A review of maternal health and anesthetic history, relevant obstetric history, allergies, and baseline blood pressure and heart rate measurements.

2. Performance of an airway, heart, and lung examination consistent with the American Society of Anesthesiologists (ASA) guidelines.[34,35]

Preparation

Attention should be given to the availability and proper functioning of equipment and monitors for the provision of anesthesia and the management of potential complications (e.g., failed intubation, cardiopulmonary arrest).[34]

Basic monitoring consists of maternal pulse oximetry, electrocardiogram (ECG), and noninvasive blood pressure monitoring.

The necessary drugs, including vasopressors, Obstetric (uterotonic agents), emergency drugs (for advanced cardiac life support, malignant hyperthermia) and drugs used for the provision of general and neuraxial anesthesia, should be readily available.

Resources for the conduct and support of neuraxial anesthesia and general anesthesia should include those necessary for the basic delivery of anesthesia and airway management as well as those required to manage complications (e.g., failed intubation). The immediate availability of these resources is particularly important, given the frequency and urgency of the anesthesia care provided

Patient undergoing caesarean delivery may drink modest amounts of clear liquids up to 2 hours before induction of anesthesia.[34] Examples of clear liquids are water, fruit juices without pulp, carbonated beverages, clear tea, black coffee, and sports drinks. A fasting period for solids of 6 to 8 hours, depending on the fat content of the food, has been recommended.

H2-receptor antagonists (ranitidine, famotidine) reduce secretion of gastric acid. Metoclopramide is a promotility agent that hastens gastric emptying and also increases lower esophageal sphincter tone.[36,37] Metoclopramide has the additional advantage of being an antiemetic agent.

Traditionally, 1 to 1.5 L of crystalloid solution has been administered intravenously (as ‘‘pre hydration’’) to prevent or reduce the incidence and severity of hypotension during neuraxial anesthesia for caesarean delivery. However, pre hydration with crystalloid does not reliably prevent neuraxial anesthesia– induced hypotension. Dyer et al.[38] observed that rapid intravenous crystalloid administration (20 mL/kg) initiated at the time of intrathecal injection (co-load) was as effective at preventing intra operative hypotension as administration of crystalloid prior to the initiation of neuro blockade (preload); the required dose of ephedrine prior to delivery was lower in the co-load group.

Both the incidence and severity of post caesarean infections, especially endometritis, are reduced with the use of antibiotic prophylaxis. Prophylactic antibiotics (i.e., administered either before abdominal incision or immediately after umbilical cord clamping) are beneficial in both elective (nonlaboring) and non elective (laboring) caesarean deliveries. A 60% decrease in the incidence of endometritis, a 25% to 65% decrease in the incidence of wound infection, and fewer episodes of fever and urinary tract infections have been demonstrated after prophylactic administration of antibiotics.[39,40,41] The ACOG[41] has recommended the administration of narrow-spectrum antibiotics (e.g., a first-generation cephalosporin) for prophylaxis.

Preoxygenation/denitrogenation is required before general anesthesia but is of unclear benefit during neuraxial anesthesia for elective delivery of a non compromised fetus.

All pregnant women should be positioned with left uterine displacement to minimize aortocaval compression.

Administration of spinal anesthesia

• Patient back is prepared by painting with antiseptic solution. A ‘‘rapid sequence spinal’’ has been described for use in emergency caesarean delivery cases in which the use of draping is omitted [42]

• Spinal anesthesia is usually administered as a single-injection procedure (‘‘single-shot’’ technique) through a non-cutting, pencil-point needle that is 24-gauge or smaller. A number

of different needle designs are available [43]; the size and design of the needle tip affect the incidence and severity of post–dural puncture headache (PDPH)

• The spinal technique should be performed at the L3 to L4 interspace or below. This space is used to avoid the potential for spinal cord trauma; although the spinal cord ends at L1 in most adults, it extends to the L2 to L3 interspace in a small minority.

• The choice of local anesthetic agent (and adjuvants) used to provide spinal anesthesia depends on the expected duration of the surgery, the postoperative analgesia plan, and the preferences of the anesthesia provider. For caesarean delivery, the local anesthetic agent of choice is typically bupivacaine. In the United States, spinal bupivacaine is formulated as a 0.75% solution in dextrose 8.25%. Intrathecal administration of bupivacaine results in a dense block of long duration. The dose of intrathecal bupivacaine that has been successfully used for caesarean delivery ranges from 4.5 to 15 mg.

Administration of general anaesthesia:

• The patient should be placed supine with left uterine displacement. The head, neck, and shoulders should be optimally positioned for airway management (i.e., the sniffing position). Routine monitoring should be established, including ECG, pulse oximetry, blood pressure, and
capnography.

• Preoxygenation (denitrogenation) with 100% oxygen should be performed to delay the onset of hypoxemia during apnea; this hypoxemia occurs more rapidly due to the pregnancy-induced decrease in functional residual capacity and increase in oxygen consumption. Ideally, pre oxygenation is accomplished by 3 minutes of tidal-volume breathing with a tight-fitting face mask.[44]

• In contrast to most surgical procedures, the patient's abdomen is prepared and draped prior to induction of general anesthesia in order to minimize fetal exposure to general anesthesia. After the surgical drapes have been applied and the operating personnel are ready at the tableside, the surgeon should be instructed to delay the incision until the anesthesia provider

confirms correct placement of the endotracheal tube and gives verbal instructions to proceed with surgery.

• Rapid-sequence induction is initiated with denitrogenation / preoxygenation followed by administration of an induction agent and paralysis; The induction agent of choice is thiopental (4 to 5 mg/kg), but propofol (2 to 2.8 mg/kg) can also be used. In the presence of hemodynamic instability, ketamine (1 to 1.5 mg/kg) or etomidate (0.3 mg/kg) should be substituted for thiopental. Paralysis is achieved by succinylcholine (1 to 1.5 mg/kg) in approximately 30 to 40 seconds; fasciculations are an unreliable sign, and a peripheral nerve stimulator can be used to confirm neuromuscular blockade.

• Mask ventilation is not performed, to prevent unintentional insufflation of the stomach. Initially, an assistant should apply 10 newtons (N) of force on the cricoid cartilage, which is increased to 30 N after loss of consciousness; endotrachel tube is then inserted into the trachea after visualizing the vocal cords.

TECHNIQUE FOR CAESAREAN DELIVERY[1]

With minor variations , surgical performance of caesarean delivery is comparable worldwide. Most steps are founded on evidence based data and these have been reviewed by Dahlke and Hofmeyr and their associates.

- Patient put in dorsal supine position. Abdomen and parts prepared and draped.

- Abdominal incision: Usually a midline vertical or a suprapubic transverse incision is chosen for laparotomy. Transverse abdominal entry is by either Pfannenstiel or Maylard incisions. Of these, the Pfannenstiel incision is selected most frequently for caesarean delivery. Vertical infraumbilical incisions provide quick entry to shorten incision-to-delivery time.

Tranverse incisions: With the pfannenstiel incision,the skin and subcutaneous tissue are incised using a low, transverse, slightly curvilinear incision. This is made at the level of the pubic hairline, which is typically 3 cm above the superior border of the symphysis pubis.

The incision is extended beyond the lateral borders of rectus abdominis muscles. It should be of adequate width to accommodate delivery -12 to 15 cm is of typical.

- Abdominal wall opened in layers upto peritoneum by blunt or sharp dissection.

- Before any hysterotomy, the surgeon should palpate the fundus and adnexa to identify degrees of uterine rotation. The uterus may be dextrorotated so that the left round ligament is more anterior and closer to the midline. In such cases, hysterotomy placement is modified to keep the incision centered within the lower segment. This avoids extension into and laceration of the left uterine artery.

- The reflection of peritoneum above the upper margin of the bladder and overlying the anterior lower uterine segment—termed the bladder flap—is grasped in the midline with forceps and incised transversely with scissors.Bladder flap creation effectively moves the bladder away from the planned hysterotomy site and prevents bladder laceration if an unintended inferior hysterotomy extension occurs during fetal delivery.

- Most often, the lower uterine segment is incised transversely as described by Kerr in 1921. Occasionally, a low-segment vertical incision as described by Krönig in 1912 may be used. The classical incision is a vertical incision into the body of the uterus above the lower uterine segment and reaches the uterine fundus. In practice, however, the classical incision is similar to the low vertical incision, which is typically extended cephalad only to the extent required for fetal delivery. For most caesarean deliveries, the transverse incision is preferred.

- Amniotic membranes ruptured and the liquor drained.

- **Delivery of the Fetus:** In a cephalic presentation, a hand is slipped into the uterine cavity between the symphysis and fetal head. The head is elevated gently with the fingers and palm through the incision. Once the head enters the incision, delivery may be aided by modest trans abdominal fundal pressure. After head delivery, a finger

should be passed across the fetal neck to determine whether it is encircled by one or more umbilical cord loops. If an umbilical cord coil is felt, it should be slipped over the head. The head is rotated to an occiputo-transverse position, which aligns the fetal bisacromial diameter vertically. The sides of the head are grasped with two hands, and gentle downward traction is applied until the anterior shoulder enters the hysterotomy incision. Next, by upward movement, the posterior shoulder is delivered.

- The umbilical cord is clamped, and the newborn is given to the team member who will conduct resuscitative efforts as needed. The American Academy of Pediatrics and the American College of Obstetricians and Gynecologists (2012) recommend that "a qualified person who is skilled in neonatal resuscitation should be in the delivery room, with all equipment needed for neonatal resuscitation, to care for the neonate."

• **Placental Delivery:** The uterine incision is observed for any vigorously bleeding sites. These should be promptly clamped with Pennington or ring forceps. The placenta is then delivered. Many surgeons prefer manual removal, but spontaneous delivery along with some cord traction may reduce the risk of operative blood loss and infection. Fundal massage may begin as soon as the fetus is delivered to hasten placental separation and delivery. Immediately after delivery and gross inspection of the placenta, the uterine cavity is suctioned and wiped out with a gauze sponge to remove avulsed membranes, vernix, and clots.

• The uterine incision is then closed with one or two layers of continuous No. 0 or No. 1 absorbable suture. Chromic suture is used by many, but some prefer synthetic delayed-absorbable sutures. Single-layer closure is typically faster and is not associated with higher rates of infection or transfusion .[45]

• Following caesarean delivery, adhesions commonly form within the vesicouterine space or between the anterior abdominal wall and uterus. And with each successive pregnancy, the percentage of affected women and adhesion severity increases. Adhesions can significantly lengthen incision-to delivery times and total operative time. Although occurring infrequently, rates of cystotomy and bowel injury are also increased.

• **Abdominal closure:** As each layer is closed, bleeding sites are located, clamped, and ligated or coagulated with an electrosurgical blade. The rectus abdominis muscles are allowed to fall into place. With significant diastasis, the rectus muscles may be approximated with one or two figure-of-eight sutures of No 0 or No. 1 chromic gut suture. The overlying rectus fascia is closed by a continuous, non locking technique with a delayed-absorbable suture. In patients with a higher risk for infection, there may be theoretical value in selecting a monofilament suture here rather than braided material. The subcutaneous tissue usually need not be closed if it is less than 2 cm thick. With thicker layers, however, closure is recommended to minimize seroma and hematoma formation, which can lead to wound infection and/or disruption. Skin is closed with a running subcuticular stitch using 4-0 delayed absorbable suture or with staples.

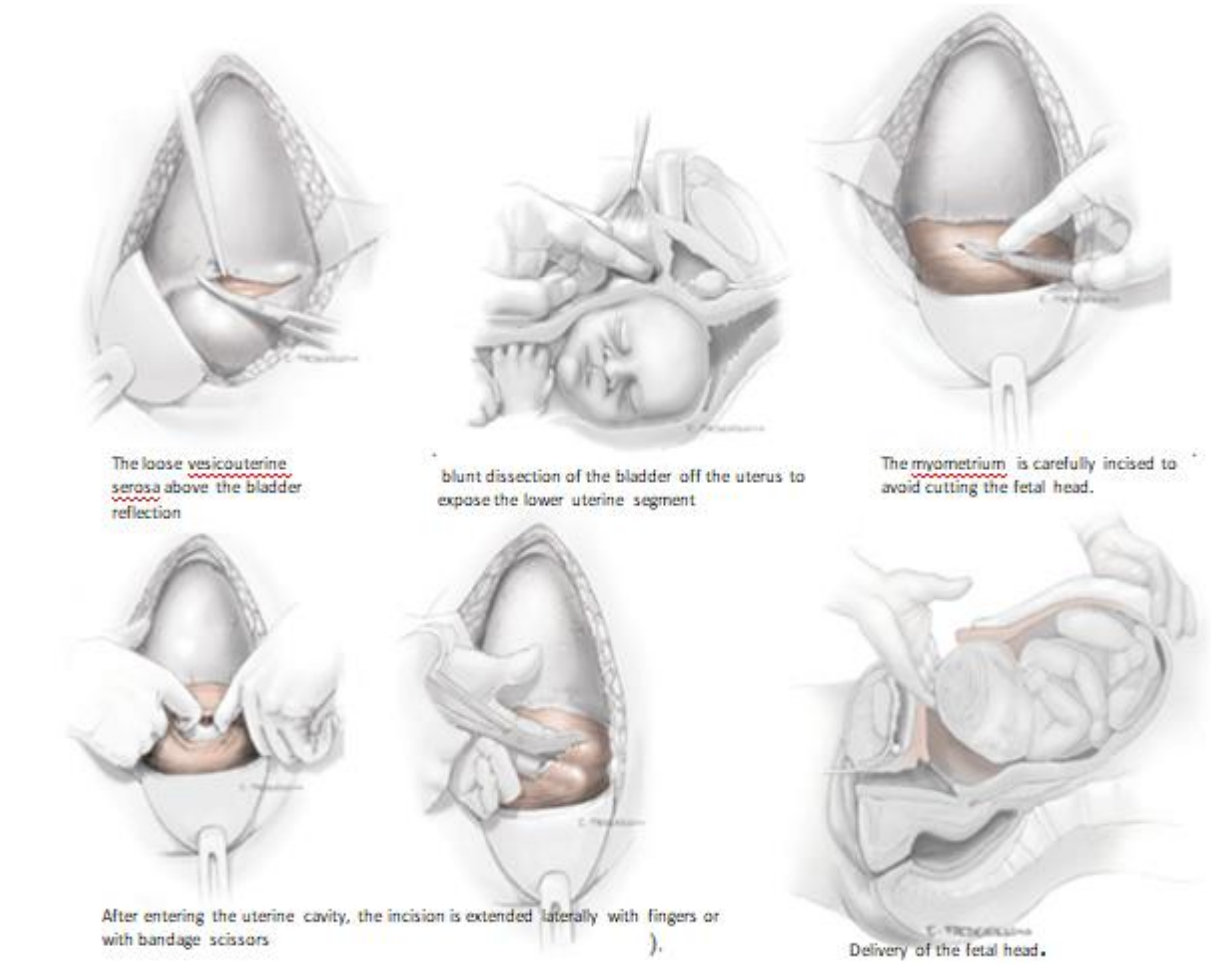

Figure 4 – Steps Of Caesearen Section[1]

INDICATIONS

Caesarean deliveries are performed to resolve maternal or fetal complications not amenable to vaginal delivery, either for mechanical limitations or to temporize delivery for maternal or fetal benefit.

The leading indications for caesarean delivery (85%) are previous caesarean delivery, abnormal fetal presentation, dystocia, and fetal distress.[1]

Maternal indications for caesarean delivery include the following:[1]

- Prior caesarean delivery
- Abnormal placentation
- Maternal request
- Prior classical hysterotomy
- Unknown uterine scar type
- Uterine incision dehiscence
- Prior full-thickness myomectomy
- Genital tract obstructive mass
- Invasive cervical cancer
- Prior trachelectomy
- Permanent cerclage
- Prior pelvic reconstructive surgery
- Pelvic deformity
- HSV or HIV infection
- Cardiac or pulmonary disease
- Cerebral aneurysm or arteriovenous malformation
- Pathology requiring concurrent intraabdominal surgery
- Perimortem caesarean delivery

Fetal indications for caesarean delivery include the following:

- Nonreassuring fetal status

• Malpresentation
• Macrosomia
• Congenital anomaly
• Abnormal umbilical cord Doppler study
• Thrombocytopenia
• Prior neonatal birth trauma

Indications for caesarean delivery that benefit the mother and the fetus include the following:

- Cephalopelvic disproportion
- Failed operative vaginal delivery
- Placenta previa or placental abruption[1]

MODIFIED ROBSON'S CRITERIA FOR CLASSIFICATION OF CAESAREAN DELIVERY

The heterogeneity of Caesarean delivery classification does not allow valid comparisons. Specifically, there is a lack of clarity regarding operative indications and relevant obstetric history. To overcome this problem a common classification system was developed by Dr. Michael Robson, MD that allows reflection and research at the local, regional, and national levels to better guide future care.[46]

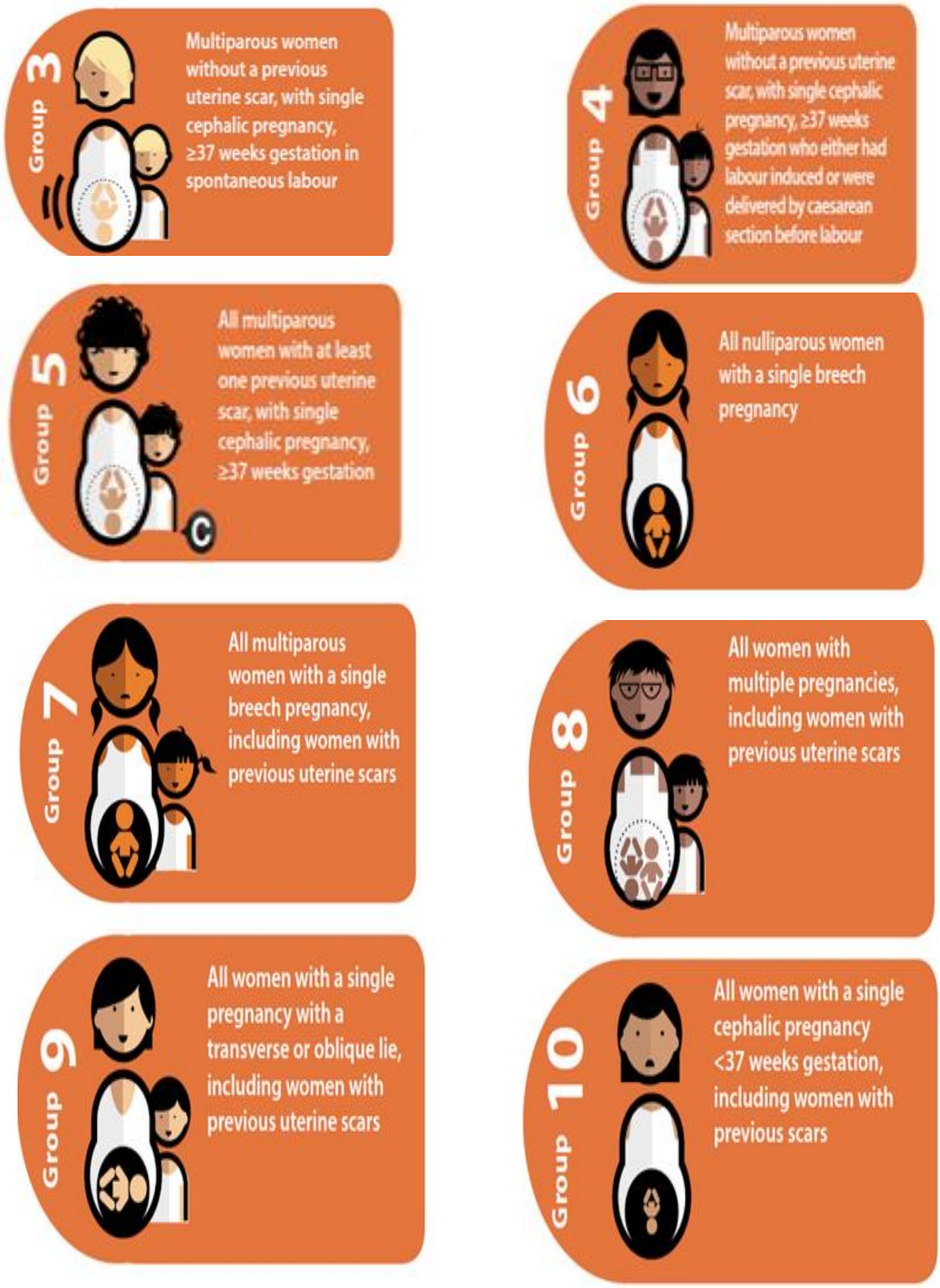

Figure 5-Robsons Classification of caesarean delivery

LUCAS CLASSIFICATION OF URGENCY OF CAESAREAN DELIVERY

It is acknowledged that the traditional classification of caesarean section into 'elective' and 'emergency' is of limited value for data collection and audit of obstetric and anaesthetic outcomes. This is because the spectrum of urgency that occurs in obstetrics is lost within a single 'emergency' category. In 2000, Lucas *et al.*[47] proposed a new classification based on clinical definitions.

This classification relates the degree of urgency to the presence or absence of maternal or fetal compromise. The color scale reinforces the need to recognize that a 'continuum of urgency' applies to caesarean section, rather than discrete categories. Dupuis *et al.*[48] used a three-color code for categorizing risk and suggested that this could shorten the DDI for emergency caesarean section. However, it is recognized that, for audit purposes, the use of the four defined categories remains useful. Once a category is applied to an individual caesarean section, all members of the team can have a common understanding of the degree of urgency of the procedure for that specific case.

Fig 6 : Lucas Classification of caesarean delivery

A classification relating the degree of urgency to the presence or absence of maternal or fetal compromise

Urgency	Definition	Category
Maternal or fetal compromise	Immediate threat to life of woman or fetus	1
	No immediate threat to life of woman or fetus	2
	Requires early delivery	3
No maternal or fetal compromise	At a time to suit the woman and maternity services	4

The benefits of this system include:

• It uses a pre-existing classification which is familiar to many units and has been endorsed by the RCOG, Royal College of Anesthetists, the Obstetric Anesthetists' Association, the Centre for Maternal and Child Enquiries and the Clinical Negligence Scheme for trusts.

• It recognizes and promotes **four** different categories of urgency, in contrast to the traditional classification of emergency and elective.

• It helps to identify **specific** cases requiring 'immediate' delivery (category 1)
• It encourages the clinical team to individualize risk within a given category by inclusion of the color spectrum

• It may reduce potential maternal risks (for instance, by avoidance of general anaesthesia in the majority of cases in categories 2–4 and in some cases of category 1).

• It avoids time-based definitions.

• It can be integrated with the color-coded systems presently used in some units.

• It allows comparison of local and national audit of obstetric and anaesthetic practice, complications and outcomes.

• It may be used to inform on reasonable and achievable DDI in the future.[49]

DECISION TO DELIVERY INTERVAL

The time line between a decision being made and delivery of the baby is referred to as a decision delivery interval. In tandem with this statement, is not synonymous with decision to incision time where the goal of birth of a baby is yet to be achieved. The "30 minute rule" for a DDI takes its origin from the Guidelines to Perinatal Care developed jointly by the American Academy of Paediatrics and the American College of Obstetricians and Gynecologists.[50]

The OB Pearls Committee of the American Society of Health Care Risk Management (ASHRM) does not streamline the DDI to a time limit rather addresses based on the institutional capability providing obstetric care. The ASHRM reads as "emergency caesarean sections should be performed as quickly as possible, in keeping with the capabilities of the institution.[51] Currently, there is no general consensus of an acceptable DDI for performance of emergency caesarean delivery. Most obstetricians would aim to improving outcomes from emergency caesarean delivery using common sense principles of a smart and diligent obstetric team.

Emergency caesarean deliveries are performed in most cases to prevent birth asphyxia. Determining perinatal asphyxia is both complex and a crucial issue. Even with the best risk prevention strategies, there are clinical situations that prompt a shortest possible decision delivery interval. Current approaches evolve around critical evaluation so as to adopt and focus relying on the time required to initiate a surgical procedure with birth of a non-hypoxic baby.

Though controversial, currently, there is no strict regulation on upper limit of the decision-delivery interval (DDI) that code an acceptable time interval for performance of caesarean delivery.[52]

Previously, the American College of Obstetricians and Gynecologist guidelines suggest that medical facilities providing obstetric care services have the capability to manage delivery of a fetus within 30 minutes of the decision to operate, referred to as "decision- delivery interval". The OB Pearls Committee of the American Society of Health Care Risk Management (ASHRM) does not streamline the DDI to a time limit rather addresses based on the institutional capability providing obstetric care.[51]

UNDERSTANDING THE DECISION DELIVERY INTERVAL

In simple words, DDI relates to the 30 minute rule pertinent to critical conduct analysis in conditions of fetal heart rate abnormalities or any acute maternal complication. It may connote an element of negligence in dealing with intrapartum complications that result in delivery of a fetus with evidence of birth or perinatal asphyxia. Since the inception of the rule, several investigators have questioned the feasibility of achieving a 30 minute DDI on all cases of emergency caesarean delivery and its negative impact on neonatal outcome.

Only in cases of acute and catastrophic non-reassuring fetal status, it is reasonable that emergency caesarean delivery is performed within the shortest possible DDI and any purposeful wait is inappropriate. Most researchers were unable to prove that standard 30 minute DDI have uniformly improved neonatal outcomes, despite pathophysiologic possibility. Nevertheless, there are clinical situations that require immediate or emergent operative interference for fetal and maternal well being. Examples of such cases include cord prolapse, uterine scar rupture, acute placental abruption, and haemorrhage from placenta praevia It is worth emphasis that in a hospital rendering obstetric care, it is mandatory to identify and be prepared for acute and unpredictable obstetric situations.[53]

CAUSES FOR DELAY IN DECISION TO DELIVERY INTERVAL

It has been suggested that longer decision to-delivery interval arise because a multitude of tasks has to be completed in a coordinated fashion by a relatively large multidisciplinary team before the caesarean can take place ,[54] thus, staff shortages, poor training, and lack of appropriate facilities all have the potential to slow the process. Various reasons for the delay in decision to delivery interval include:

• Lack of 1:1 care in the labor room for laboring women is a major cause for delay[55] in the time between the decision for emergency caesarean delivery and patient being shifted to preoperative area in the emergency OT (interval 1). More specifically, failure to provide this level of care hinders the woman's transfer to the operating theatre but, once the woman has arrived in theatre, the concept of 1:1 care has no further bearing on the delivery time of the baby. A multitude of tasks must be performed before theatre transfer is possible , which includes obtaining consent, preparing parts, giving preoperative medications if necessary and

shifting the patient to the operation theatre. Any "away-time" that the medical professional has from her preoperative patient, for example to provide clinical care to another woman or to arrange for a colleague to provide that care, is therefore likely to delay theatre transfer.

• Non availability of OT whether due to another ongoing surgery or the OT not yet ready after a previous surgery. In a government hospital owing to long list of patient, this remains an important cause for the delay.

• Delay while arranging or transfusing blood, preloading, or controlling BP when patient was considered unfit for anaesthesia. This becomes the major cause in cases like antepartum haemorrhage including haemorrhaging placenta praevia and placental abruption, uterine scar rupture, where majority of the time is consumed for arranging cross matched blood which becomes even more difficult when the patients are of Rh negative blood type and in cases of eclampsia and severe pre eclampsia, controlling blood pressure causes the major delay.

• Delay due to lack of manpower including surgeons, anaesthetists, staff nurses, nursing orderlies & sweepers in OT. This can be a cause for the delay in the night shift where the number of medical professionals on duty are lesser compared to day.

• Delay due to non availability of relatives to give consent. This occurs because either the relatives are not present when the decision for caesarean delivery is made, or they don't understand the risks involved to the mother and the baby to make the right decision in time.

• Delay due to malfunctioning apparatus, non availability of instruments, sutures, drugs, technical problems etc. Non availability of these essential requirements, if not all the time around the year, cause the delay in the emergency caesarean delivery in some cases.

• Pending investigations is another important cause for the delay in the emergency caesarean delivery, especially in referred cases which are the cases usually with no antenatal investigations. In cases of severe preeclampsia and eclampsia too it forms a major determining factor because the need for most recent laboratory parameters like platelet count, and sometimes renal and liver function tests, coagulation profiles become necessary.

STEPS TO IMPROVE THE DECISION TO DELIVERY INTERVAL

Obstetricians' experience in dealing with fetal and maternal outcomes in appalling situations has lead to developing strategies that looks into a minimum DDI time. Most malpractice allegations against the obstetricians and gynaecologists relate or point in some ways to the care of patients during labour and delivery. Few lawsuits might involve negligence or faulty practice in prenatal or postnatal care. Unfortunately for the obstetricians, the alleged litigation is frequently linked more to the severity of the birth injury than to the quality of care that was provided. As such, obstetricians either focus on risk management with a goal at reducing adverse events encountered in labour and delivery; or withdraw themselves to defensive practice. In an attempt to abate and make uniform approach an arbitrary upper limit to DDI has been set and recommended for practice.[53]

Attempts to enforce an ideal time limit may not be applicable in most circumstances because in current practice more than half of caesarean delivery is electively performed. The DDI may be the consequence of individual obstetrician's valued assessment and clinical decision. The appropriate management should be to increase the understanding of the vulnerability of a fetus to hypoxic insults in labour; and how to decode, when and where necessary, to necessitate a safe time limit for emergency operative intervention.

Various steps are taken to decrease the decision to delivery interval and it begins at antenatal level. Preparing the couple in the antenatal period on the possibility of the need for a rapid recourse to operative delivery will facilitate obtaining informed consent, thereby precluding undue delay. Good antenatal work up of all patient will reduce the need for laboratory work up after the decision for caesarean delivery is made and hence can reduce the DDI.

Various steps in minimizing morbidity related to caesarean delivery in the face of time compromise have been explored by researchers. Modern hospitals setting with obstetric facilities provide 24 hour coverage in labour and delivery ward with an in house dedicated team consisting of obstetricians, anaesthetist and theatre staff, and neonatal support personnel, so that operative delivery is possible within a short period of time.

With efficient team operation, work is targeted at abolishing and thus minimizing unnecessary delay, particularly with transfer of patient to the theatre and induction of anaesthesia. Most caesarean operating theatre is located within the labour and delivery ward, thus reducing the time needed to shift the patient to operation theatre, an important step in the process. Hillemanns in a 10 year study had shown that emergency caesarean delivery performed in the delivery room results in a shortened DDI without detrimental perioperative maternal or neonatal [56]complications. Therefore, this can be an option in a hospital setting with provision of a well equipped delivery room.

Reducing time spent on aseptic technique particularly in crash emergency caesarean delivery can be safely supported by the use of broad spectrum antibiotics prophylaxis. Using antibiotic prophylaxis in caesarean delivery has become a standard practice.

The routine insertion of Foley's catheter prior to emergency caesarean delivery can be cumbersome and skipped with minimal maternal intra-operative morbidity with careful procedure.[57] However, it is essential that a labouring patient voids urine at frequent intervals. Omission of urethral catheterization may be worrisome in labouring women with previous caesarean delivery scar where there is possibility of adhesions or anatomical distortion of pelvic organs.

The primary purpose of caesarean delivery is prompt delivery of the fetus keeping the critical conduct interval between abdominal incision and delivery of the fetus short. This crucial interval should not be wasted on securing small bleeders or repairing incurred bowel or bladder injuries. Certainly seniority of the operating surgeon together with a dedicated support team will contribute positively to achieving the recommended 30 minute rule. Kolas from Norway in his study showed that seniority of the surgeon was a significant predictor in achieving the recommended 30 minute rule.[58]

Availability of efficient blood transfusion service is also mandatory to secure safe and prompt operative deliveries. To have a 24 hour blood bank services within the hospital premises with availability of blood components of all blood types will markedly reduce the time needed to procure these blood products which is the main reason for delay in DDI in few cases.

Though the above mentioned actions will contribute to short DDI, timely recognition of a complication is the key element in the management of a non reassuring fetal status or obstetric emergencies that mandate expedited delivery. The previous American College of Obstetricians and Gynecologist guidelines on DDI of 30 minutes[59] did not take into account any procedures prior to decision-making that may be required for assessment of fetal hypoxia such as fetal scalp blood sampling. The recommendation had been along strict time lines. It was based on the crucial factor that any setback in delivery of a fetus in the event of acute obstetric crisis may have adverse outcome. The 30 minute rule referred to necessity of hospital facilities and setting, for prompt treatment and did not rule or dictate clinical decision. Currently, there is no strict regulation on upper limit of the DDI that code an acceptable time interval for performance of caesarean delivery.[52]

With a pragmatic approach, decision-making and delivery of the fetus ought to be achieved in a timely manner at the discretion of the attending obstetrician. The DDI is an imperative element of a critical conduct interval. Phelan and co-workers (2005) analyzed the application of Justice Cardosa's "foresee ability of harm" principle using critical conduct interval for a case of 'fetal distress'.[60] To foresee the harm and prevent birth asphyxia or low Apgar score in a neonate, a targeted perinatal outcome strategy with a well coordinated and efficient team work is obligatory.

The critical conduct interval begins with skilful and timely identification and appropriate interpretation of fetal heart rate abnormalities; evaluation of the clinical scenario; proper decision making for the best possible perinatal and maternal outcomes; and finally a precise DDI keeping in mind the severity of the situation. In few cases adverse outcome will still occur even with the best preventive protocol in order. As part of quality assurance safety program in dealing with acute obstetric emergencies, a written protocol should be available in the labour suite as part of a mandated educational activity for continued improvement. Such an approach will avoid miscommunication in management, particularly in hospitals lacking adequate facilities; and largely mitigate clinico-legal issues.

In both the recommendations on DDI– Guidelines to Perinatal Care "30 minute rule" and OB Pearls Committee Guideline, definition of emergency caesarean delivery remains unclear. The former delineates the indications that mandates expedited operative delivery in acute

fetal distress – acute placental abruption, cord prolapse , haemorrhage from placenta praevia and uterine rupture. Therefore, a 30 minute rule may not be applicable to all emergency operative deliveries and a clear classification of the types of caesarean delivery based on acuteness of the obstetric problem can be helpful. Hence the lucas classification of caesarean delivery based on urgency of caesarean delivery which has already been discussed in detail earlier came into picture.

Reports from various studies has shown that in clinical reality a standard 30 minute DDI is not feasible and not related in most cases to adverse outcome of the fetus. A workable approach would be to define category of emergency caesarean delivery according to lucas classification and make recommendations facilitating obstetricians to optimal conduct for best perinatal and maternal outcomes.

DECISION- DELIVERY INTERVAL AND NEONATAL OUTCOME

To study the relation between the decision to delivery interval and neonatal outcome most research studies were reported from hospitals in industrialized countries, and only a couple from developing countries. It is worth understanding that a prompt vaginal or caesarean delivery with shortest possible DDI require appropriate hospital facilities that may not be easily available in developing countries. Hence for appropriate of what ought to be the DDI time, studies from developing countries should be encouraged to form global approach to recommendations.

In the National Health Service Maternity Unit in England[54] study to determine the DDI for performing an emergency caesarean delivery, 66 percent of babies were delivered within 30 minutes and 88 percent within 40 minutes; and 4.0 percent remain undelivered at 50 minutes. There was no significant impact of DDI on term babies born. The study suggested that DDI interval of 30 minute was not an important predictor for neonates requiring admission to the intensive care unit. Eight percent babies with DDI of less than 30 minutes and 13 percent with an interval of more than 50 minutes required admission. The study concluded that 30 minute DDI was not realistic in routine practice and furthermore, failure to deliver babies within recommended time frame did not have adverse effects on neonatal outcome.

Bloom, Steven. L. MD et al., conducted a prospective study on "Decision to incision times and maternal and infant outcomes", at multiple university based hospitals comprising the National Institute of Child Health and Human Development Maternal-Fetal Medicine Units Network, which showed more than 1/3 of primary caesarean delivery performed for emergency indications commenced more than 30 minutes of decision to operate and the adverse neonatal outcomes were not increased.[61]

Mackenzie had similar conclusions in a prospective study on non elective caesarean deliveries.[62] In their hospital 30 minute DDI was the obstetric unit policy. Less than 40% of emergency caesarean deliveries performed for fetal distress was achieved within 30 minutes DDI. There was no evidence to support that even an interval up to 120 minutes had adverse affects on neonatal outcome unless if the delivery had been a crash emergency caesarean delivery. The study suggested that a 30 minute time line was applicable in emergency-crash caesarean deliveries.

Sayegh and co-workers [63]evaluated the DDI in emergency caesarean deliveries and reported a mean DDI of 39.5 minutes in the emergency and urgent group and 55.9 minutes in the non-emergency or elective group. The main reason for increase in DDI was delay in the theatre and lack of communication between neonatal and anaesthesia teams.

A multi centre cross sectional survey[64] was carried out in Maternity Units in England and Wales, to determine if the DDI in emergency caesarean delivery was a critical factor that affected maternal and neonatal outcome. With babies delivered within 15 minutes and those delivered within 75 minutes, there was no difference in neonatal outcome. After 75 minutes there was a significant higher chance of babies having five minute Apgar score of less than 7 and 50 percent chance of admission to special care unit.

In a retrospective chart review[65] carried out at the Department of Obstetrics and gynecology, University of Texas Medical Branch, Texas to evaluate the effect of the current ACOG guidelines of 30 minute DDI for emergency caesarean delivery on neonatal and maternal outcome, the overall median DDI was 20 minutes. He reported that on the contrary, there were more babies born with low APGAR score at 1 and 5 minute, cord pH less than 7.0 and

neonatal seizures in group of mothers with DDI of 30 minutes or less, than in the group of mothers with DDI exceeding 30 minutes, though not statistically significant. There were no statistical differences between the two groups of neonates in terms of neonatal admission to intensive care unit and/or length of stay.

Chauhan and coworkers[66] in a 2 year retrospective study on emergency caesarean deliveries concluded that a < 30 minute DDI is an ideal preventive measure in acute fetal distress though failure to achieve this goal is not associated with significant adverse perinatal outcome.

Similar findings were reported from a retrospective analysis of emergency caesarean delivery in a tertiary university centre in Israel .[67] The study showed that in emergency group 71 percent of caesarean delivery was achieved within 30 minutes compared to 35 percent in non-emergency group. In emergency crash group 100 percent delivered within the recommended time compared to 59 in non-crash emergency group of patients. The researchers classified the caesarean delivery into emergency and non-emergency, further classified emergency to emergency-crash and emergency-non-crash groups. Though the obstetricians took into account that those in the emergency-crash group needed very prompt intervention, they found no correlation between DDI and umbilical artery pH or Apgar score at 1 and 5 minutes in infants in both caesarean delivery groups.

In another study, Holcroft from Division of Maternal-Fetal Medicine, John Hopkins University School of Medicine examined the relationship between umbilical arterial gas analysis and DDI in emergency caesarean delivery performed for nonreassuring fetal status. He noted that in most neonates there was no deterioration in cord blood gas results even when born with DDI more than 30-minutes.[68]

Gita Radhakrishnan et al., conducted a cross sectional observational study on Indian women at UCMS and GTB hospital, Delhi, on ”Factors affecting decision delivery interval in emergency caesarean sections in a tertiary care hospital”, which showed decision-delivery interval of 30 minutes is difficult to achieve even for urgent caesarean sections in government based setup of a developing nation, therefore more reasonable timeframe of 60-75 minutes may be justified for emergency caesarean delivery under similar setup and major factor

causing the delay was nonavailability of operation theatre due to long list of waiting caesarean deliveries.[69]

Singh R et al., conducted a prospective observational study on "Decision to delivery interval in emergency caesarean section and its correlation with perinatal outcome", which showed 19% of the deliveries were achieved in ≤30 minutes and mean decision-delivery interval was 42.5±19.4 min. there was no difference in the perinatal outcome for babies with decision-delivery interval of ≤30 versus 31-60 minutes. However significantly high risk for poor perinatal outcome was observed for babies with decision-delivery interval >60min.[70]

Onwudiegwu U et al., conducted a prospective study on "Decision delivery interval in a Nigerian tertiary hospital: implications for maternal morbidity and mortality" in a Nigerian tertiary hospital which showed mean decision-delivery interval was 4.4±4.2 hours. Bottlenecks within the maternity units were responsible for the delays in 31.7% of cases. Unavailability of pediatrician (19.6%), nonavailability of anesthetic coverage (13.6%), unreadiness of the operation theatre (11.9%) and seeking second opinion (6.4%) were other major causes of delay. There were 15 perinatal deaths, five of whom were directly linked to the delays i.e., a perinatal mortality rates of 3.7%. Four maternal deaths were directly attributable to delay, a maternal mortality rate of 3%. Other direct consequences of the delays were severe hemorrhage (10.3%), uterine rupture(2.3%) and DIC(1.5%).[71]

HE onah et al., conducted a prospective observational study on "Decision delivery interval and perinatal outcome in emergency caesarean sections", in 2 Nigerian tertiary care centre which showed none of the caesarean sections were conducted within the recommended 30 minute interval. Despite this there was nosignificant correlation between decision-delivery interval and perinatal outcome. The major cause of the delay was anesthetic delay in both centres and difficulty to procure essential materials in one of the centres. Decision-delivery interval of 30 minutes should remain the gold standard, however decision-delivery interval up to 3 hours maynot be incompatible with good perinatal outcome.[72]

In a Norwegian study,[58] 52.4 minutes was the average interval for all emergency caesarean delivery; and 11.8 minutes for urgent emergency caesarean delivery. From the study results they came to a conclusion that there were several significant factors that may predict when 30

minute DDI is vital to optimize pregnancy outcome and these included acute fetal distress, placental abruption and cord prolapse. Seniority of the surgeon was also a significant predictor in his study to a more expeditious delivery.

A study reported the results of an audit of all caesarean deliveries done in five different periods, in a general district hospital in Kent, United Kingdom.[73] The recommended DDI exceeded in 64 percent of cases of caesarean delivery. The main factors observed in their study causing delay in performing the surgery were transferring the women to the operating theatre and inducing anaesthesia. The study proposed that introduction of a time sheet may improve the decision delivery interval. With implementation of a time sheet only 71 percent of caesarean delivery had a DDI of 30 minutes.

A Prospective 1-year study [74] was conducted on emergency CS in a tertiary care hospital attached to a R.N.T. Medical College, Udaipur, Rajasthan, India to evaluate the DDI, factors affecting it and to analyze their effects on maternal and neonatal outcome.In this audit, it was observed that only 42.4% of emergency CS conformed to the 30 min DDI recommended by WHO while 57.6% cases had a >30 min DDI, the mean DDI being 37.2 ± 17.4 min.

A retrospective cohort study [75] was conducted at the Department of Obstetrics and Gynaecology, Faculty of Medicine Siriraj Hospital, which is the largest University-based tertiary referral centre in Thailand. A total of 431 pregnant women who were indicated for emergency caesarean delivery were included. Clinical information and timing of process after decision until delivery and pregnancy outcomes were evaluated. Only 3.5% of emergency caesarean delivery had a DDI ≤30 minutes (median 82 minutes). Significant shorter time intervals were observed in those with non-reassuring FHR.

A retrospective study[76] was conducted on emergency CS in University Of Technology Teaching Hospital Ogbomoso, Nigeria to identify the common indications for emergency caesarean section, factors responsible for delays after decision has been made and the short-term effect on the mother and neonate . From the study results the mean DDI was 145.3± 69.2 mins and the leading cause of delay due to lack of funds, non provision of surgical materials and non availability of blood and blood products. They concluded that there are still avoidable delays in emergency caesarean section. Although there were no immediate

neonatal complications, improving health care delivery so as to eliminate the identified causes would go a long way in reducing these delays.

A retrospective cross sectional study [77] was conducted at Kilimanjaro Christian Medical Centre (KCMC), Moshi, Tanzania . A total of 598 pregnant women who were indicated for emergency caesarean delivery were included. Clinical information and timing of process after decision until delivery and pregnancy outcomes were evaluated.They showed the results that the median Decision Delivery Interval was 60 min [IQR 40–120]. There was no significant association between DDI and neonatal transfer. Only 12% were operated within 30 min from decision time.They concluded that the recommended DDI by ACOG & AAP of 30 min is not feasible in our setting, time frame of 75 min could be acceptable but clinical judgment is required to assess on the urgency of caesarean section in order to prevent maternal and neonatal morbidity and mortality.

An observational study [78]was conducted at tertiary level government medical college . A total of 480 women with indications of category I (emergency), and category II (urgent) caeasarean sections, were studied in the context of DDI and composite adverse perinatal outcomes . Only in 30% cases DDI of <30 min was achieved and sixty-three per cent with prolapsed cord was delivered within 30 min. The composite neonatal outcomes were not significantly increased up to DDI of 60 min for category I (emergency) and up to 90 min in category II (urgent) caesarean sections. They concluded that reconsideration of the present recommendations of DDI in categories I and II, while Crash CS should be a separate group with recommended DDI of 30 min.

Hence with this study we have tried to evaluate the factors affecting decision to delivery interval and its effect on perinatal outcome.

Materials and methods

MATERIALS AND METHODS

Study setting: This study was conducted in the Department of Obstetrics & Gynaecology at the R.L.Jalappa hospital, which is a tertiary care hospital located in Kolar, from January 2017 to May 2018.

Study design: Prospective observational study

Subjects: Patients posted for emergency caesarean delivery in R.L.Jalappa hospital during the study period were included into the study.

Sample size: 200

Sample size was estimated by using of formula

$$\text{Sample size} = Z_a^2 \, SD^2/d^2$$

Here Z_a= Is standard normal variate (at 5% type 1 error ($P<0.005$) it is 1.96 and at 1% type 1 error ($P<0.01$) it Is 2.58).

As in majority studies P values are considered significant below 0.05 hence 1.96 is used in formula.

SD= Standard deviation

d= Absolute error or precision-Has to be decided by researcher $Z_a^2 = 2.58$ at 99% CI

SD = 204.1

D=20%

Using the above values at 95% confidence level a sample size of 200 subjects will be included in the study.

Inclusion criteria:

1. Pregnant women at term in whom decision for emergency caesarean delivery wastaken and who delivered a singleton baby.

Exclusion criteria:

1. Pregnant women posted for elective caesarean delivery.

2. Pregnant women with medical co-morbidities which independently could result in poor maternal outcome.

3. Pregnant women who delivered a baby with any congenital anomaly.

4. Cases where data was not recorded properly.

Methodology of data collection

Data was collected from the records of the patients posted for emergency caesarean delivery in R.L.Jalappa hospital. Among all the patients who fulfilled the inclusion and exclusion criteria, study subjects were chosen by simple random sampling. All the socio demographic profile of the subject was noted from the case sheet. In addition following data

1) The time at which the decision for emergency caesarean delivery was made.
2) The time at which patient was shifted out from the labour ward.
3) The time at which patient entered preoperative area in operation theatre.
4) Duration for induction of anesthesia.
5) Form of anesthesia used.
6) The time at which operation commenced.
7) The time at which baby was extracted.
8) Reasons for any particular delay in the decision to delivery interval like
    1. Delay in obtaining consent
    2. Delay in cross matched blood
    3. Non availability of basic investigations
    4.Delay in arrangement of drugs
    5.Preparation of OT table in between surgeries
    6. Non availability of OT table during daytime
    7. Procedural delay in inducing anaesthesia
    8. Failed spinal converting to general anasethesia
    9.Delay in extraction due to adhesions and malpresentations
10) Apgar score of the neonate was noted at 5 minutes.

11) Babies admitted to NICU were noted. Complications they develop during their NICU stay and duration of NICU stay was noted.
12) Neonatal death, if any, along with cause of death.

The indications for LSCS were categorized as under:

Category I: immediate threat to life of woman or fetus

Category II: maternal or fetal compromise but not immediate life threatening

Category III: needing early delivery but no maternal or fetal compromise

Total decision to delivery interval (DDI) was calculated as the sum of the following intervals:

a. Interval between decision of caesarean section and shifting the patient from the labour room to the pre-operative area of the OT (Interval-1).

b. Interval between receiving the patient by OT team and shifting the patient to the operation table (Interval-2).

c. Time taken for induction of anaesthesia (Interval-3).

d. Interval between induction of anaesthesia and delivery of the baby (Interval-4).

Although the optimal decision to delivery interval is 30 min especially for category I cases, an interval of more than 15 minutes at any of the above steps for interval 1-3 and more than 8 minutes for interval 4 was considered as delay and cause of delay was noted.

Statistical analysis:

Data was entered into Microsoft excel data sheet and was analyzed using SPSS 22 version software. Categorical data was represented in the form of Frequencies and proportions. **Chi-square test** was used as test of significance for qualitative data. Continuous data was represented as mean and SD. **ANOVA (Analysis of Variance)** was the test of significance to identify the mean difference between more than two groups for quantitative data.

Graphical representation of data: MS Excel and MS word was used to obtain various types of graphs such as bar diagram, Pie diagram.

p value (Probability that the result is true) of <0.05 was considered as statistically significant after assuming all the rules of statistical tests.

Statistical software: MS Excel**,** SPSS version 22 **(**IBM SPSS Statistics, Somers NY, USA) was used to analyze data.

Results

RESULTS

This study titled "**A PROSPECTIVE OBSERVATIONAL STUDY ON DECISION TO DELIVERY INTERVAL AND PERINATAL OUTCOME IN EMERGENCYCAESAREAN SECTION IN TERITARY CARE HOSPITAL"** was conducted in the Department of Obstetrics and Gynecology, R.L.Jalappa Hospital and Research Institute, Kolar during to May . During this period, there were 2700 deliveries of which 1125 were by caesarean delivery giving a rate of 41.67 % for this period. 112 caesarean delivery were elective cases and hence excluded.

Amongst 1013 emergency caesarean deliveries, 200 cases were selected by simple random sampling after confirming that they satisfied the inclusion and exclusion criteria.

Mean age was 25.43 ± 3.644 years. Majority of women were in the age group 26 to 30 years (44%).

Table 2: Age distribution of study participants (N=200)

		N	%
Age	<18 years	5	2.5%
	18 to 20 years	17	8.5%
	21 to 25 years	74	37.0%
	26 to 30 years	88	44.0%
	31 to 35 years	16	8.0%
	Total	200	100.0%

81% of women included into study belonged to 21-30 years of age.

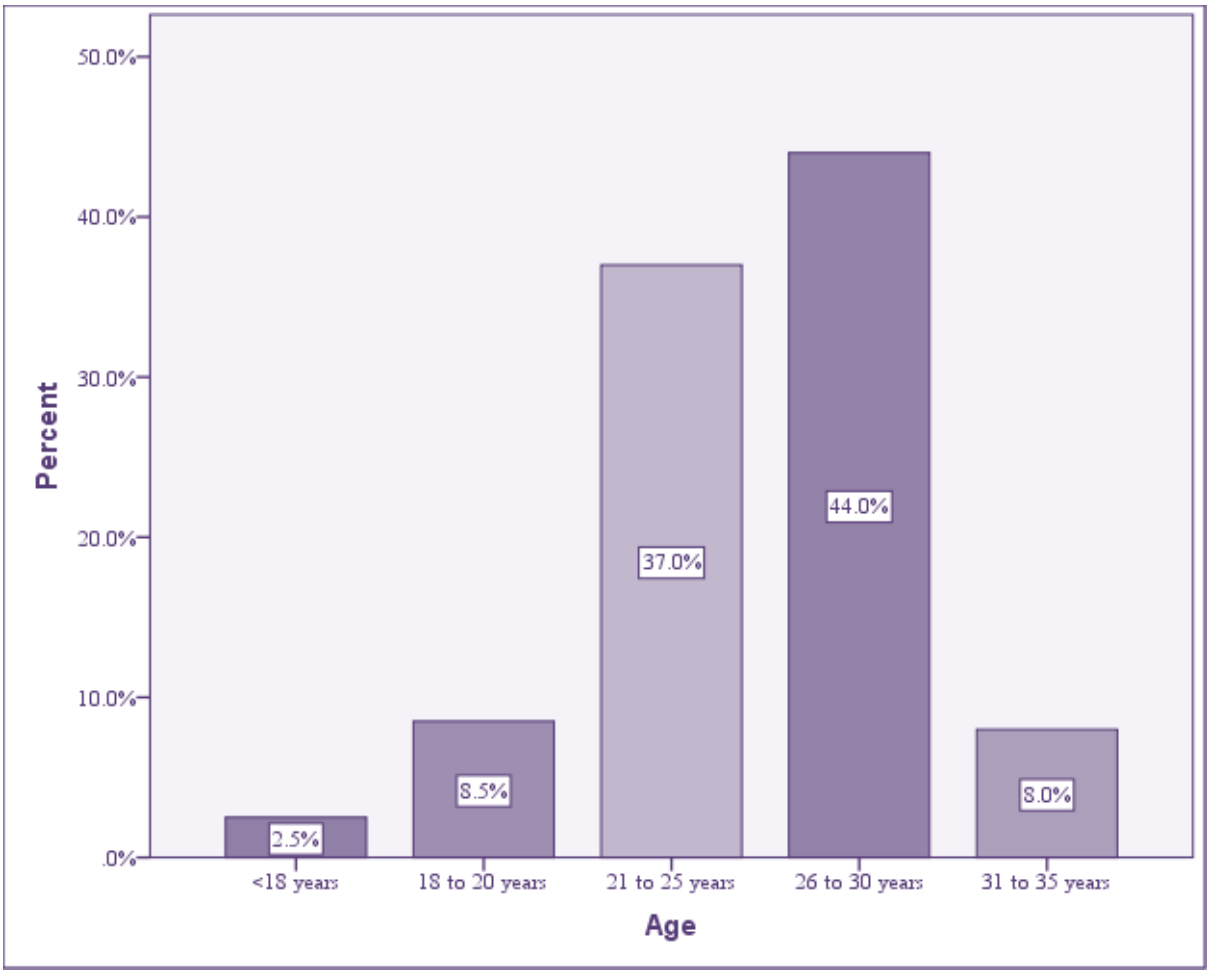

FIGURE 7: Age distribution of study participants (N=200)

Table 3: Parity distribution among study participants (N=200)

		N	%
Parity	0	107	53.5%
	1	75	37.5%
	2	18	9.0%

53.5% of women were nulliparous and 46.5% were multiparous.

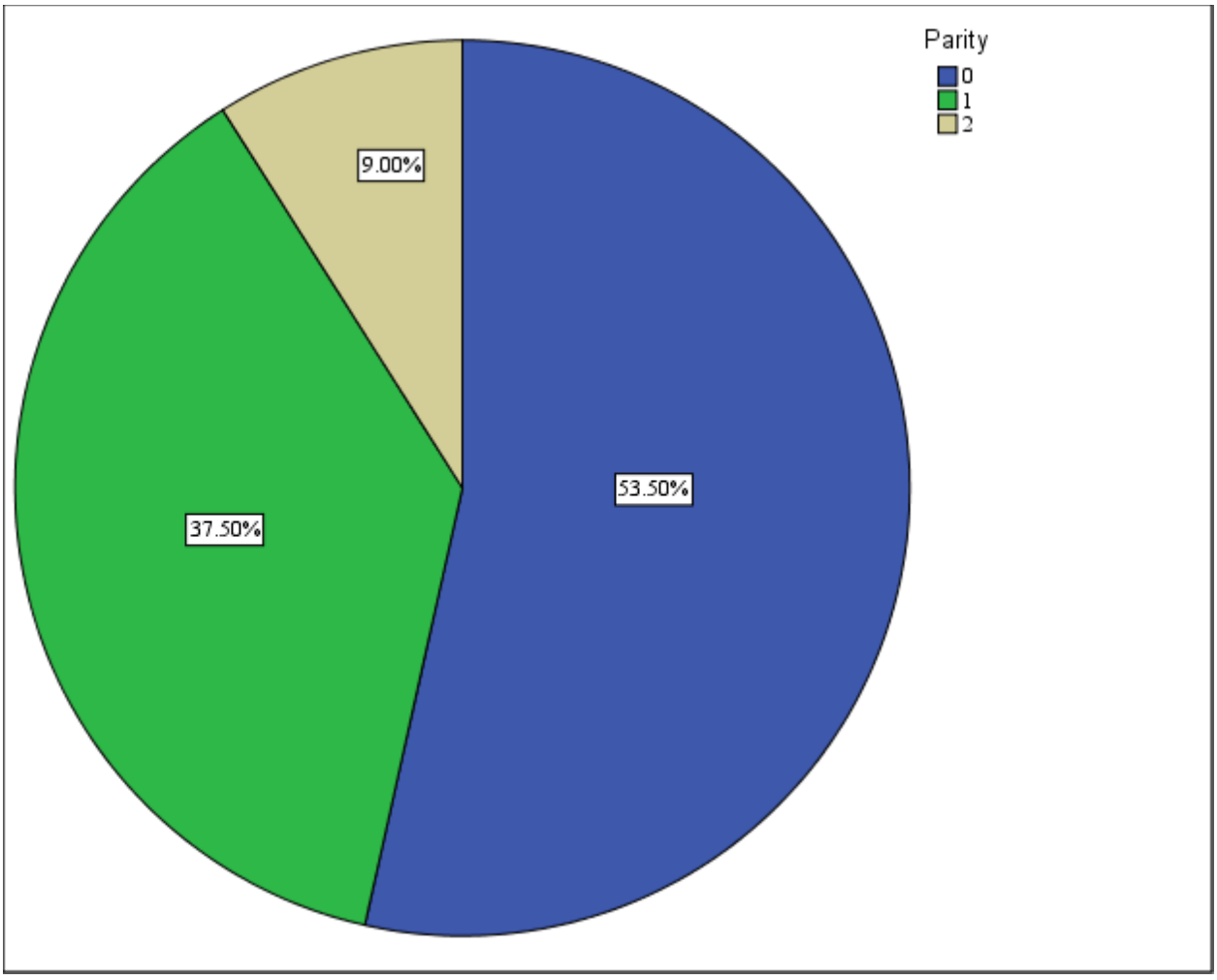

FIGURE 8: Parity of study participants(N=200)

Table 4: Gestational Age distribution among study participants(N=200)

		N	%
Gestational Age	37 to 40 Weeks	172	86.0%
	41 to 42 weeks	28	14.0%

86% of women were in the gestational age 37 to 40 Weeks and 14% were in the gestational age 41 to 42 weeks.

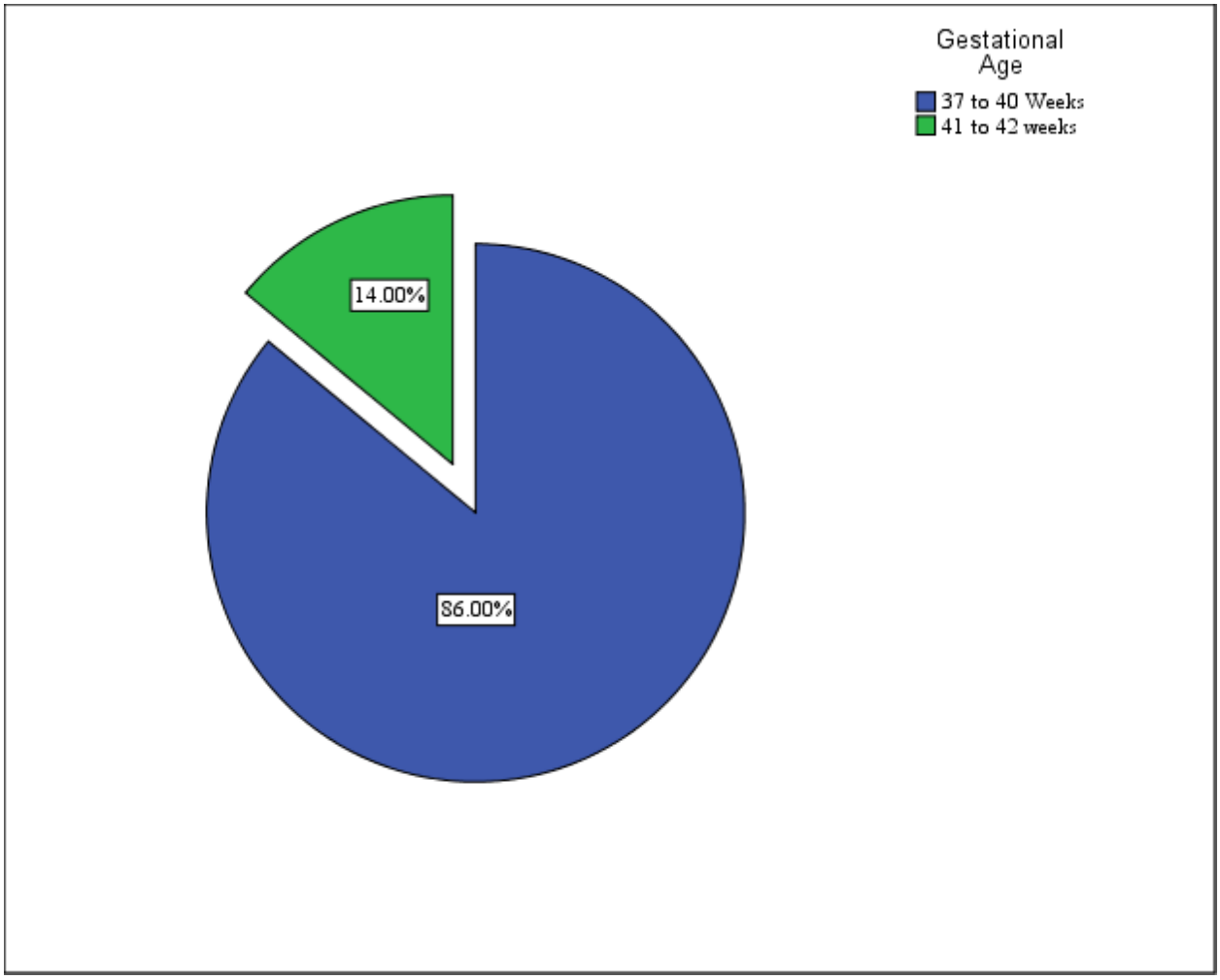

FIGURE 9: Pie diagram showing Gestational Age distribution among subjects

Table 5: Caesarean Category distribution among study participants (N=200)

		N	%
Caesarean Category	1	39	19.5%
	2	82	41.0%
	3	79	39.5%

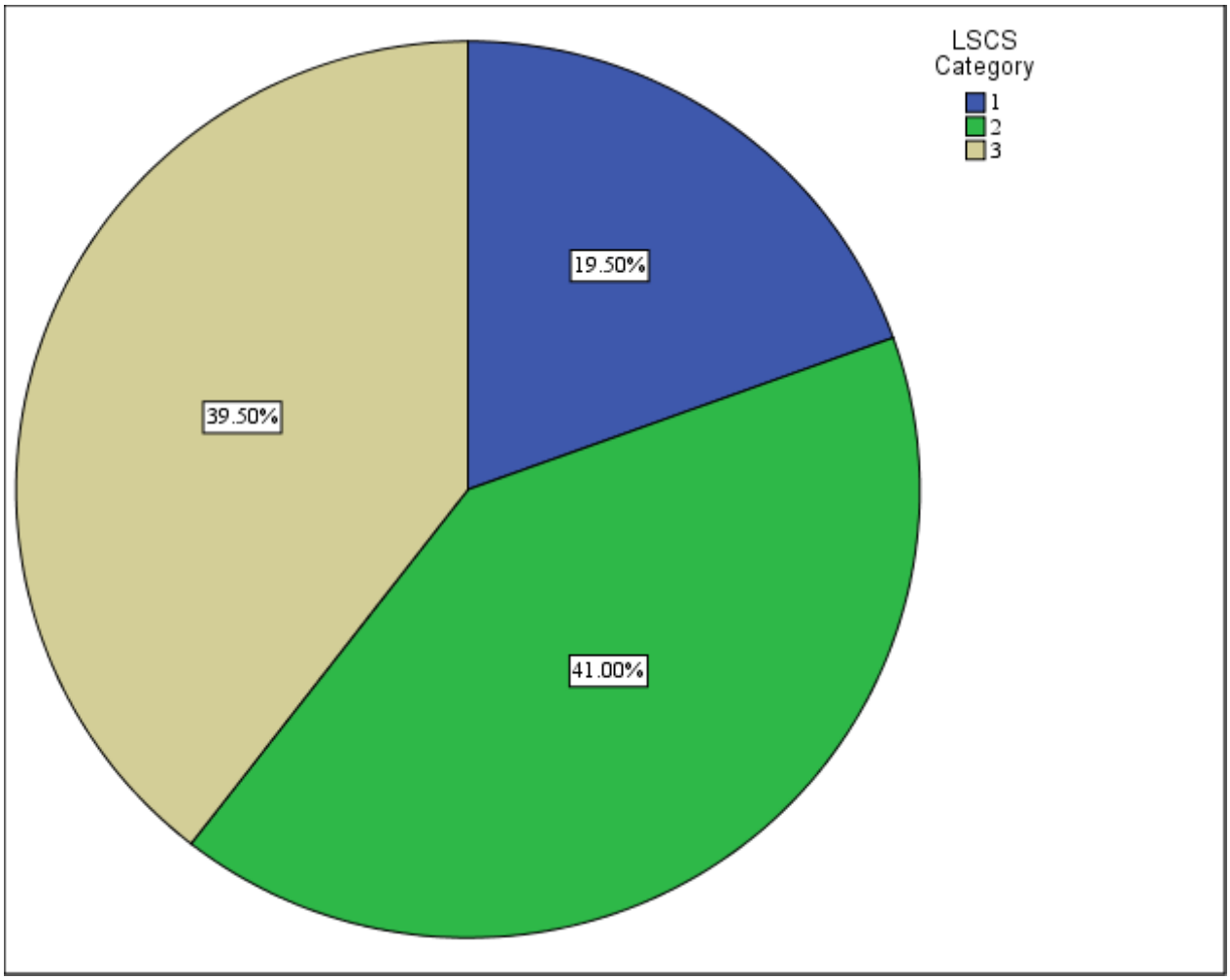

Figure 10: Pie diagram showing LSCS Category distribution among subjects

Among 200 participants, 39(19.5%) belonged to category 1, 82(41%) belonged to category 2 and 79(39.5%) belonged to category 3.

Table 6: Descriptive analysis for DDI and different intervals in study population (N=200)

Parameter	Mean ±STD	Median	Min	Max	95% C.I. for EXP(B)	
					Lower	Upper
INTERVAL 1	39.68 ± 22.51	30.00	10.00	90.00	36.54	42.82
INTERVAL 2	17.50 ± 6.930	15.00	4.00	35.00	16.54	18.47
INTERVAL 3	15.66 ± 4.966	15.00	5.00	30.00	14.97	16.36
INTERVAL 4	6.48 ± 1.591	6.00	4.00	12.00	6.26	6.70
DDI	79.28 ± 28.66	71.00	26.00	141.00	75.28	83.28

- The mean DDI in the study participants was 79.28 ± 28.66 mins . The mean DDI for interval 1 ,interval 2 ,interval 3 and interval 4 were 39.68 ± 22.51,17.50 ± 6.930, 15.66 ± 4.966 and 6.48 ± 1.591 mins respectively.

Table 7 : Comparison of mean DDI across different caesarian sections in study population (N=200)

CATEGORY	DDI Mean ± SD	Mean difference	95% Confidence Interval for Mean		P value
			Lower Bound	Upper Bound	
Category 1 (Base line)	47.23 ± 13.35				
Category2	64.83 ± 11.83	17.59	12.76	22.43	***<0.001***
Category 3	110.1 ± 13	62.8	58.01	67.74	***<0.001***

Mean DDI for category 1, 2, 3 caesarean deliveries were 47.23 ± 13.35 mins , 64.83 ± 11.83 mins, 110.1 ± 13 mins respectively. Duration of DDI varied significantly in between the caesarean categories .

Table 8: Comparison of DDI across different caesarian sections in study population (N=200)

CATEGORY	DDI					
	≤30	**31-60**	**61-75**	**76-90**	**91-120**	**>120**
Category 1 (N=39)	4 (10.256%)	27 (69.23%)	8 (20.51%)	0 (0%)	0 (0%)	0 (0%)
Category2 (N=82)	0 (0%)	31 (37.80%)	37 (45.12%)	12 (14.63%)	2 (2.439%)	0 (0%)
Category 3 (N=79)	0 (0%)	0 (0%)	0 (0%)	5 (6.329%)	58 (73.41%)	16 (20.25%)

All 4 cases where DDI was < 30 min belonged to category 1 casearean delivery. 100 % of category 1 caesarean deliveries were performed within 75 minutes. All cases where DDI was > 120 minutes belonged to category 3 casearean deliveries.

Table 9 : Indication for caesarean section among study participants(N=200)

		N	%
Indication for caesarean section	Fetal distress	58	29.0%
	Cephalopelvic disproportion	17	8.5%
	Persistent Fetal Bradycardia	12	6.0%
	Oligohydramnios	23	11.5%
	Previous LSCS in latent labour	31	15.5%
	Breech in active labour	4	2.0%
	Breech in latent labour	5	2.5%
	Contracted pelvis	3	1.5%
	Abruption placenta	5	2.5%
	Previous 2 LSCS in Active labour	14	7.0%
	Scar dehiscence with impending rupture	6	3.0%
	Placenta Previa	9	4.5%
	Placenta Previa with hemodynamic stability	6	3.0%
	Failed instrumental delivery	2	1.0%
	Cord prolapse	1	0.5%
	Obstructed labour	4	2.0%

Among the study participants most common indication for caesarean section was Fetal distress (29%), Previous LSCS in latent labour (15.5%), Oligohydramnios (11.5%) and others as shown in above table.

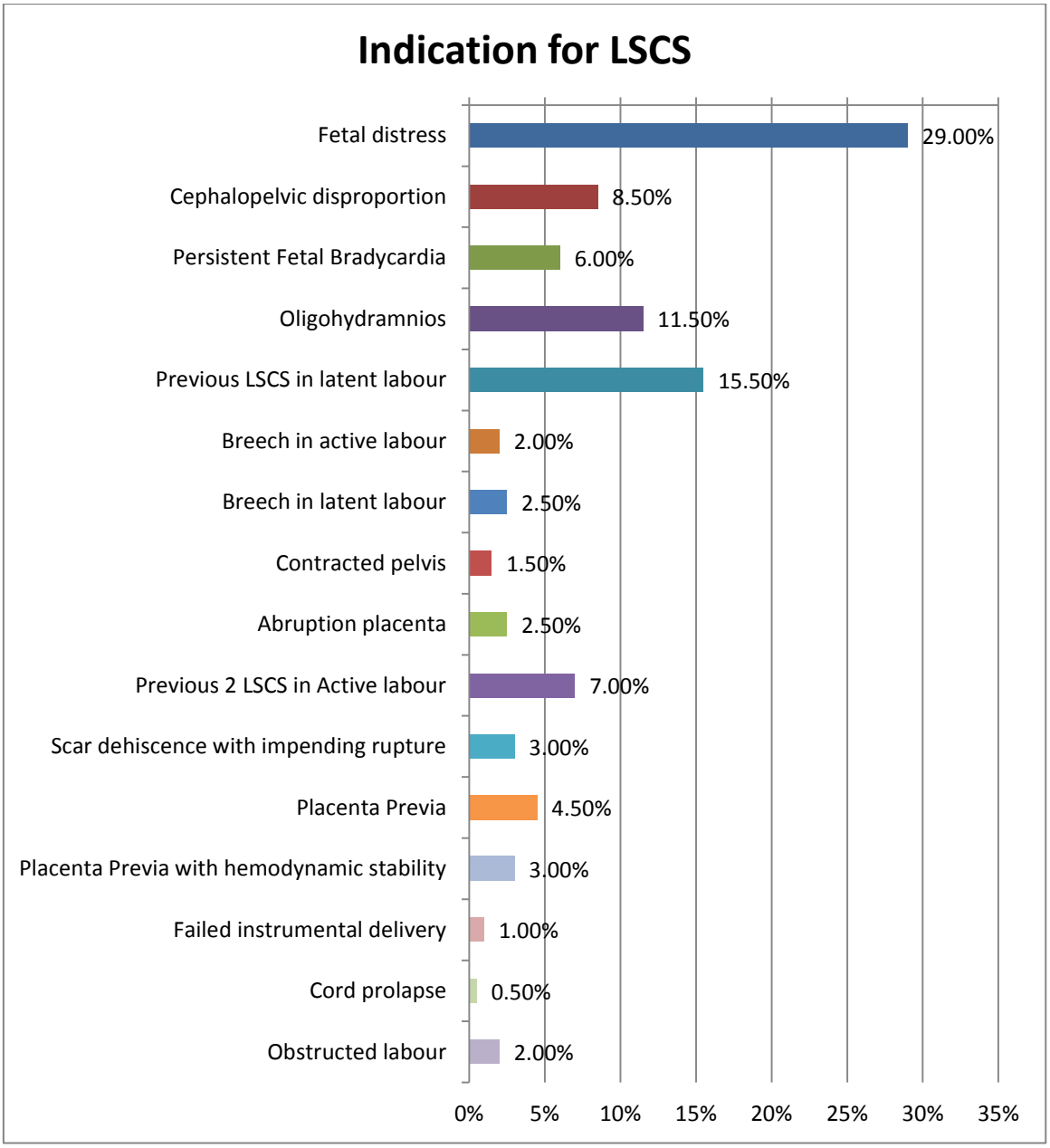

FIGURE 11: Bar diagram showing Indication for caesarean section among study participants

Table 10: Association between caesarean section category and Indication for caesarean section among study participants

Indication for LSCS	LSCS Category							
	1		2		3		Total	
	N	%	N	%	N	%	N	%
Fetal distress	0	0.0%	58	70.7%	0	0.0%	58	29.0%
Cephalopelvic disproportion	0	0.0%	0	0.0%	17	21.5%	17	8.5%
Persistent Fetal Bradycardia	12	30.8%	0	0.0%	0	0.0%	12	6.0%
Oligohydramnios	0	0.0%	0	0.0%	23	29.1%	23	11.5%
Previous LSCS in latent labour	0	0.0%	0	0.0%	31	39.2%	31	15.5%
Breech in active labour	0	0.0%	4	4.9%	0	0.0%	4	2.0%
Breech in latent labour	0	0.0%	0	0.0%	5	6.3%	5	2.5%
Contracted pelvis	0	0.0%	0	0.0%	3	3.8%	3	1.5%
Abruption placenta	5	12.8%	0	0.0%	0	0.0%	5	2.5%
Previous 2 LSCS in Active labour	0	0.0%	14	17.1%	0	0.0%	14	7.0%
Scar dehiscence with impending rupture	6	15.4%	0	0.0%	0	0.0%	6	3.0%
Placenta previa	9	23.1%	0	0.0%	0	0.0%	9	4.5%
Placenta previa with hemodynamic stability	0	0.0%	6	7.3%	0	0.0%	6	3.0%
Failed instrumental delivery	2	5.1%	0	0.0%	0	0.0%	2	1.0%
Cord prolapsed	1	2.6%	0	0.0%	0	0.0%	1	0.5%
Obstructed labour	4	10.3%	0	0.0%	0	0.0%	4	2.0%
Total	39	100.0%	82	100.0%	79	100.0%	200	100.0%

$\chi 2 = 400$, df =30, $p < 0.001$*

Among the study participants there was significant association between casearean category and indication for caesearan section . In Category 1, most common indication was Persistent Fetal Bradycardia (30.8%), in category 2 most common indication was Fetal distress (70.7%) and in category 3 most common indication was Previous Caesarean section in latent labour.

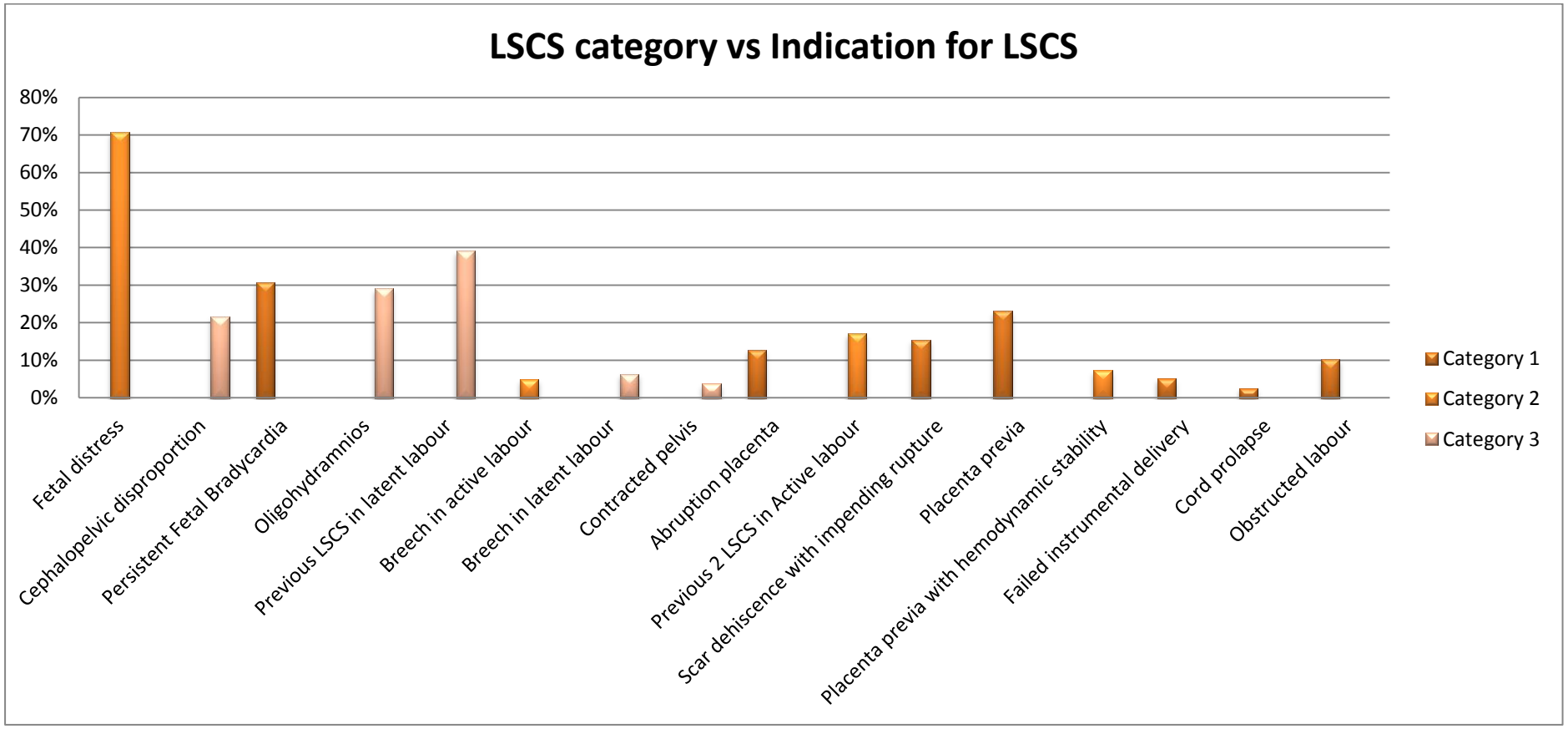

FIGURE 12: Bar diagram showing Association between LSCS category and Indication for LSCS among subjects

Table 11: Mean DDI with respect to Indications for caesarean section

		DDI		P value (ANOVA test)
		Mean	SD	
Indication for caesarean section	Fetal distress	61	7	<0.001*
	Cephalopelvic disproportion	112	13	
	Persistent Fetal Bradycardia	37	4	
	Oligohydramnios	112	11	
	Previous LSCS in latent labour	107	15	
	Breech in active labour	58	6	
	Breech in latent labour	108	5	
	Contracted pelvis	118	8	
	Abruption placenta	56	7	
	Previous 2 LSCS in Active labour	77	15	
	Scar dehiscence with impending rupture	49	7	
	Placenta previa	64	10	
	Placenta previa with hemodynamic stability	81	7	
	Failed instrumental delivery	31	4	
	Cord prolapse	26	.	
	Obstructed labour	42	4	
	Total	79	29	

Mean DDI was higher in those with Contracted pelvis 118 ± 8 mins and lowest in those with Cord prolapse 26 mins. There was significant difference in mean DDI with respect to Indication for LSCS.

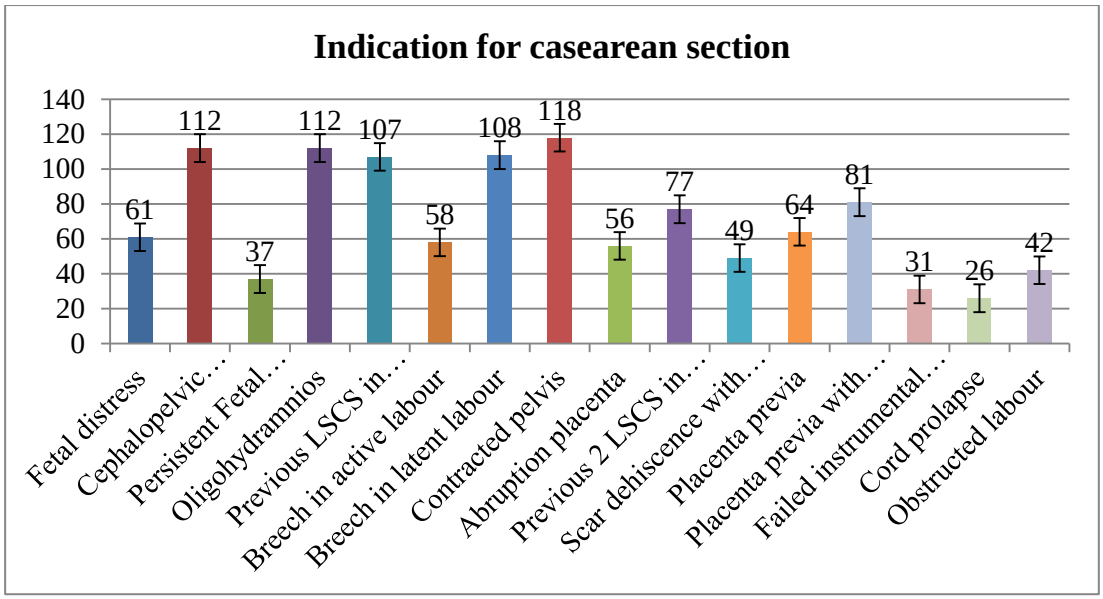

FIGURE 13: Bar diagram showing Mean DDI with respect to Indications for caesarean section

Table 12: Mean DDI with respect to Indications for caesarean section in Category 1

LSCS Category = 1		DDI	
		Mean	SD
Indication for LSCS	Persistent Fetal Bradycardia	37	4
	Abruption placenta	56	7
	Scar dehiscence with impending rupture	49	7
	Placenta Previa	64	10
	Failed instrumental delivery	31	4
	Cord prolapse	26	.
	Obstructed labour	42	4

In Category 1, highest DDI was observed among those with Placenta Previa 64 ± 10 mins and lowest DDI was observed in Cord prolapse 26 mins .

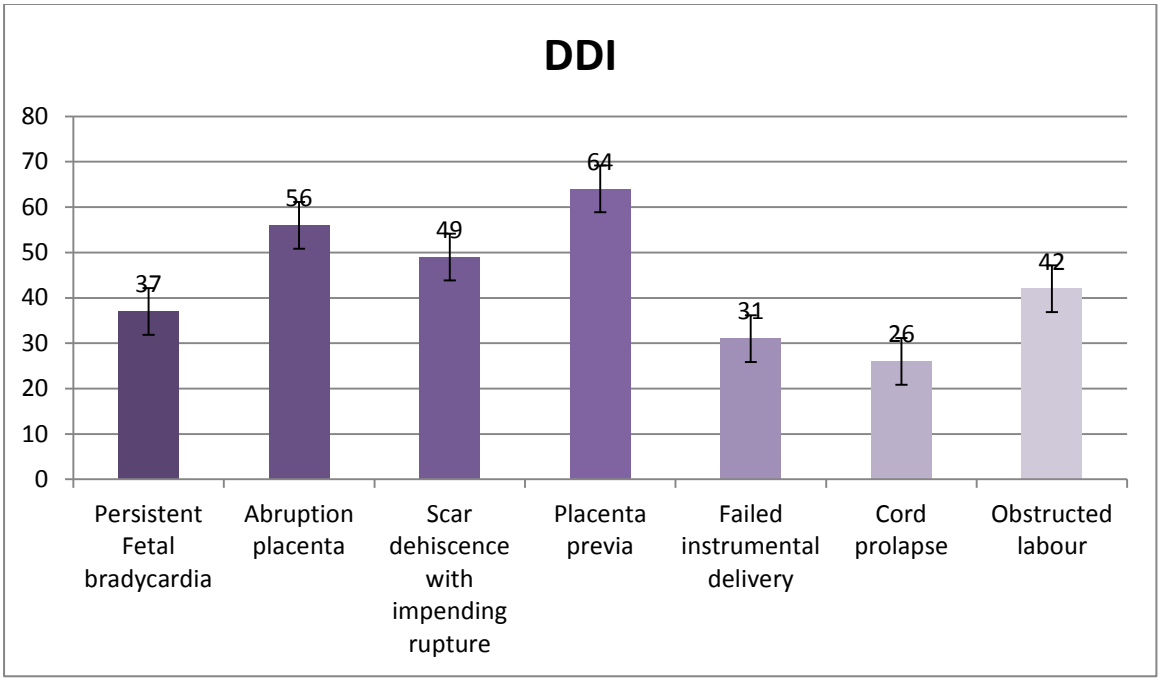

FIGURE 14: Bar diagram showing Mean DDI with respect to Indications for caesarean section in Category 1

Table 13: DDI groups with respect to Indications for caesarean section in Category 1

	DDI					
	<30 mins		31 to 60 mins		61 to 75 mins	
	N	%	N	%	N	%
Persistent Fetal Bradycardia	2	50.0%	10	37.0%	0	0.0%
Abruption placenta	0	0.0%	3	11.1%	2	25.0%
Scar dehiscence with impending rupture	0	0.0%	5	18.5%	1	12.5%
Placenta Previa	0	0.0%	4	14.8%	5	62.5%
Failed instrumental delivery	1	25.0%	1	3.7%	0	0.0%
Cord prolapse	1	25.0%	0	0.0%	0	0.0%
Obstructed labour	0	0.0%	4	14.8%	0	0.0%
Total	4	100.0%	27	100.0%	8	100.0%

$\chi 2 = 26.85$, df $= 12$, $p = 0.008$*

In the study among those with DDI <30 mins, most common indication was Persistent Fetal Bradycardia (50%), among those with DDI 31 to 60 mins, most common indication was Persistent Fetal Bradycardia (37%) and among those with DDI 61 to 75 mins, most common indication was Placenta Previa (62.5%). There was significant association between DDI and Indication for Caesarean in category 1.

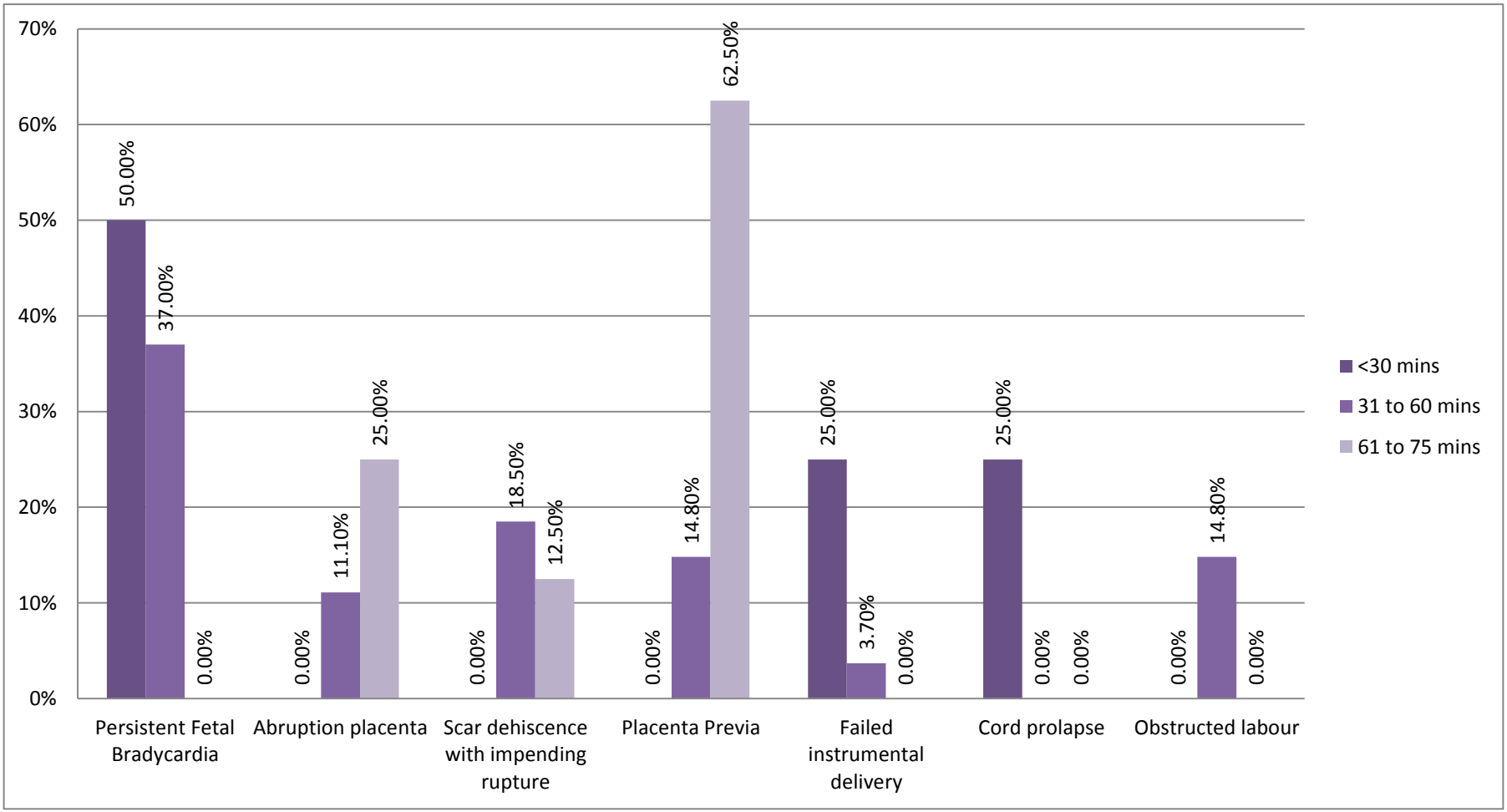

FIGURE 15: Bar diagram showing DDI groups with respect to Indications for caesarean section in Category 1

Table 14: Mean DDI with respect to Indications for caesarean section in Category 2

		DDI	
		Mean	SD
Indication for caesarean section	Fetal distress	61	7
	Breech in active labour	58	6
	Previous 2 LSCS in Active labour	77	15
	Placenta Previa with hemodynamic stability	81	7

In Category 2, highest DDI was observed among those with Placenta Previa with hemodynamic stability 81 ± 7 min and lowest DDI was observed in Breech in active labour 58 ± 6 min .

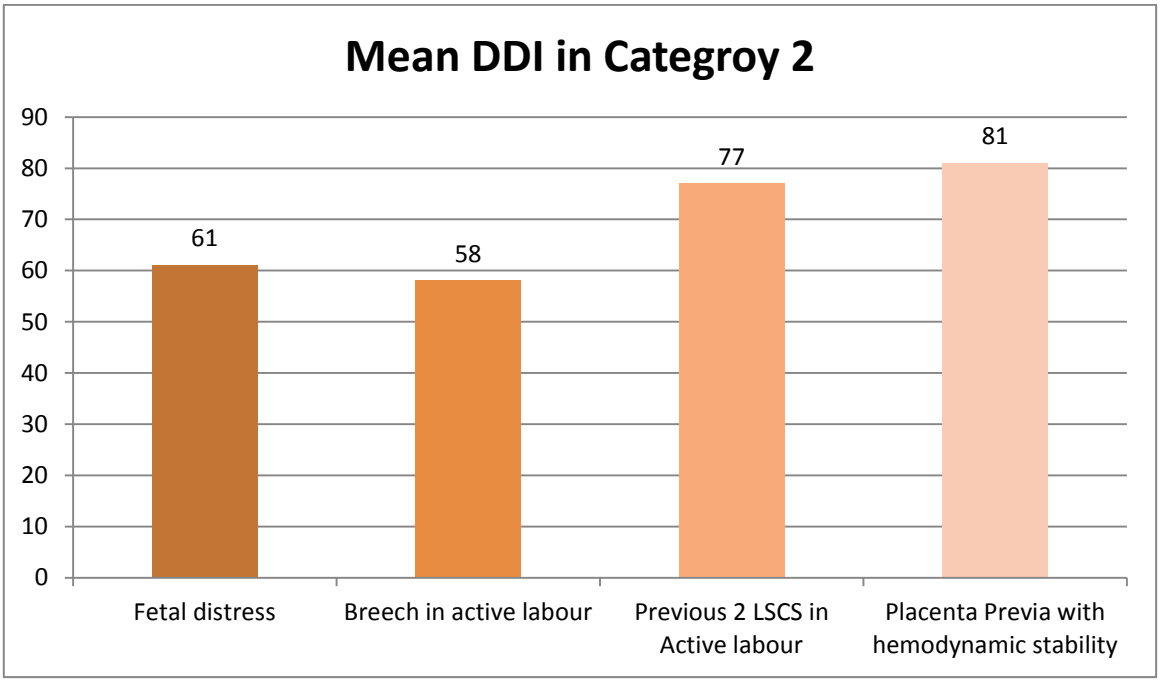

FIGURE 16: Bar diagram showing Mean DDI with respect to Indications for caesarean section in Category 2

Table 15 : DDI groups with respect to Indications for caesarean section in Category 2

		DDI							
		31 to 60 mins		61 to 75 mins		76 to 90 mins		91 to 120 mins	
		N	%	N	%	N	%	N	%
Indication for caesarean section	Fetal distress	28	90.3%	29	78.4%	1	8.3%	0	0.0%
	Breech in active labour	2	6.5%	2	5.4%	0	0.0%	0	0.0%
	Previous 2 LSCS in Active labour	1	3.2%	5	13.5%	6	50.0%	2	100.0%
	Placenta Previa with hemodynamic stability	0	0.0%	1	2.7%	5	41.7%	0	0.0%
	Total	31	100.0%	37	100.0%	12	100.0%	2	100.0%

$\chi 2 = 53.14$, df =9, $p < 0.001$*

In the study among those with DDI 31 to 60 mins, most common indication was Fetal distress (90.3%), among those with DDI 61 to 75 mins, most common indication was Fetal distress (78.4%), among those with DDI 76 to 90 mins, most common indication was Previous 2 LSCS in Active labour (50%) and among those with DDI, most common indication was Previous 2 LSCS in Active labour (100%). There was significant association between DDI and Indication for LSCS in category 2.

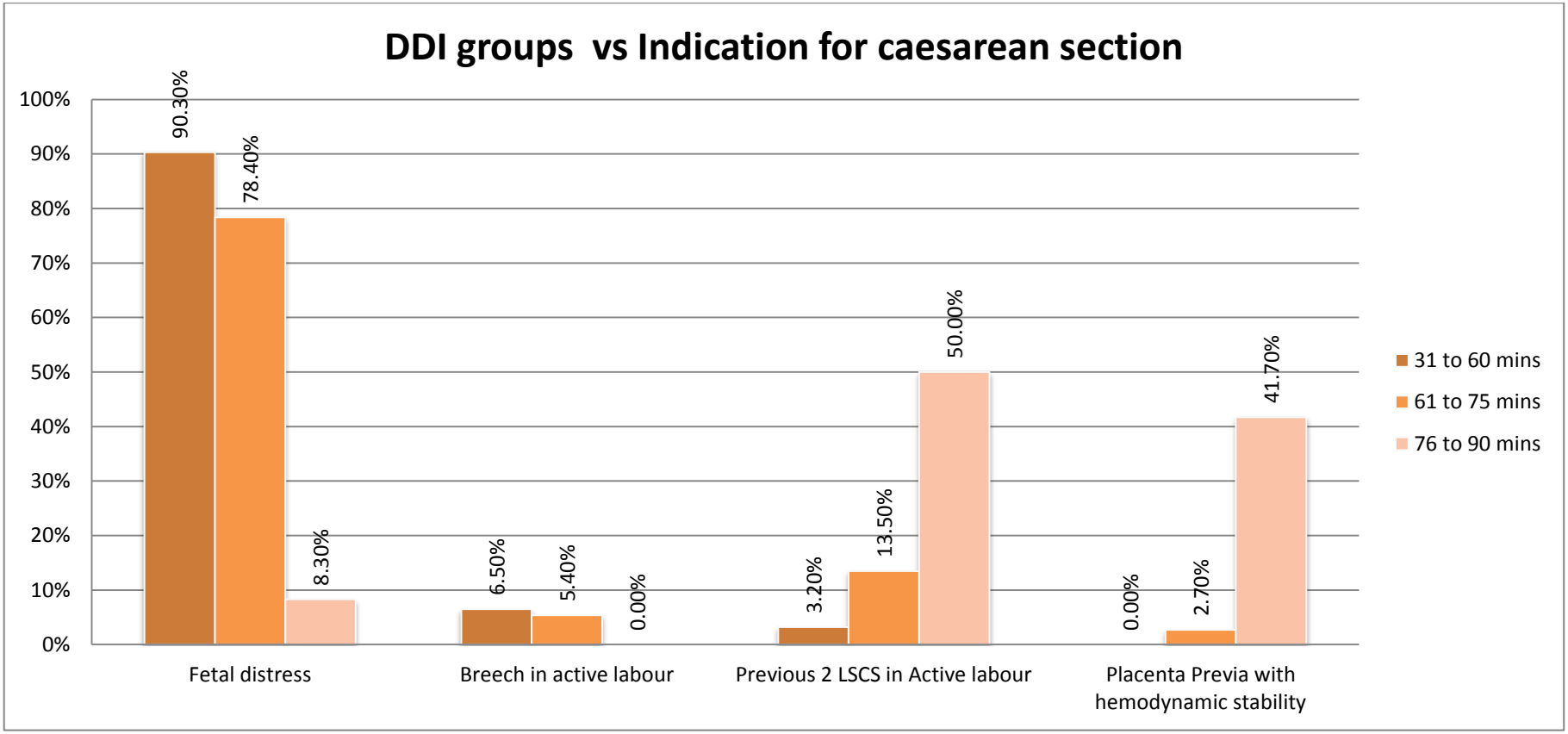

FIGURE 17: Bar diagram showing DDI groups with respect to Indications for caesarean section in Category 2

Table 16: Mean DDI with respect to Indications for caesarean section in Category 3

		DDI	
		Mean	SD
Indication for caesarean section	Cephalopelvic disproportion	112	13
	Oligohydramnios	112	11
	Previous LSCS in latent labour	107	15
	Breech in latent labour	108	5
	Contracted pelvis	118	8

In Category 3, highest DDI was observed among those with Contracted pelvis 118 ± 8 min and Previous LSCS in latent labour 107 ± 15 min.

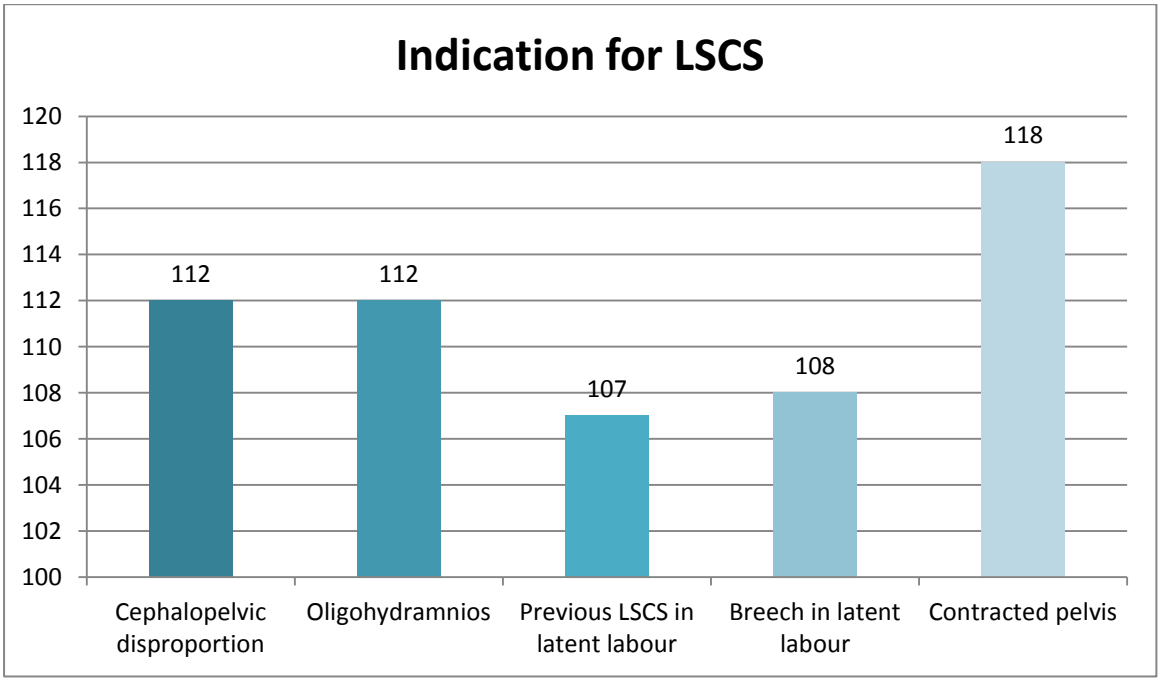

FIGURE 18:: Bar diagram showing Mean DDI with respect to Indications for Caesarean section in Category 3

Table 17: DDI groups with respect to Indications for caesarean section in Category 3

		DDI					
		76 to 90 mins		91 to 120 mins		>120 mins	
		N	%	N	%	N	%
Indication for LSCS	Cephalopelvic disproportion	0	0.0%	14	24.1%	3	18.8%
	Oligohydramnios	0	0.0%	17	29.3%	6	37.5%
	Previous LSCS in latent labour	5	100.0%	20	34.5%	6	37.5%
	Breech in latent labour	0	0.0%	5	8.6%	0	0.0%
	Contracted pelvis	0	0.0%	2	3.4%	1	6.2%
	Total	5	100.0%	58	100.0%	16	100.0%

$\chi 2 = 10.48$, df =8, p = 0.233

In the study among those with DDI 76 to 90 mins, most common indication was Previous LSCS in latent labour (100%), among those with DDI 91 to 120 mins, most common indication was Previous LSCS in latent labour (34.5%) and among those with DDI >120 mins, most common indication was Oligohydramnios and Previous 2 LSCS in Active labour (37.5% respectively). The association between DDI and Indication for LSCS in category 3 was insignificant.

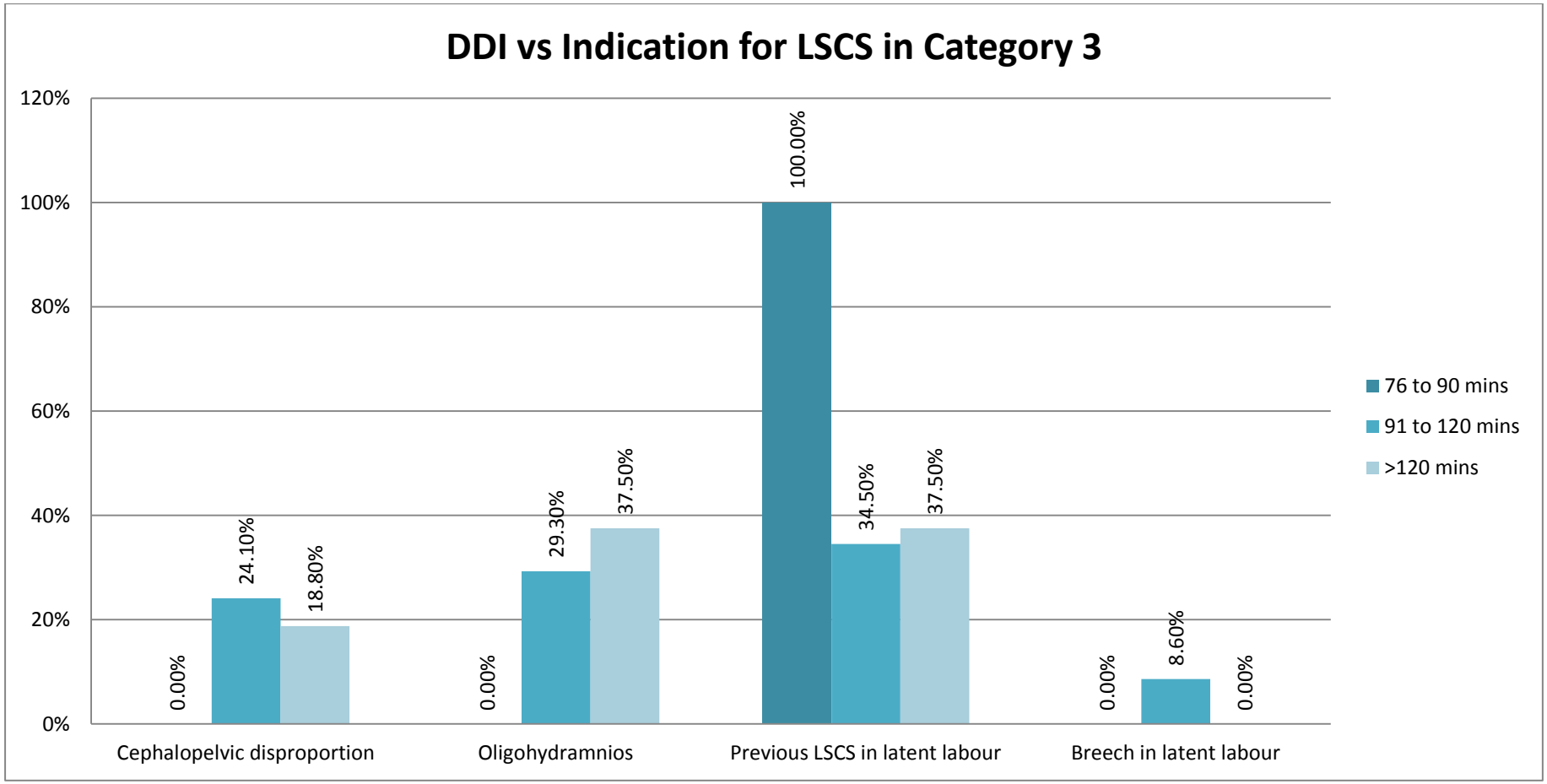

FIGURE 19: Bar diagram showing DDI groups with respect to Indications for LSCS in Category 3

FACTORS CAUSING DELAY IN DDI

Table 18: Causes for delay in performing caesarean section

	Yes		No	
	N	%	N	%
No delay	4	2.0%	196	98.0%
Delay in Obtaining Consent	91	45.5%	109	54.5%
Delay in Cross Matched Blood	36	18.0%	164	82.0%
Non Availability of Basic Investigations	57	28.5%	143	71.5%
Delay in Arrangement of Drugs	77	38.5%	123	61.5%
Preparation of OT Table In Between Surgeries	80	40.0%	120	60.0%
Non Availability of OT Table during Daytime	33	16.5%	167	83.5%
Procedural Delay in Inducing Anesthesia	62	31.0%	138	69.0%
Failed Spinal Converting To General Anesthesia	6	3.0%	194	97.0%
Delay in Extraction Due To Adhesions and Malpresentation	10	5.0%	190	95.0%

Most important factors causing delay in the study were delay in obtaining consent in 91cases (45.5%) and preparation of OT table between surgeries in 80 cases (40%).

Delayed referral though cannot be a cause for delay in decision to delivery interval but was considered to account for the cases where maximum damage was done before the decision for caesarean delivery was taken.

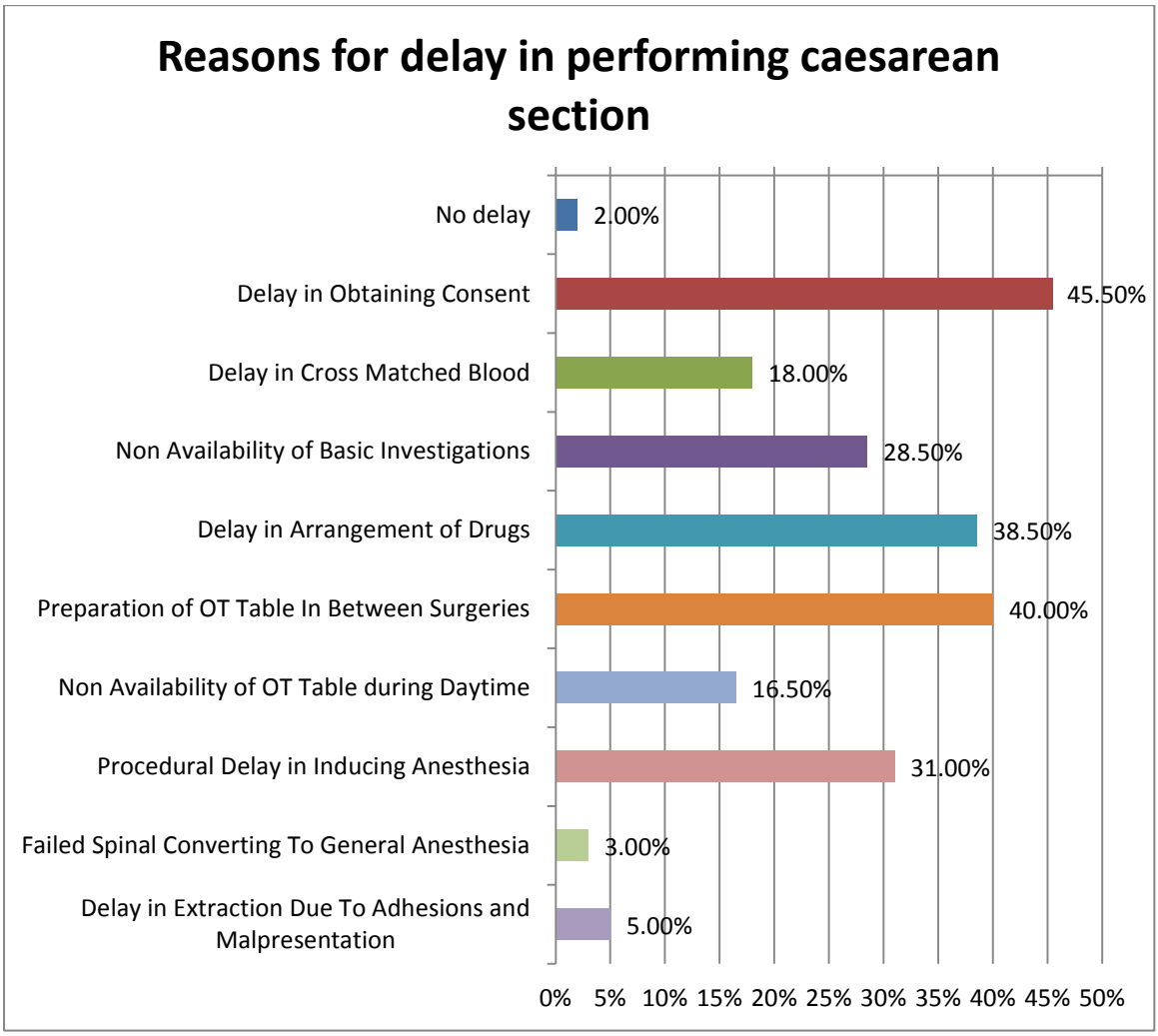

FIGURE 20: Bar diagram showing Causes for delay in performing caesarean section

Table 19: Descriptive analysis of causes for delay in performing caesarian section in study population (N=200)

Reasons for delay	Category 1	Category 2	Category 3
No delay	4 (100%)	0 (0%)	0 (0%)
Delay in obtaining consent	14 (15.38%)	11 (12.08%)	66 (72.52%)
Delay in cross matched blood	18 (50%)	9 (25%)	9 (25%)
Non availability of basic investigations	9 (15.78%)	21 (36.84%)	27 (47.36%)
Delay in arrangement of drugs	11 (14.28%)	39 (50.64%)	27 (35.06%)
Preparation of OT table in between surgeries	5 (6.25%)	22 (27.5%)	53 (66.25%)
Non availability of OT table during daytime	3 (9.090%)	6 (18.18%)	24 (72.72%)
procedural delay in inducing anesthesia	2 (3.225%)	19 (30.64%)	41 (66.12%)
Failed spinal converting to general anesthesia	1 (16.66%)	3 (50%)	2 (33.33%)
Delay in extraction due to adhesions and malpresentations	2 (20%)	4 (40%)	4 (40%)

Among 200 cases , only 4 cases were performed without any delay in decision to delivery interval. All 4 cases were belonged to category 1.

Table20: Descriptive analysis of Causes for delay in performing caesarean section in study population category wise (category 1)

Reasons for delay	Category 1 (N=39)
No delay	4 (10.25%)
Delay in obtaining consent	14 (35.89%)
Delay in cross matched blood	18 (46.15%)
Non availability of basic investigations	9 (23.07%)
Delay in arrangement of drugs	11 (28.20%)
Preparation of OT table in between surgeries	5 (12.82%)
Non availability of OT table during daytime	3 (7.692%)
procedural delay in inducing anesthesia	2 (5.128%)
Failed spinal converting to general anesthesia	1 (2.564%)
Delay in extraction due to adhesions and malpresentations	2 (5.128%)

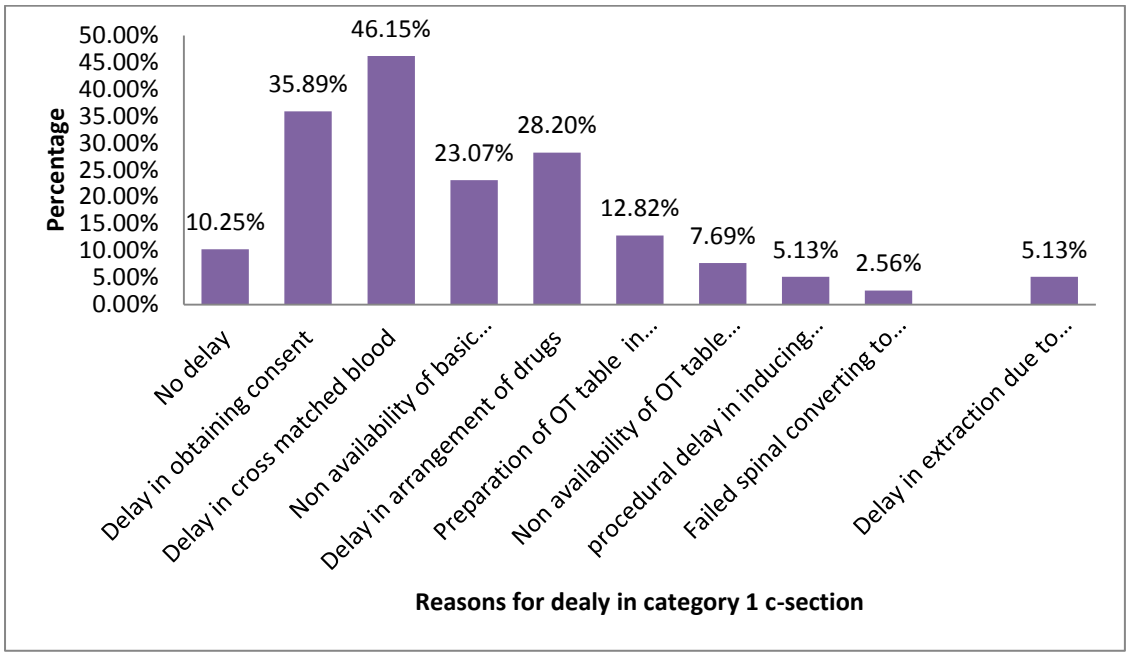

FIGURE 21 :Bar diagram of reasons for delay in category 1 (N=39)

In category 1 caesarean delivery , in 46.15% of the cases the delay was due to time spent in arranging for cross matched blood products in cases of placenta previa, placental abruption. In 35.89% of cases the delay was in obtaining consent from patient bystanders.

Table 21: Descriptive analysis of Causes for delay in performing caesarean section in study population category wise(category 2)

Reasons for delay	Category 2 (N=82)
No delay	0 (0%)
Delay in obtaining consent	11 (13.41%)
Delay in cross matched blood	9 (10.97%)
Non availability of basic investigations	21 (25.60%)
Delay in arrangement of drugs	39 (47.56%)
Preparation of OT table in between surgeries	22 (26.82%)
Non availability of OT table during daytime	6 (7.317%)
procedural delay in inducing anesthesia	19 (23.17%)
Failed spinal converting to general anesthesia	3 (3.658%)
Delay in extraction due to adhesions and malpresentations	4 (4.878%)

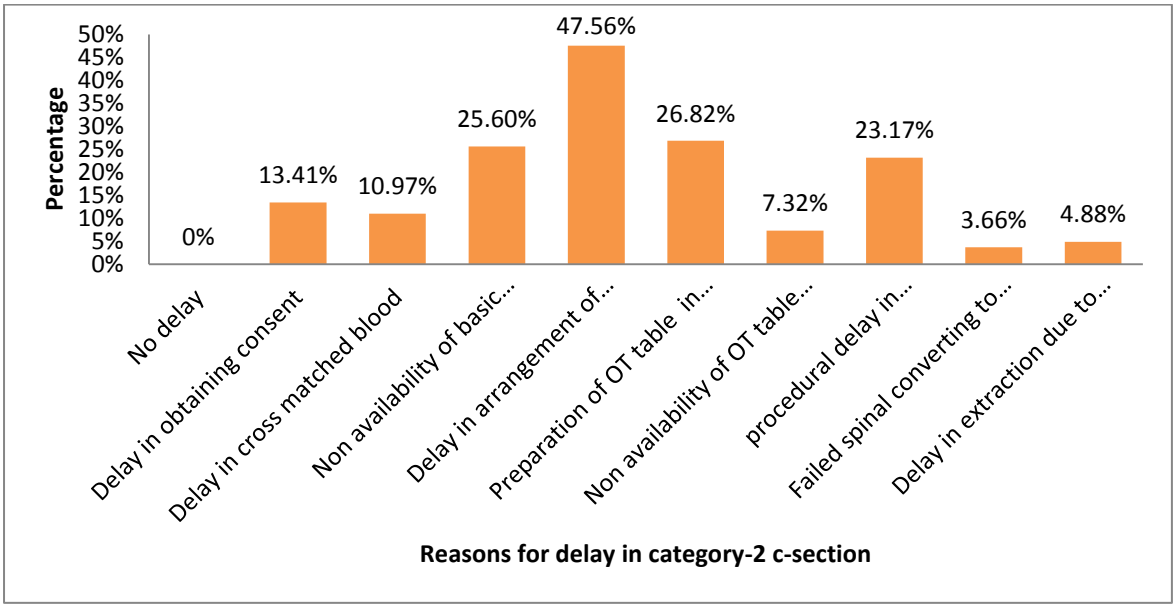

FIGURE 22:Bar diagram of reasons for delay in category 2 (N=82)

In category 2 caesarean delivery , in 47.56% of cases the delay was in arranging drugs and suture materials by patient bystanders. In 26.82% of cases the delay was in preparation of OT table in between surgeries.Other causes of delay were non availability of OT table during day time as there is no separate OT allotted exclusively for emergencies in our setup and procedural delay in inducing anaesthesia.

Table 22: Descriptive analysis of Causes for delay in performing caesarean section in study population in categorywise (category 3)(N=200)

Reasons for delay	Category 3 (N=79)
No delay	0 (0%)
Delay in obtaining consent	66 (83.54%)
Delay in cross matched blood	9 (11.39%)
Non availability of basic investigations	27 (34.17%)
Delay in arrangement of drugs	27 (34.17%)
Preparation of OT table in between surgeries	53 (67.08%)
Non availability of OT table during daytime	24 (30.37%)
procedural delay in inducing anesthesia	41 (51.89%)
Failed spinal converting to general anesthesia	2 (2.531%)
Delay in extraction due to adhesions and malpresentations	4 (5.063%)

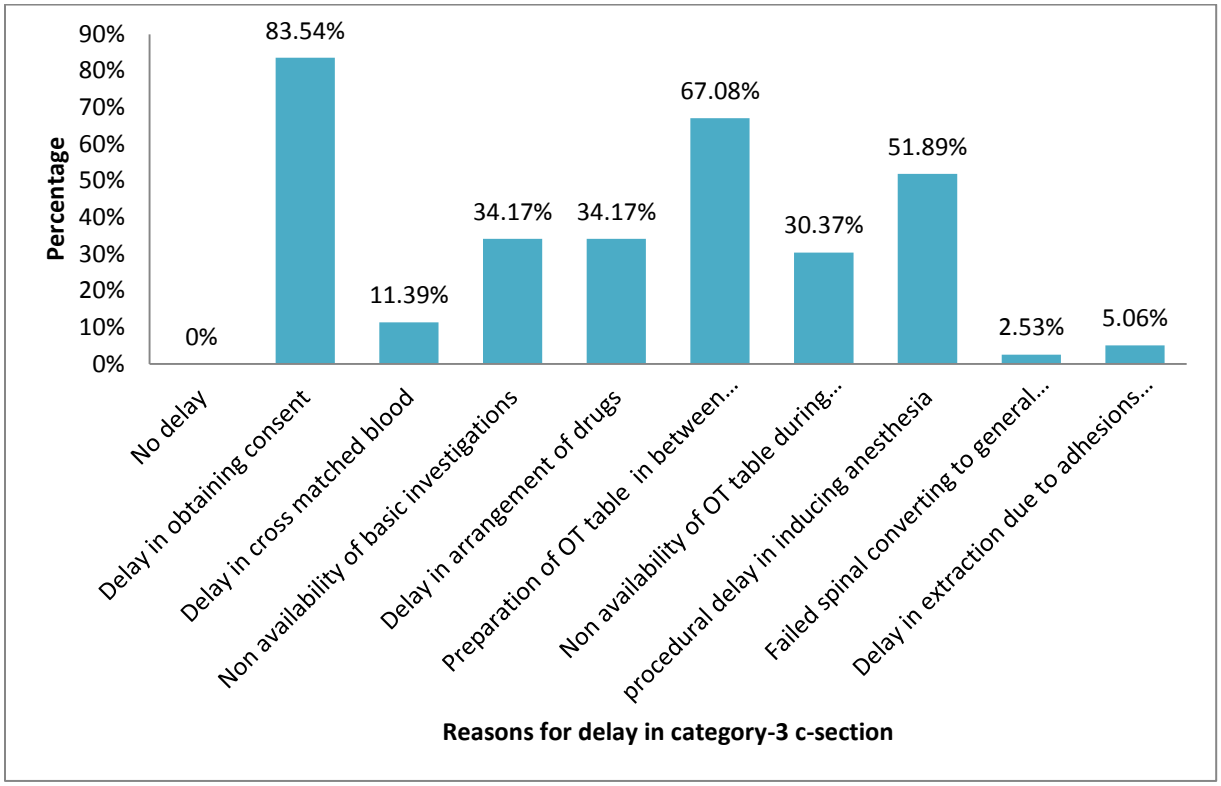

FIGURE 23: Bar diagram of reasons for delay in category 3 (N=79)

In category 3 caesarean delivery , causes of the delay were obtaining consent from patient bystanders. preparation of OT table in between surgeries, non availability of OT table during day time and procedural delay in inducing anaesthesia.

NEONATAL OUTCOME (AT BIRTH)

Table 23: Neonatal outcome at birth among study participants (N=200)

Neonatal outcome	Frequency	Percentage
Mother side	145	72.5%
NICU	54	27%
Still born	1	0.5%

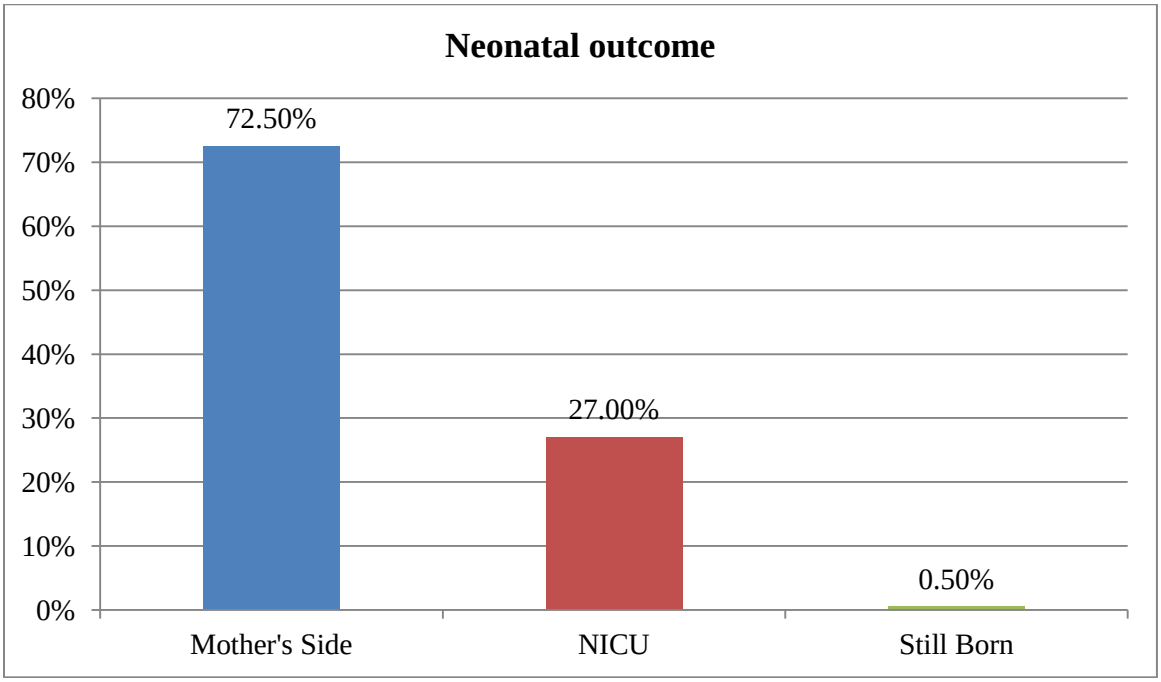

FIGURE 24: Bar diagram showing Neonatal outcome

In 200 cases included in the study , 145 babies were shifted to mothers side after caesarean delivery , 54 babies were shifted to NICU and 1 was still born .

Table 24: Category wise Neonatal Outcome at birth

		LSCS Category						P value
		1		2		3		
		N	%	N	%	N	%	
NICU	Yes	26	66.7%	25	30.5%	3	3.8%	<0.001*
	No	13	33.3%	57	69.5%	76	96.2%	
Mother's Side	Yes	12	30.8%	57	69.5%	76	96.2%	<0.001*
	No	27	69.2%	25	30.5%	3	3.8%	
Still Born	Yes	1	2.6%	0	0.0%	0	0.0%	0.126
	No	38	97.4%	82	100.0%	79	100.0%	

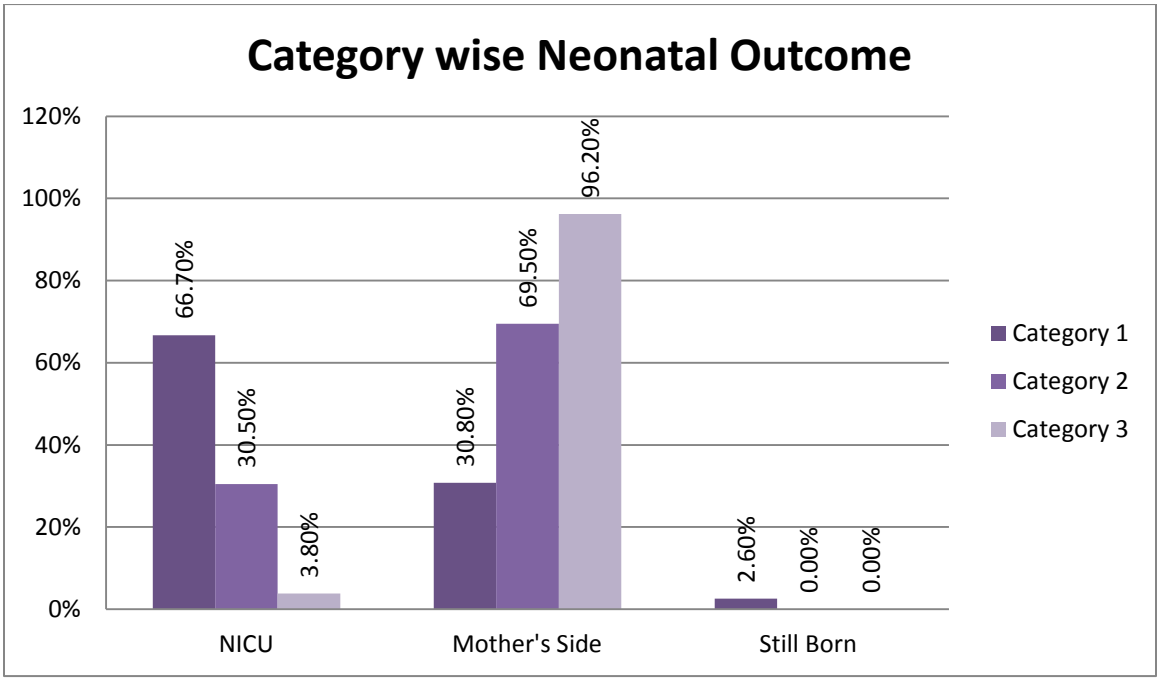

FIGURE 25: Bar diagram showing Category wise Neonatal Outcome

In the study among those with Category 1, 66.7% were admitted to NICU, 30.8% were on mother's side and 2.6% were still born. Among those with Category 2, 30.5% were admitted to NICU, 69.5% were on mother's side and 0% were still born. Among those with Category 3, 3.8% were admitted to NICU, 96.2% were on mother's side and 0% were still born. There was significant association between LSCS category and NICU admission and Mothers side . There was no significant association between Still born and LSCS category.

Table 25: Comparison of neonatal outcome across different DDI cutoff values in study population (N=200)

Neonatal outcome	DDI					
	<30 (N=4)	**31-60 (N=58)**	**61-75 (N=45)**	**76-90 (N=17)**	**91-120 (N=60)**	**>120 (N=16)**
MOTHER'S SIDE	3(75%)	23 (40.67%)	29 (64.44%)	17 (100%)	57 (95%)	16 (100%)
NICU admission	1 (25%)	34 (57.62%)	16 (35.55%)	0 (0%)	3 (5%)	0 (0%)

Among 4 cases who underwent caesarean delivery within 30 min 1 baby were shifted to NICU and 3 were shifted to mother's side. 57.62 % of the babies delivered between 31 to 60 min were admitted to NICU.

Table 26 : Comparison of mean DDI between neonatal outcomes (N=200)

Parameter	Neonatal outcome	
	Mother's side (N=145) **Mean ±SD**	**NICU admission (N=55)** **Mean ±SD`**
DDI	88.47 ± 26.92	55.05 ± 16.47

Mean DDI for babies admitted to NICU was 55.05 ± 16.47 min and Mean DDI for babies shifted to mother's side was 88.47 ± 26.92 min.

NEONATAL OUTCOME (ON FOLLOW UP)

Table27:Neonatal outcomes (on follow up) among study participants (N=200)

Neonatal outcome	Frequency	Percentage
No complications	145	72.86%
HIE (any grade)	48	24.1
SEPSIS	6	3.01%
Neonatal death	3	1.5%

Among 200 cases, 199 babies born alive were followed up during their hospital stay. In 72.86% of cases there were no complications, 24.1 % of cases had hypoxic ischemic encephalopathy and 3.01 % of cases had sepsis. There were 3 neonatal death among the cases included in the study.

Table28: Descriptive analysis of neonate with HIE on follow up in study population

neonate at birth HIE	Frequency	Percentage
1	33	17.00%
2	13	6.50%
3	2	1.00%

At birth 72.86% had no complications, 3.01% had sepsis, 1.5% had neonatal death, 17% had HIE grade 1, 6.5% had grade 2 and 1% had grade 3 HIE.

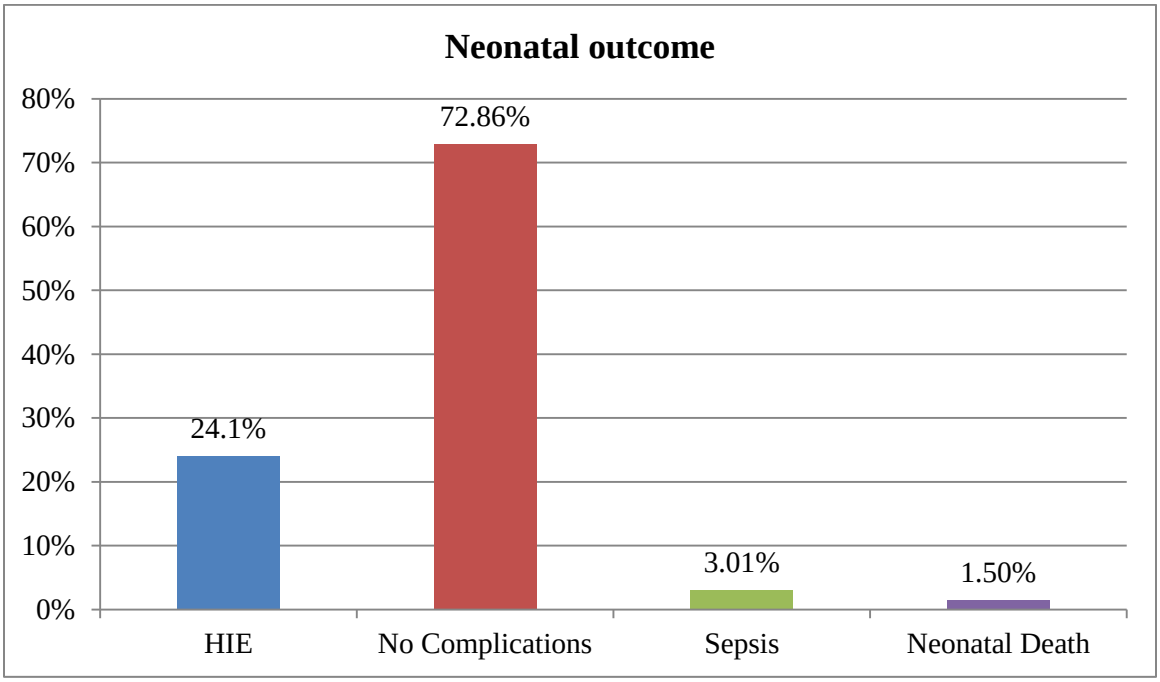

FIGURE 26: Bar diagram showing Neonatal outcome after follow up among study participants

Table29: Selected Neonatal Outcomes in relation to emergency caesarean delivery with in 30 minutes of the decision compared to caesarean after 30 minutes

	DDI				P value
	<30		>30		
	N	%	N	%	
No Complications	3	75.0%	142	72.4%	0.910
NICU	1	25.0%	53	27.0%	0.927
HIE	1	25.0%	48	24.5%	0.981
Sepsis	0	0.0%	6	3.1%	0.722
Neonatal Death	0	0.0%	3	1.5%	0.803

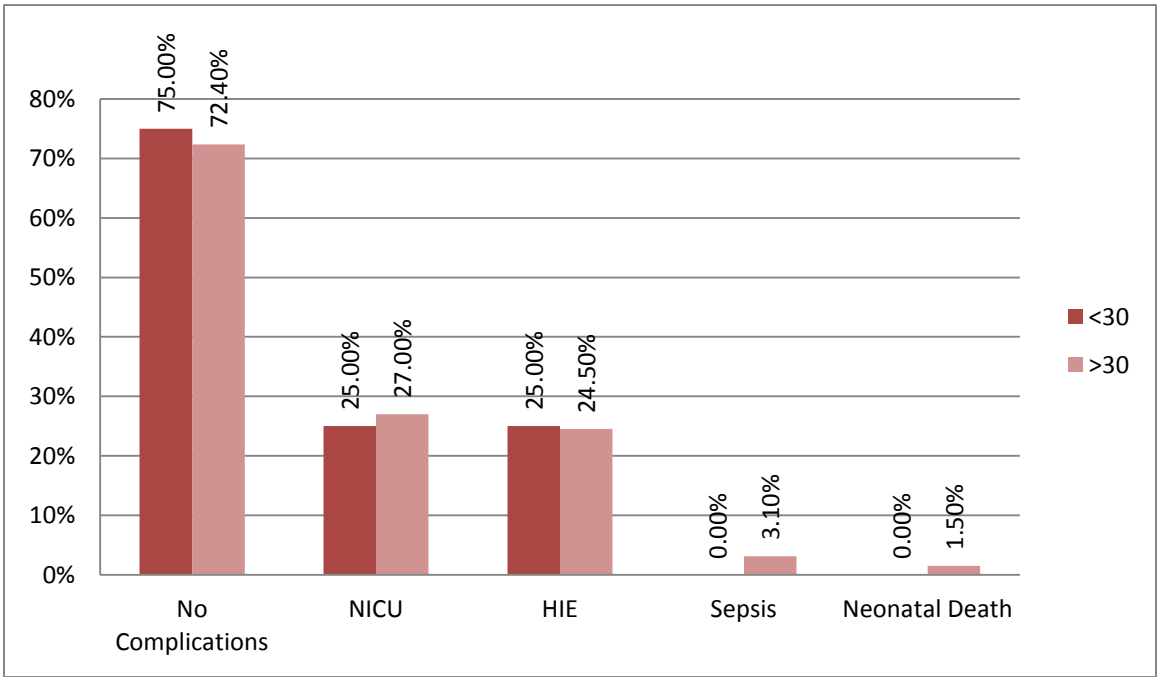

FIGURE 27: Bar diagram showing Selected Neonatal Outcomes in relation to emergency caesarean delivery with in 30 minutes of the decision compared to caesarean after 30 minutes

To see the relevance of DDI cut off of ≤30 mins, selected outcomes were compared between those cases which delivered within 30 mins with those cases which delivered after 30 mins. Among 145 neonates without complications, 3 had DDI ≤30mins and 142 had DDI >30 mins and this when compared with those neonates who developed complication, the difference was not statistically significant. Similarly for other neonatal outcome like NICU admission, HIE, and Neonatal death, the difference was not statistically significant

Discussion

DISCUSSION

In general, the consensus has been that hospitals should have the capability of beginning a caesarean delivery within 30 minutes of the decision to operate." This guideline does not establish the 30-minute interval to be a *requirement* but rather a *capability*. The distinction between these two terms is important and we believe this is often overlooked. For example, not being able to perform caesarean delivery within 30 minutes is a common reason that obstetric malpractice claims are perceived to be indefensible. The implication of such perception is that the 30-minute interval is a requirement or standard for acceptable obstetric practice. Intrinsic to this perception is the belief that delivering within 30 minutes necessarily would prevent untoward infant outcomes.

The need for the study was to see if exceeding the 30-minute interval is necessarily an index of substandard obstetric care. We aimed to estimate the ideal "decision to delivery interval" in emergency caesarean delivery for optimal perinatal outcome and the factors causing delay were also evaluated .

Mean age in the study was 25.43 ± 3.644 years. Majority of women were in the age group 26 to 30 years (44%). 81% of women included into study belonged to 21-30 years of age. 53.5% of women were nulliparous and 46.5% were multiparous. 86% of women were in the gestational age 37 to 40 Weeks and 14% were in the gestational age 41 to 42 weeks.

Among 200 participants, 39(19.5%) belonged to category 1, 82(41%) to category 2, and 79(39.5%) to category 3 . They were categorized accordingly and their perinatal outcomes were analysed and evaluated with standard literature. This was compared to a study by Gita et al[69]., in which among 275 participants, 146(53.1%) belonged to category 1, 38 (13.82%) to category 2, and 91 (33.1%) to category (3+ 4).

Table 30: Comparision of LSCS Category distribution among subjects with other study

		Present study(%)	Gupta et al [74]	Gita et al[69]
LSCS Category	1	39(19.5)	287(63.7)	146(53.1)
	2	82(41)	166(36.3)	38(13.82)
	3	79(39.5)		Category (3+4) 91(33.1)
Total		200(100)	453(100)	275(100)

The mean DDI for all participants in the study was 79.28 ± 28.66 min, but when it was calculated for each category separately it was 47.23± 13.35min,64.83± 11.83 min,110.1± 13 min for category 1,2, and 3 respectively. The differences in the DDI of caesarean deliveries belonging to different categories were statistically significant.

Table 31: Comparison of mean DDI with other study

CATEGORY	**Present study**	**Gupta et al[74]**	**Gital et al[69]**
Category 1	47.23 ± 13.35	36.3 ± 17.2	122.1± 89.2
Category2	64.83 ± 11.83	38.1± 17.7	183.2 ±201.8
Category 3	110.1 ± 13		299.8 ± 200.7
Total	79.28 ± 28.66	37.2±17.4	183.6± 204.1

Chauleur et al[79], reported the mean DDI of 46.84 min in their study. Mackenzie et al[62], reported a DDI 27.4 minutes for crash caesarean deliveries (impending fetal death), 42.9 minutes for fetal distress and for cases without fetal distress it was 71.1 minutes. In another study by Sayegh et al [63] showed mean DDI for emergency caesarean delivery was 39.5 minutes and for elective cases it

was 55.9 minutes. Gita et al[69], reported a mean DDI of 183.6 mins for all participants in the study, and 122.1 min, 183.2 min, 299.8 min for category 1,2, and 3 respectively.

A mere 4 cases (2%) could be delivered within 30 minutes all of which belonged to category 1 and 58 cases (29%) by 60 minutes. This observation was totally in contrast with the western standards, where in a study by Mackenzie et al [62], approximately 40% emergency caesareans could be completed within 30 minute interval and bloom et al [61], observed 62% of caesarean deliveries for non-reassuring fetal heart rate and 98% of caesarean deliveries for an obstetric accident defined as umbilical cord prolapse, placental abruption or previa, or uterine rupture met the 30-minutes-or-less guideline. Chauleur C et al [79]observed that around 50% patients could be delivered within 30 minute DDI and in the study by Chauhan et al[66], 52% babies with fetal distress could be delivered within 30 minute interval. However Gita et al [69] , reported 18% of category I & II cases delivered within 60 minutes and 63% by 120 minutes.

When the preparation step at which delays occurred and the reasons behind the same were analysed, it was observed that maximum delay happened between decision for caesarean delivery & shifting the patient to the OT (Interval 1). Interval 1 accounted for nearly 51% of the entire DDI and the major reasons were delay in obtaining consent in 45.5% and preparation of OT table in between surgeries 40.0%. This delay was inversely proportional to the degree of urgency of the caesarean delivery.

Table 32 : Comparison of factors causing delay in DDI with other study

	Present study	Gupta et al[74]	Mishra et al[78]
Delay in Obtaining Consent	45.5%	2.6%	-
Delay in Cross Matched Blood	18.0%	2.2%	1.4%
Non Availability of Basic Investigations	28.5%	-	-
Delay in Arrangement of Drugs	38.5%	2.2%	-
Preparation of OT Table In Between Surgeries	40.0%	22.1%	0.8%
Non Availability of OT Table during Daytime	16.5%	7.5%	39%
Procedural Delay in Inducing Anesthesia	31.0%	13.5%	5.1%
Failed Spinal Converting To General Anesthesia	3.0%	2.4%	-
Delay in Extraction Due To Adhesions and Malpresentation	5.0%	0.9%	1.24%

In category 1 caesarean delivery, in 46.15% of the cases the reason for delay was due to time spent in arranging for cross matched blood products in cases of placenta previa, placental abruption or as the patients were immediately unfit (severe anemia, fever, hypotension, DIC etc.) and required some resuscitative measures to withstand anesthesia. In category 2 caesarean delivery, in 47.56 % of the cases the reason for delay was in the waiting for arranging drugs by patient bystanders. In category 3 , in 83.4% cases delay due to nonavailability of Patient bystanders for obtaining consent and in 67.08% delay in preparation of OT table between surgeries.

Gita et al [69], reported maximum delay happened between decision for caesarean delivery & shifting the patient to the OT (Interval 1). Interval 1 accounted for nearly 72% of the entire DDI and the major reason was non availability of OT in 166 cases (73.5%). In 40 cases (15%), the delay was inevitable as the patients were immediately unfit and required some resuscitative measures to withstand anaesthesia. Nearly 78% patients in this group belonged to category I & II.

Sayegh et al [63], reported observed that the maximum delay occurred in shifting the patient to the operation theatre and the delay was mainly due to non availability of operation theatres. This delay was inversely proportional to the urgency of caesarean section, the lowest was for category I caesarean deliveries (76.47 min) and the highest was for category IV (753 minutes).

Aiste cerbinskaite et al [55] , reported delay in shifting the patient to operation theatre contributed to major part of the delay in decision to delivery interval. Study showed failure to provide Laboring women: midwife ratio(LW:MW) of 1:1, hinders the women's transfer to operation theatre. This effect is minimum in category 1 caesarean deliveries compared to other category.

The present study specifically looked at the effect of DDI on neonatal outcome using APGAR scores, no of stillborn, need for admission into NICU, duration of NICU stay development of complications like HIE, sepsis and neonatal death. In the study, 27 % of neonates were shifted to NICU and 0.5% were stillborn. 66.7 % of neonates admitted to NICU belonged to category 1 caesarean delivery. One stillborn belonged to category 1 caesarean delivery. When admission to NICU among neonates with DDI≤30 min and neonates with DDI>30 min was compared with neonates not admitted to NICU, the difference was not statistically significant.

Gita et al [69]reported there were no complications in 130 babies, 141 were admitted to NICU and 9 perinatal deaths(One case admitted with intrauterine death, 3 fetal deaths occurred while waiting for LSCS and 5 neonatal death). When degree of asphyxia or presence or absence of neonatal complications was correlated with the mean DDI in category I& II caesareans, it was found that when the mean DDI exceeded 75 minutes, there was a 4.6 fold increase in the risk to the life of neonate. Since, the number of cases with a mean DDI of ≤30 minutes was only 5, risk reduction in neonatal complication could not be assessed statistically, but all those babies were shifted mother side with no neonatal complications. 8 babies who expired had a DDI of > 75 min.

Table 33 :comparison of neonatal outcome with other study

	Present study	Gita et al[69]	Mishra et al[78]	Gupta et al[74]
No complications	145 (72.5%)	130 (47.27%)	390 (81.25%)	378 (83.44%)
NICU admission	54 (27%)	141(51.27%)	86 (17.91%)	51 (11.3%)
Still birth	1 (0.5%)	4 (1.45%)	4 (0.83%)	24 (5.3%)
Neonatal death	3 (1.5%)	5 (1.85%)	41(8.6%)	23 (5.1%)

Mean DDI for babies admitted to NICU was 55.05 ± 16.47 min and Mean DDI for babies shifted to mother's side was 88.47 ± 26.92 min.

Similar results were seen by Bloom et al [61], where decision-to-incision intervals of 30 minutes or less were significantly associated with higher rates of fetal acidemia and need for intubation in the delivery room. Of 538 infants with indications for emergency caesarean delivery who delivered more than 30 minutes after the decision to operate, 95% did not experience any adverse outcomes. This paradoxical result could be explained based on the fact that obstetricians prioritized the cases where fetus was more at danger to be delivered within 30 mins and hence the incidence of complications was more in these cases.

I Z. MacKenzie et al[62] , reported an important finding of a trend of improving cord arterial pH values with more prolonged time from decision-to-delivery which was observed for deliveries with and without fetal distress, although the values were less acidotic among the latter babies. It is hard to explain the lower values found in the non-distressed babies born with short time from decision-to-delivery.

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H. E. Onah et al[72], found that no baby died at the NH with a mean DDI of approximately 3 h 20 min, while 16 died at the UNTH with a longer mean DDI of 8 h 30 min suggests that a long DDI such as was seen at the UNTH cannot be justified.

One baby with cord prolapse, in the present study, was delivered within 30 minute interval. Thus one can conclude that achieving a DDI of 30 minutes is not an impossible task and it highly depends on the prioritization of the emergency by the treating obstetrician and rest of the team involved.

One neonate which was delivered within 30 mins for obstructed labor had APGAR<7 at birth and had HIE stage 3. This shows having a DDI<30 min doesn't ensure good neonatal outcome.

Summary

SUMMARY

- This is a study prospective observational study conducted in the Department of Obstetrics and Gynecology, R.L.Jalappa hospital, Kolar during January 2017 to May 2018.

- Amongst 1125 emergency caesarean deliveries, 200 cases were selected by simple random sampling after confirming that they satisfied the inclusion and exclusion criteria.

- •Data was collected from the records of these patients according to the proforma.

- Mean age was 25.43 years with SD of 3. 644 years; 81% of women included into study belonging to 21-30 years

- 53.5% of women were nulliparous women and 46.3 % were multiparous.

- 86% of women were in gestational age of 37-40 weeks and 14% of women were in gestational age in 41-42 weeks.

- Among 200 participants, 39 (19.5%) belonged to category 1, 82 (41%) to category 2, and 79 (39.5%) to category 3.

- •The mean DDI in the study participants was 79.28 ± 28.66 mins. Mean DDI for category 1, 2 and 3 caesarean deliveries were 47.23± 13.35 mins, 64.83 ± 11.83 mins and 110.1 ± 13mins respectively.

- •The difference in the DDI between different categories was statistically significant.

- Interval 1 contributed to majority of DDI.

- Most common indication for caesarean section was fetal distress among the study participants.

- Mean DDI was higher in those with Contracted pelvis 118 ± 8 mins and lowest in those with Cord prolapse 26 mins. There was significant difference in mean DDI with respect to Indication for caesarean section.

- Most important factors causing delay in the study were delay in obtaining consent from patient bystanders in 91 cases(45.5%) and preparation of OT table in between surgeries in 80 cases (40%).

- In category 1 caesarean delivery, in 46.15 % of cases the delay was due to time spent in arranging for cross matched blood products in cases of placenta previa, placental abruption or as the patients were immediately unfit (severe anemia, fever, hypotension, DIC etc.) and required some resuscitative measures to withstand anaesthesia.

- Neonatal outcomes did not differ significantly in between those caesarean deliveries with DDI≤30 mins and those with DDI>30 mins.

- Though the ideal DDI for optimal neonatal and maternal outcome couldn't be calculated within the limitations of this study, it can be safely said a DDI<30 mins was not essential for optimal perinatal outcome.

- From the present study, it is obvious that it is difficult to achieve 30 minute goal in every emergency caesarean delivery and it is also not an indispensible measure to prevent perinatal morbidities.

- But DDI of 30 mins is not unachievable in case of urgent indications like cord prolapse. Hence it is necessary for each emergency obstetric unit, to effectively triage emergency caesarean deliveries and develop the capability of commencing such cases as fast as possible

Conclusion

CONCLUSION

- The present study concludes that most important factors causing delay were obtaining consent from patient bystanders and preparation of OT table in between the surgeries . In category 1 caesarean deliveries, the delay was due to time spent for arranging cross matched blood products especially in cases of antepartum hemorrhage.

- Neonatal outcomes did not differ significantly in between those caesarean deliveries with DDI≤30 minutes and those with DDI>30 minutes.

- It can be safely said that DDI <30 minutes was not essential for optimal neonatal outcome .From the present study, it is obvious that it is difficult to achieve 30 minute goal in every emergency caesarean delivery and it is also not an indispensible measure to prevent neonatal morbidities.

- But as observed in the study, DDI of 30 minutes is not unachievable in case of urgent indications like cord prolapse. Hence it is necessary for each emergency obstetric unit, to effectively triage emergency caesarean deliveries and develop the capability of commencing such cases as fast as possible.

LIMITATIONS OF THE STUDY

• It was an observational study. A more definitive study design was not possible because patients obviously could not be randomly assigned to delivery before or after the 30-minute time point.

• This study was performed in a rural tertiary centre with referral cases where counseling and obtaining consent from patient bystanders for operation is difficult , due to lack of awareness about patient condition.

RECOMMENDATIONS

• Proper decision making by the obstetrician.

• Every effort should be made to reduce the decision-to operating room interval(interval 1).

• We should improve communication between the various members of the team and making them aware of the different levels of urgency. Lucas' classification should be commonly used to facilitate the communication of urgency and the evaluation of maternity unit's results.

• Colour coding to determine the urgency of caesarean deliveries can also be done to make it simple and easy to understand for all.

• The obstetrician, the anesthetist, the pediatricians and the nurse should work together as a perinatal team, using the same protocols, with the aim of improving communication and saving time.

• Drills must be conducted in the hospital to make all the personnel involved to get to know their role, if need arises, better.

• Preparing the patient and their bystanders for a possibility of caesarean delivery antenatally will avoid delay in obtaining consent.

•Technique for caesarean section such Misgav ladach procedure where Joel-Cohen method for opening abdomen will take just 50 seconds to enter abdominal cavity and reaching pregnant uterus. This technique can be followed in emergency caesarean section for reducing decision delivery interval.

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Annexures

PROFORMA

- Name : case no:
- I.P.No:
- Age:
- Occupation:
- Address:
- Husband's Occupation:
- Socio-economic Status:
- History of presenting illness:
- Past Obstetric history of C/S:
- Past h/o abdominal gynecological operation:
- Past medical history:
- Family History:
- Personal History:
  Sleep:
  Appetite:
  Diet:
  Bowel & Bladder:
- G.P.E:
- Build: Nourishment:
- Pallor: Icterus: Cyanosis: Clubbing: Lymphadenopathy: Pedal edema:
- Pulse: B.P.: Temp:
- Breast: Thyroid:

Systemic examination:

- CVS:
- RS:
- CNS:

- Abdominal Examination:

- P/V:

- Investigations:

- Complete blood picture
- BT, CT
- SEROLOGY
- Random Blood sugar
- NST
- USG OBS SCAN

- Diagnosis:

- INDICATION FOR EMERGENCY LSCS:

  DECISION DELIVERY INTERVAL :

  Interval-1:interval between decision of caesarean section and shifting the patient from labour room to pre-operative area of OT:

  Interval -2:interval between receiving the patient by OT team and shifting patient to OT table:

  Interval -3:time taken for induction of anaesthesia:

  Interval-4:interval between induction of anaesthesia to delivery of baby:

CAUSE FOR DELAY

No delay
OT busy
Arranging/transfusing blood/fluids
Manpower shortage
Relatives not available
Logistic issues/ technical problems

TYPE OF ANAESTHESIA:

EARLY NEONATAL OUTCOME:

APGAR SCORE:

CONDITION OF BABY:

ANY NICU ADMISSION:

EARLY MATERNAL OUTCOME:

CONSENT FORM

STUDY TITLE: A PROSPECTIVE OBSERVATIONAL STUDY ON DECISION TO DELIVERY INTERVAL AND PERINATAL OUTCOME IN EMERGENCY CAESAREAN SECTION IN TERITARY CARE HOSPITAL

CHIEF RESEARCHER/ PG GUIDE'S NAME: DR. KONDAREDDY RADHIKA

UNDER THE GUIDANCE OF: DR. E. GOMATHY

Name of the subject:

Age :

Address :

a. I have been informed in my own vernacular language the purpose of the study, the necessity of relevant investigations to be carried out and photographs to be taken.
b. I understand that the medical information produced by this study will become part of institutional record and will be kept confidential by the said institute.
c. I understand that my participation is voluntary and may refuse to participate or may withdraw my consent and discontinue participation at any time without prejudice to my present or future care at this institution.
d. I agree not to restrict the use of any data or results that arise from this study provided such a use is only for scientific purpose(s).
e. I confirm that _____ (chief researcher/ name of PG guide) has explained to me the purpose of research and the study procedure that I will undergo and the possible risks and discomforts that I may experience, in my own language. I hereby agree to give valid consent to participate as a subject in this research project.

Participant's signature

Signature of the witness: Date:

I have explained to _____ (subject) the purpose of the research, the possible risk and benefits to the best of my ability.

Chief Researcher/ Guide signature Date:

ಮಾಹಿತಿಯುಕ್ತ ಸಮ್ಮತಿ ಪತ್ರ

ಶೀರ್ಷಿಕೆ: ತೀರ್ಮಾನದ ವಿತರಣೆಯ ಮೇಲೆ ಪ್ರಾಯೋಗಿಕವಾದ ಅಧ್ಯಯನ ಅಧ್ಯಯನಗಳು ತೃತೀಯ ಆಸ್ಪತ್ರೆಯಲ್ಲಿ ತುರ್ತುಸ್ಥಿತಿ ಸಿಸೇರಿಯನ್ ವಿಭಾಗದಲ್ಲಿ ಇಂಟರ್ವಲ್ ಮತ್ತು ಪೆರಿನಾಟಲ್ ಒಟ್ಯುಟೋಮ್
ಪ್ರಮುಖ ಸಂಶೋಧಕರು: ಡಾ.
ಮಾರ್ಗದರ್ಶನದಲ್ಲಿ: ಡಾ. ಇ .ಗೋಮತಿ
ಹೆಸರು:
ವಯಸ್ಸು:
ವಿಳಾಸ:

೧. ನನ್ನ ಸಂ್ಪತ ಭಾಷೆಯಲ್ಲಿ ಮತ್ತು ಸರಳ ರೀತಿಯಲ್ಲಿ ಈ ಅಧ್ಯಯನದ ಮಾಹಿತಿ ನೀಡಲಾಗಿದೆ. ಈ ಸಂದರ್ಭದಲ್ಲಿ ಬೇಕಾದ ತಪಾಸಣೆಗಳು ಮತ್ತು ಛಾಯಾಚಿತ್ರಗಳ ಅವಶ್ಯಕತೆಗಳಿಗೆ ನಾನು ಸಹಕರಿಸುತ್ತೇ್ತನೆ.

೨. ಈ ಅಧ್ಯಯನದಲ್ಲಿ ನಿರ್ಮಾಣವಾದ ವೈದ್ಯಕೀಯ ಮಾಹಿತಿ ಆಸ್ಪತ್ರೆಯ ಭಾಗವಾಗಿದ್ದು, ಗೌಪ್ಯವಾಗಿ ಇಡಲಾಗುವುದು.

೩. ನನ್ನ ಭಾಗವಹಿಸುವಿಕೆಯನ್ನು , ನಾನು ಯಾವುದೇ ಸಮಯದಲ್ಲಿ ನನ್ನ ಸಹಮತಿಯನ್ನು ಹಿಂದೆಪಡೆಯಬಹುದು ಹಾಗು ಯಾವುದೇ ಸಮಯದಲ್ಲಿ ನನ್ನ ಭಾಗಸುವಿಕೆ ನಿಲ್ಲಿಸಬಹುದು.

೪. ಈ ಅಧ್ಯಯನದಿಂದ ಉದ್ಭವಿಸುವ ಯಾವುದೇ ಮಾಹಿತಿ ಅಥವಾ ಫಲಿತಾಂಶವನ್ನು ವೈಜ್ಞಾನಿಕ ಉದ್ದೇ್ಶಗಳಿಗೆ ಉಪಯೋಗಿಸಲು ಒಪ್ಪುತ್ತೇ್ತನೆ.

೫. ನನಗೆ _____ (ಮುಖ್ಯ ಸಂಶೋಧಕ) ನನ್ನ ಭಾಷೆಯಲ್ಲಿಯೇ, ಸಂಶೋಧನೆ ಹಾಗು ಅಧ್ಯಯನದ ವಿಧಿ, ವಿಧಾನಗಳ ಬಗ್ಗೆ ಮತ್ತು ನಾನು ಅನುಭವಿಸಬಹುದಾದ ಸಂಭಾವ್ಯ ಅಪಾಯಗಳು ಮತ್ತು ಅನಾನುಕೂಲತೆಗಳ ಕುರಿತು ವಿವರಿಸಲಾಗಿದೆ. ನಾನು ಈ ಸಂಶೋಧನಾ ಯೋಜನೆಯ ವಿಷಯವಾಗಿ ಭಾಗವಹಿಸಲು ಸಹಕರಿಸುತ್ತೇ್ತನೆ.

ಭಾಗವಹಿಸುವವರ ಸಹಿ:

ಸಾಕ್ಷಿಯ ಸಹಿ: ದಿನಾಂಕ:

ನಾನು ---------- ಈ ಸಂಶೋಧನೆಯ ಉದ್ದೇ್ಶ ಹಾಗು ಇದರಿಂದ ಉಂಟಾಗುವ ಅಪಾಯಗಳು ಮತ್ತು ಲಾಭಗಳನ್ನು ನನ್ನ ಸಾಮರ್ಥ್ಯಕ್ಕೆ ಸಾಧ್ಯವಾದ ರೀತಿಯಲ್ಲಿ ವಿವರಿಸಿದ್ದೇ್ನೆ.

ಮುಖ್ಯ ಸಂಶೋಧಕ / ಗೈಡ್ ಸಹಿ: ದಿನಾಂಕ:

PATIENT INFORMATION SHEET

A PROSPECTIVE OBSERVATIONAL STUDY ON DECISION TO DELIVERY INTERVAL AND PERINATAL OUTCOME IN EMERGENCY CAESAREAN SECTION IN TERITARY CARE HOSPITAL

Study location: R L Jallappa Hospital and Research Centre attached to Sri Devraj Urs Medical College. Tamaka, Kolar

Details: Emergency caesarean section in most commonly performed life saving obstetric operation. It refers to the delivery of fetus which has attained a viable gestational age, placenta and membranes through an abdominal and uterine incision in cases where vaginal delivery is not feasible or would impose undue risks to mother or baby or both.

National institute for clinical excellence (NICE) clinical guideline on electronic fetal monitoring recommends that "in cases of suspected or confirmed acute fetal compromise, delivery should be accomplished within 30 minutes.

As number of caesarean deliveries in tertiary centers are rising each day it becomes a great responsibility on the clinicians to make a decision of emergency caesarean section and to assess its affect on maternal-fetal outcome.

Patients in this study will have to undergo complete general physical examination, obstetric examination, routine blood investigations such as Complete blood count, Blood grouping and Rh typing, HIV, HBsAg , VDRL, routine urine analysis, RBS, BT, CT, NST,Obstretic ultrasound with BPP will be done.

Please read the following information and discuss with your family members. You can ask any question regarding the study. If you agree to participate in the study we will collect information (as per proforma) from you or a person responsible for you or both. Relevant history will be taken. This information collected will be used only for dissertation and publication.

All information collected from you will be kept confidential and will not be disclosed to any outsider. Your identity will not be revealed. This study has been reviewed by the Institutional Ethics Committee and you are free to contact the member of the Institutional Ethics Committee.

There is no compulsion to agree to this study. The care you will get will not change if you don't wish to participate. You are required to sign/ provide thumb impression only if you voluntarily agree to participate in this study.

For further information contact

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ತಾಳ್ಮೆ ಮಾಹಿತಿ ಹಾಳೆ

ಅಧ್ಯಯನ ಶೀರ್ಷಿಕೆ: ಟೆರಿಟರಿಯ ಆಸ್ಪತ್ರೆಯಲ್ಲಿ ಎಮರ್ಜೆನ್ಸಿ ಸೆಶರಿಯನ್ ವಿಭಾಗದಲ್ಲಿ ವಿತರಣಾ ಇಂಟರ್ವಲ್ ಮತ್ತು ಪೆರಿನಾಟಲ್ ಒಟ್ಕೂಟಮಿಯ ಅಧ್ಯಯನದ ಒಂದು ಪ್ರಾಯೋಗಿಕ ಪ್ರತಿಪಾದನೆಯ ಅಧ್ಯಯನ

ಅಧ್ಯಯನ ಸ್ಥಳ: ಶ್ರೀ ದೇವರಾಜ್ ಉರ್ಸ್ ಮೆಡಿಕಲ್ ಕಾಲೇಜ್ಸ ಸೇರಿದ ಆರ್ ಎಲ್ ಜಲ್ಲಪ್ಪ ಆಸ್ಪತ್ರೆ ಮತ್ತು ಸಂಶೋಧನಾ ಕೇಂದ್ರ. ತಮಾಕಾ, ಕೋಲಾರ
ವಿವರಗಳು: ಅತಂತ್ಯ ಸಾಮಾನ್ಯವಾಗಿ ನಡೆಸಿದ ಜೀವ ಉಳಿಸುವ ಪ್ರಸೂತಿಯ ಕಾರ್ಯಾಚರಣೆಯಲ್ಲಿ ತುರ್ತು ಸಿಸೇರಿಯನ್ ವಿಭಾಗ. ಇದು ಭ್ರೂಣದ ವಿತರಣೆಯನ್ನು ಸೂಚಿಸುತ್ತದೆ ಇದು ಯೋನಿ ವಿತರಣೆಯು ಕಾರ್ಯಸಾಧ್ಯವಾಗದ ಅಥವಾ ತಾಯಿ ಅಥವಾ ಮಗುವಿಗೆ ಅಥವಾ ಎರಡಕ್ಕೂ ಅನಗತ್ಯ ಅಪಾಯಗಳನ್ನು ವಿಧಿಸುವ ಸಂದರ್ಭಗಳಲ್ಲಿ ಹೊಟ್ಟೆಯ ಮತ್ತು ಗರ್ಭಾಶಯದ ಛೇದನ ಮೂಲಕ ಪ್ರಾಯೋಗಿಕ ಗರ್ಭಧಾರಣೆಯ ವಯಸ್ಸು, ಜರಾಯು ಮತ್ತು ಪೊರೆಗಳನ್ನು ಪಡೆದುಕೊಂಡಿರುತ್ತದೆ.
ಎಲೆಕ್ಟಾ್ರನಿಕ್ ಭ್ರೂಣದ ಮೇಲ್ವಿಚಾರಣೆಯಲ್ಲಿ ಕ್ಲಿನಿಕಲ್ ಎಕ್ಸಲೆನ್ಸ್
ವೈದ್ಯಕೀಯ ಮಾರ್ಗದರ್ಶಿ ರಾಷ್ಟ್ರೀಯ ಇನ್ಸ್ಟಿಟ್ಯೂಟ್ ಶಿಫಾರಸು "ತೀವ್ರ ಭ್ರೂಣದ ರಾಜಿ ಶಂಕಿತ ಅಥವಾ ದೃಢಪಡಿಸಿದ ಪ್ರಕರಣಗಳಲ್ಲಿ,, ವಿತರಣೆಯನ್ನು 30 ನಿಮಿಷಗಳಲ್ಲಿ ಸಾಧಿಸಬೇಕು.
ತೃತೀಯ ಕೇಂದ್ರಗಳಲ್ಲಿನ ಸಿಸೇರಿಯನ್ ವಿತರಣೆಗಳು ಪ್ರತಿ ದಿನವೂ ಹೆಚ್ಚಾಗುತ್ತಿದ್ದು, ಇದು ತುರ್ತು ಸಿಸೇರಿಯನ್ ವಿಭಾಗದ ನಿರ್ಧಾರವನ್ನು ತೆಗೆದುಕೊಳ್ಳಲು ಮತ್ತು ತಾಯಿಯ-ಭ್ರೂಣದ ಫಲಿತಾಂಶದ ಮೇಲೆ ಅದರ ಪರಿಣಾಮವನ್ನು ನಿರ್ಣಯಿಸಲು ವೈದ್ಯರ ಮೇಲೆ ಒಂದು ದೊಡ್ಡ ಜವಾಬ್ದಾರಿಯಾಗಿದೆ.
ಈ ಅಧ್ಯಯನದಲ್ಲಿ ರೋಗಿಗಳು ಸಂಪೂರ್ಣ ಸಾಮಾನ್ಯ ದೈಹಿಕ ಪರೀಕ್ಷೆ, ಪ್ರಸೂತಿ ಪರೀಕ್ಷೆ, ಸಂಪೂರ್ಣ ರಕ್ತದ ಎಣಿಕೆ, ರಕ್ತ ಗುಂಪು ಮತ್ತು ಆರ್ಎಚ್ ಟೈಪಿಂಗ್, ಎಚ್ಐವಿ, ಎಚ್ಬಿಎಸ್ಎಗ್, ವಿಡಿಆರ್ಎಲ್, ವಾಡಿಕೆಯ ಮೂತ್ರ ವಿಶ್ಲೇಷಣೆ, ಆರ್ಬಿಎಸ್, ಬಿಟಿ, ಸಿಟಿ, ಎನ್ಎಸ್ಟಿ, ಅಬ್ಸೆಟ್ರಿಕ್ BPP ಯೊಂದಿಗಿನ ಅಲ್ಟಾ್ರಸೌಂಡ್ ಅನ್ನು ಮಾಡಲಾಗುತ್ತದೆ.

ಕೆಳಗಿನ ಮಾಹಿತಿಯನ್ನು ಓದಿ ಮತ್ತು ನಿಮ್ಮ ಕುಟುಂಬ ಸದಸ್ಯರೊಂದಿಗೆ ಚರ್ಚಿಸಿ. ಅಧ್ಯಯನದ ಬಗ್ಗೆ ನೀವು ಯಾವುದೇ ಪ್ರಶ್ನೆಯನ್ನು ಕೇಳಬಹುದು. ನೀವು ಅಧ್ಯಯನದಲ್ಲಿ ಪಾಲ್ಗೊಳ್ಳಲು ಒಪ್ಪಿಕೊಂಡರೆ, ನಾವು ನಿಮ್ಮಿಂದ ಅಥವಾ ನಿಮ್ಮಿಂದ ಅಥವಾ ಎರಡಕ್ಕೂ ಜವಾಬ್ದಾರರಾಗಿರುವ ಮಾಹಿತಿಯನ್ನು (ಪ್ರೋಫಾರ್ಮಾದ ಪ್ರಕಾರ) ಸಂಗ್ರಹಿಸುತ್ತೇವೆ. ಸಂಬಂಧಿತ ಇತಿಹಾಸವನ್ನು ತೆಗೆದುಕೊಳ್ಳಲಾಗುವುದು. ಸಂಗ್ರಹಿಸಿದ ಈ ಮಾಹಿತಿಯನ್ನು ಪ್ರೌಢಪ್ರಬಂಧ ಮತ್ತು ಪ್ರಕಟಣೆಗಾಗಿ ಮಾತ್ರ ಬಳಸಲಾಗುತ್ತದೆ.
ನಿಮ್ಮಿಂದ ಸಂಗ್ರಹಿಸಿದ ಎಲ್ಲಾ ಮಾಹಿತಿಯನ್ನು ಗೌಪ್ಯವಾಗಿರಿಸಲಾಗುವುದು ಮತ್ತು ಯಾವುದೇ ಹೊರಗಿನವರಿಗೆ ಬಹಿರಂಗಪಡಿಸಲಾಗುವುದಿಲ್ಲ. ನಿಮ್ಮ ಗುರುತನ್ನು ಬಹಿರಂಗಪಡಿಸಲಾಗುವುದಿಲ್ಲ. ಈ ಅಧ್ಯಯನವು ಸಂಸ್ಥೆಯ ನೈತಿಕ ಸಮಿತಿಯಿಂದ ಪರಿಶೀಲಿಸಲ್ಪಟ್ಟಿದೆ ಮತ್ತು ನೀವು ಸಂಸ್ಥೆಯ ಎಥಿಕ್ಸ್ ಸಮಿತಿಯ ಸದಸ್ಯರನ್ನು ಸಂಪರ್ಕಿಸಲು ಮುಕ್ತವಾಗಿರುತ್ತೀರಿ. ಈ ಅಧ್ಯಯನಕ್ಕೆ ಒಪ್ಪಿಕೊಳ್ಳುವ ಯಾವುದೇ ಕಡ್ಡಾಯವಿಲ್ಲ. ನೀವು ಪಾಲ್ಗೊಳ್ಳಲು ಬಯಸದಿದ್ದರೆ ನೀವು ಪಡೆಯುವ ಕಾಳಜಿ ಬದಲಾಗುವುದಿಲ್ಲ. ಈ ಅಧ್ಯಯನದಲ್ಲಿ

ನೀವು ಸ್ವಯಂಪ್ರೇರಣೆಯಿಂದ ಸಮ್ಮತಿಸಿದರೆ ಮಾತ್ರ ಹೆಬ್ಬೆರಳು ಗುರುತುಗಳನ್ನು ಸಹಿ / ನೀಡಬೇಕಾಗುತ್ತದೆ.

ಹೆಚ್ಚಿನ ಮಾಹಿತಿಗಾಗಿ
ಡಾ. ಕೊಂಡರೆಡ್ಡಿ ರದಿಕಾ
ಪೋಸ್ಟ್ ಪದವಿ
ಪ್ರಸೂತಿ ಮತ್ತು ಸ್ತ್ರೀರೋಗ ಶಾಸ್ತ್ರ ಇಲಾಖೆ, SDUMC, ಕೋಲಾರ.

KEY TO MASTERCHART

1. Interval-1: Interval between decision of caesarean delivery and shifting the patient from the labour room to the pre-operative area of the OT
2. Interval -2: Interval between receiving the patient to preoperative area and shifting the patient to the operation table
3. Interval-3: Time taken for induction of anaesthesia
4. Interval-4: Interval between induction of anaesthesia and delivery of the baby
5. DDI: Total decision to delivery interval
6. Reasons for delay
    0. No delay
    1. Delay in obtaining consent
    2. Delay in cross matched blood
    3. Non availability of basic investigations
    4.Delay in arrangement of drugs
    5.Preparation of OT table in between surgeries
    6. Non availability of OT table during daytime
    7. Procedural delay in inducing anaesthesia
    8. Failed spinal converting to general anasethesia
    9.Delay in extraction due to adhesions and malpresentation

7. GA: Gestational Age

8. 0 = NO

9. 1 = YES

10. Indications for lscs

ABRUPTIO	Abruption placenta
BREECH IN AL	Breech in active labour
BREECH IN LL	Breech in latent labour
CONTRACTED	Contracted pelvis in latent labor
CP	Cord prolapse
CPD	Cephalopelvic disproportion in latent labor
FD	Fetal distress
FDB	Persistent Fetal bradycardia
FID	Failed instrumental delivery
OL	Obstructed labour
OLIGO	Severe oligohydramnios
P2LSA	Previous 2 lscs in active labour
P2LSL	Previous 2 lscs in latent labour
P2LSR	Scar dehiscence with impending rupture
PLSA	Previous lscs in active labour
PLSL	Previous lscs in latent labour
PLSR	Scar dehiscence with impending rupture
PP	Placenta previa
PPS	Placenta previa with hemodynamic stability

SNO	IP NO	AGE	OBSTETRIC INDEX	PARITY	GESTATIONAL AGE	INDICATION	CATEGORY	INTERVAL 1	INTERVAL 2	INTERVAL 3	INTERVAL 4	DDI	causes of delay									anaesthesia	neonate at birth							
													0	1	2	**3**	**4**	**5**	**6**	**7**	**8**	**9**		MOTHER'S SIDE	**NICU**	STILL BORN	APAGAR	NO COMPLICATIONS	HIE	SEPSIS	NEONATAL DEATH
1	602510	22	PRIMI	0	40	FD	2	30	15	15	5	65	0	1	0	0	0	0	0	0	0	0	SAB	1	**0**	0	>7	1	0	0	0
2	614684	24	PRIMI	0	38+6	CPD	3	50	30	15	6	101	0	1	0	0	0	1	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
3	612414	20	G3P2L2	2	36+4	P2LSL	3	35	15	20	10	80	0	0	1	0	0	0	0	1	0	1	SAB	1	0	0	>7	1	0	0	0
4	557584	26	PRIMI	0	39+6	FD	2	25	15	20	4	64	0	1	0	0	0	0	0	1	0	0	SAB	1	0	0	>7	1	0	0	0
5	558066	28	G4P2L2A1	2	40+6	FD	2	20	15	15	5	55	0	1	0	1	0	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
6	596739	24	G2P1L1	1	36+2	FD	2	25	15	15	5	60	0	0	0	0	1	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
7	616341	32	G3P2L1D1	2	37+4	PPS	2	50	15	20	5	90	0	1	1	0	0	0	0	1	0	0	SAB	1	0	0	>7	1	0	0	0
8	615397	21	PRIMI	0	39	OLIGO	3	80	15	8	8	111	0	1	0	0	0	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
9	519535	17	PRIMI	0	41+5	FD	2	30	15	15	5	65	0	0	0	1	0	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
10	620206	24	G2P1L1	1	39+4	PLSL	3	70	15	20	5	110	0	1	0	0	0	0	0	1	0	0	SAB	1	0	0	>7	1	0	0	0
11	591770	26	G2P1L1	1	39	FD	2	20	15	20	8	63	0	0	0	0	1	0	0	1	0	0	SAB	1	0	0	>7	1	0	0	0
12	566573	18	PRIMI	0	37+4	OLIGO	3	70	20	18	5	113	0	1	0	0	0	1	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
13	615337	28	G2P1L1	1	38+6	PLSA	2	40	15	15	8	78	0	1	1	0	0	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
14	622585	26	PRIMI	0	40	FD	2	30	15	15	5	65	0	0	0	0	1	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
15	598497	25	PRIMI	0	37+6	OLIGO	3	65	15	20	6	106	0	1	0	0	1	0	0	1	1	0	GA	1	0	0	>7	1	0	0	0
16	506060	25	PRIMI	0	40+1	FDB	1	15	8	10	5	38	0	0	0	0	0	0	0	0	0	0	SAB	0	1	0	<7	0	1	0	0
17	533882	29	G4P1L1A2	1	39+5	PLSL	3	80	20	25	8	133	0	1	0	0	1	1	0	1	0	0	SAB	1	0	0	>7	1	0	0	0
18	520759	31	PRIMI	0	39+2	CPD	3	80	15	10	6	111	0	1	0	0	0	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
19	584490	20	G2P1L1	1	39+1	FD	2	30	20	20	5	75	0	0	0	1	0	1	0	1	0	0	SAB	1	0	0	>7	1	0	0	0
20	613203	19	PRIMI	0	40	FID	1	15	8	6	4	33	0	0	0	0	0	0	0	0	0	0	SAB	0	1	0	<7	0	3	0	1
21	630222	22	G2P1L1	1	39+2	PLSL	3	50	25	25	8	108	0	1	0	1	0	1	1	1	0	0	SAB	1	0	0	>7	1	0	0	0
22	633227	21	PRIMI	0	39+4	FD	2	30	15	15	5	65	0	0	0	1	1	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
23	520277	26	PRIMI	0	39+2	FDB	1	15	6	5	4	30	1	0	0	0	0	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
24	544661	32	G3P1L1A1	1	38+6	OLIGO	3	80	15	15	8	118	0	1	0	0	0	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
25	611390	29	G2P1L1	1	38+2	PLSL	3	80	15	10	6	111	0	1	0	0	0	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
26	611975	26	PRIMI	0	38+4	FD	2	30	15	15	5	65	0	1	0	0	1	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
27	574113	24	PRIMI	0	37+5	OLIGO	3	75	15	18	5	113	0	1	0	0	0	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
28	574448	28	G2P1L1	1	38+3	ABRUPTIO	1	30	8	12	5	55	0	1	1	0	0	0	0	0	0	0	SAB	0	1	0	<7	0	1	0	0
29	625604	30	G2P1L1	1	38	PLSL	3	70	20	20	5	115	0	1	0	0	1	1	0	1	0	0	SAB	1	0	0	>7	1	0	0	0
30	535070	30	PRIMI	0	38+5	CONTRCTD	3	80	15	10	6	111	0	1	0	0	1	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
31	577323	22	G3P2L2	2	38+2	P2LSA	2	30	15	15	10	70	0	1	0	0	0	0	0	0	0	1	SAB	1	0	0	>7	1	0	0	0
32	577366	24	PRIMI	0	39	FD	2	15	15	15	5	50	0	0	0	0	0	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
33	582232	28	G4P2L2A1	2	39	PLSL	3	50	15	20	7	92	0	0	0	1	1	0	0	1	0	0	SAB	1	0	0	>7	1	0	0	0
34	583697	26	G2P1L1	1	40+2	FD	2	15	15	20	6	56	0	0	0	0	0	0	0	1	0	0	SAB	1	0	0	>7	1	0	0	0
35	517848	26	G2P1L1	1	39+5	FDB	1	20	10	10	4	44	0	1	0	0	0	0	0	0	0	0	SAB	0	1	0	<7	0	2	0	0
36	614054	32	G3P2L1D1	2	37	P2LSA	2	40	15	15	10	80	0	0	0	0	1	0	0	0	0	1	SAB	1	0	0	>7	1	0	0	0
37	626532	29	G4P1L1A2	1	39+3	CPD	3	50	30	20	5	105	0	1	1	0	1	1	0	1	0	0	SAB	1	0	0	>7	1	0	0	0
38	492137	28	PRIMI	0	38+6	FD	2	20	15	15	5	55	0	0	0	1	0	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
39	587738	24	G2P1L1	1	39+2	FD	2	30	15	20	6	71	0	1	0	1	0	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0

40	597214	24	PRIMI	0	39+6	OLIGO	3	75	15	18	5	113	0	1	0	0	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
41	513370	17	PRIMI	0	38+5	CPD	3	50	35	14	6	105	0	1	0	0	0	1	0	0	0	SAB	1	0	0	>7	1	0	0	0
42	525755	28	G3P1L1A1	1	37+3	PP	1	35	8	10	5	58	0	0	1	1	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
43	587821	26	PRIMI	0	41	FD	2	30	15	15	5	65	0	0	0	0	1	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
44	627967	28	G2P1L1	1	39+3	FD	2	20	15	10	6	51	0	0	0	0	1	0	0	0	0	GA	0	1	0	<7	0	1	0	0
45	627537	29	G3P2L1D1	2	38	P2LSL	3	40	20	15	8	83	0	1	0	0	0	1	1	0	0	SAB	1	0	0	>7	1	0	0	0
46	568545	32	G5P2L2A2	2	38+3	PLSL	3	80	20	20	6	126	0	1	0	1	0	1	1	0	0	SAB	1	0	0	>7	1	0	0	0
47	626831	28	G2P1L1	1	39+2	FD	2	25	15	10	8	58	0	0	0	0	1	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
48	600699	24	G2P1L1	1	38+4	CPD	3	50	35	14	6	105	0	0	0	0	0	1	0	0	0	SAB	1	0	0	>7	1	0	0	0
49	510919	22	PRIMI	0	38+1	FDB	1	15	8	8	5	36	0	0	0	0	0	0	0	0	0	SAB	0	1	0	<7	0	2	0	0
50	611976	24	PRIMI	0	37	PP	1	40	10	20	5	75	0	1	1	1	1	0	0	1	1	0	SAB-GA	0	1	0	<7	0	1	0	0
51	564423	23	PRIMI	0	39	OLIGO	3	80	20	20	6	126	0	1	0	1	0	1	0	1	0	0	SAB	1	0	0	>7	1	0	0	0
52	564428	22	PRIMI	0	38	FDB	1	15	8	10	5	38	0	0	0	0	0	0	0	0	0	SAB	0	1	0	<7	0	2	0	0
53	572378	27	G2P1L1	1	38+6	PLSL	3	50	25	15	8	98	0	0	1	0	0	1	0	0	0	SAB	1	0	0	>7	1	0	0	0
54	509248	26	G2P1L1	1	39+4	CPD	3	50	30	15	6	101	0	1	0	1	0	1	1	0	0	SAB	1	0	0	>7	1	0	0	0
55	582612	24	PRIMI	0	37+1	PPS	2	30	20	15	6	71	0	0	1	1	0	1	1	0	0	SAB	1	0	0	>7	1	0	0	0
56	614227	23	PRIMI	0	39+4	FD	2	20	20	15	6	61	0	0	0	0	1	1	0	0	0	SAB	0	1	0	<7	0	1	0	0
57	533629	23	PRIMI	0	40+1	CP	1	10	5	6	5	26	1	0	0	0	0	0	0	0	0	GA	1	0	0	>7	1	0	0	0
58	512707	30	G3P2L2	2	36+6	PP	1	30	20	10	5	65	0	0	1	0	1	1	0	0	0	SAB	1	0	0	>7	1	0	0	0
59	516967	28	PRIMI	0	38+4	FD	2	30	20	10	6	66	0	0	0	1	1	1	0	0	0	SAB	0	1	0	<7	0	1	0	0
60	619181	30	G3P2D2	2	39+3	P2LSR	1	30	10	10	12	62	0	0	1	1	1	0	0	0	1	SAB	0	1	0	<7	0	0	1	0
61	523821	24	PRIMI	0	38	FDB	1	15	5	5	4	29	1	0	0	0	0	0	0	0	0	GA	1	0	0	>7	1	0	0	0
62	597119	26	G3A2	0	40+2	FD	2	25	15	15	6	61	0	0	0	1	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
63	446129	29	G4P1L1A2	1	38+2	PLSR	1	20	10	10	8	48	0	1	1	0	0	0	0	0	0	SAB	0	0	1	0	0	0	0	0
64	608512	25	PRIMI	0	38+2	OLIGO	3	75	15	25	5	115	0	1	0	1	0	0	0	1	0	0	SAB	1	0	0	>7	1	0	0	0
65	507784	28	G2P1L1	1	36+5	PP	1	15	10	15	5	45	0	0	0	0	0	0	0	0	0	SAB	0	1	0	<7	0	1	0	0
66	605486	24	PRIMI	0	38+4	CPD	3	80	15	10	6	111	0	1	0	1	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
67	605902	26	G2P1L1	1	38+2	PLSL	3	70	15	15	8	108	0	1	0	0	1	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
68	627618	26	G2P1L1	1	40	FD	2	15	15	15	6	51	0	0	0	0	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
69	529345	24	PRIMI	0	40+5	OLIGO	3	40	20	25	6	91	0	1	0	1	0	1	0	0	0	SAB	1	0	0	>7	1	0	0	0
70	611573	25	G2P1L1	1	38+2	PLSA	2	15	15	20	8	58	0	0	0	0	0	0	0	1	1	0	SAB-GA	1	0	0	>7	1	0	0	0
71	598405	24	G2A1	0	37	OLIGO	3	50	20	30	5	105	0	1	0	0	0	1	0	1	0	0	SAB	1	0	0	>7	1	0	0	0
72	530024	25	PRIMI	0	40+2	CPD	3	80	18	10	5	113	0	1	0	1	1	1	0	0	0	SAB	1	0	0	>7	1	0	0	0
73	567084	27	G2A1	0	39+2	FDB	1	15	8	6	5	34	0	0	0	0	0	0	0	0	0	SAB	0	1	0	<7	0	1	0	0
74	587633	25	PRIMI	0	40	OLIGO	3	80	25	15	6	126	0	1	0	1	1	1	0	0	0	SAB	1	0	0	>7	1	0	0	0
75	626531	26	G2A1	0	36	PP	1	36	10	10	4	60	0	0	1	1	1	0	0	0	0	GA	0	1	0	<7	0	1	0	0
76	517282	28	G2P1L1	1	39+5	FD	2	15	15	20	6	56	0	0	0	0	0	0	0	1	0	0	SAB	1	0	0	>7	1	0	0	0
77	529275	28	G2P1L1	1	40+4	OLIGO	3	70	15	20	8	113	0	1	0	1	0	0	0	1	0	0	SAB	1	0	0	>7	1	0	0	0
78	513706	24	PRIMI	0	36+3	FD	2	15	15	15	6	51	0	0	0	0	0	0	0	0	0	SAB	0	1	0	>7	0	1	0	0
79	515329	31	G3P2L2	2	40+5	FDB	1	15	8	8	5	36	0	0	0	0	0	0	0	0	0	GA	0	1	0	<7	0	2	0	0
80	417771	30	G3P2L3	2	38	P2LSA	2	25	15	15	12	67	0	0	1	0	1	0	0	0	1	SAB	1	0	0	>7	1	0	0	0
81	605404	28	G2P1L1	1	40+4	CPD	3	70	15	20	6	111	0	1	0	0	0	0	0	1	0	0	SAB	1	0	0	>7	1	0	0	0
82	504747	25	PRIMI	0	40+1	FD	2	50	10	10	5	75	0	0	0	1	1	0	0	0	0	SAB	0	1	0	<7	0	1	0	0
83	516543	25	PRIMI	0	40+2	FD	2	40	10	10	5	65	0	0	0	1	1	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
84	599605	26	G2P1L1	1	41+2	CPD	3	50	30	20	5	105	0	1	0	0	0	1	1	1	0	0	SAB	1	0	0	>7	1	0	0	0
85	600263	28	G2P1L1	1	38	OLIGO	3	70	15	20	6	111	0	1	0	0	1	0	0	1	0	0	SAB	1	0	0	>7	1	0	0	0

86	517364	26	PRIMI	0	38+6	FD	2	15	15	15	8	53	0	0	0	0	0	0	0	0	0	SAB	0	1	0	>7	0	1	0	0
87	536293	28	G2P1L1	1	40	PLSL	3	40	25	25	8	98	0	1	0	0	0	1	0	1	1	0	SAB-GA	1	0	0	>7	1	0	0	0
88	504718	28	G2P1L1	1	39+6	FD	2	25	15	15	6	61	0	0	0	1	1	0	0	0	0	0	SAB	0	1	0	>7	0	1	0	0
89	621754	28	G2P1L1	1	39+3	PLSL	3	50	30	15	7	102	0	0	0	0	1	1	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
90	517993	30	G2P1L1	1	37+3	PLSR	1	20	5	12	8	45	0	0	1	0	0	0	0	0	0	0	SAB	0	1	0	<7	0	2	0	1
91	494429	24	G2A1	0	38+4	FD	2	15	15	15	8	53	0	0	0	0	0	0	0	0	0	0	SAB	0	1	0	<7	0	1	0	0
92	516117	31	G3P2L2	2	39	P2LSL	3	90	20	25	6	141	0	1	1	1	0	1	1	1	0	0	SAB	1	0	0	>7	1	0	0	0
93	525256	20	G2A1	0	39+4	CPD	3	90	20	25	6	141	0	1	0	0	1	1	0	1	0	0	SAB	1	0	0	>7	1	0	0	0
94	601956	18	PRIMI	0	38	OLIGO	3	80	20	20	5	125	0	1	0	0	0	1	1	1	0	0	SAB	1	0	0	>7	1	0	0	0
95	514620	19	PRIMI	0	41	FD	2	15	15	20	6	56	0	0	0	0	0	0	0	1	1	0	SAB-GA	0	1	0	<7	0	1	0	0
96	521390	20	PRIMI	0	39+6	FDB	1	20	6	8	6	40	0	1	0	0	0	0	0	0	0	0	SAB	0	1	0	<7	0	1	0	0
97	604212	24	G2P1L1	1	38+2	PLSL	3	80	25	15	6	126	0	1	0	1	1	1	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
98	615063	20	PRIMI	0	39	FD	2	15	20	20	5	60	0	0	0	0	0	1	0	1	0	0	SAB	1	0	0	>7	1	0	0	0
99	527241	28	G2P1L1	1	38+4	OLIGO	3	45	30	15	6	96	0	1	0	0	1	1	1	0	0	0	SAB	1	0	0	>7	1	0	0	0
100	622838	22	PRIMI	0	40+5	PPS	2	40	15	15	8	78	0	0	1	0	0	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
101	606415	21	PRIMI	0	40+2	FD	2	20	25	20	5	65	0	0	0	0	1	1	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
102	587258	23	PRIMI	0	39+4	CPD	3	80	25	25	6	136	0	1	0	0	0	1	0	1	0	0	SAB	1	0	0	>7	1	0	0	0
103	586998	22	PRIMI	0	38+2	OLIGO	3	80	20	25	7	132	0	1	0	1	1	1	0	1	0	0	SAB	1	0	0	>7	1	0	0	0
104	566905	24	G3P2L2	2	39+4	FD	2	30	15	20	6	71	0	0	0	0	1	0	0	0	1	0	SAB-GA	0	1	0	<7	0	1	0	0
105	626762	28	G2P1L1	1	39+3	PLSL	3	40	15	25	8	88	0	0	1	1	1	0	0	1	0	0	SAB	1	0	0	>7	1	0	0	0
106	541173	29	G2P1L1	1	40	FDB	1	20	10	8	4	42	0	1	0	0	1	0	0	0	0	0	SAB	0	1	0	<7	0	2	0	0
107	565313	28	G2P1L1	1	39+3	OLIGO	3	85	15	20	6	126	0	1	0	1	1	0	0	1	0	0	SAB	1	0	0	>7	1	0	0	0
108	579164	24	G2A1	0	37+3	ABRUPTIO	1	30	20	8	6	64	0	1	1	0	0	1	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
109	507329	20	PRIMI	0	40	FD	2	15	15	20	8	58	0	0	0	0	0	0	0	1	0	0	SAB	0	1	0	>7	0	1	0	0
110	519187	26	G2P1L1	1	36	PPS	2	40	15	15	6	76	0	0	1	0	1	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
111	587703	24	PRIMI	0	38	OLIGO	3	60	15	20	6	101	0	1	0	0	1	0	0	1	0	0	SAB	1	0	0	>7	1	0	0	0
112	510990	23	PRIMI	0	39	FD	2	15	15	15	6	51	0	0	0	0	0	0	0	0	0	0	SAB	0	1	0	>7	0	1	0	0
113	499990	20	PRIMI	0	39+3	FDB	1	15	8	10	5	38	0	0	0	0	0	0	0	0	0	0	GA	0	1	0	<7	0	2	0	0
114	613240	21	PRIMI	0	38+3	OLIGO	3	45	30	20	6	101	0	0	0	1	1	1	0	1	0	0	SAB	1	0	0	>7	1	0	0	0
115	621360	22	PRIMI	0	40	FD	2	20	15	25	5	65	0	0	0	1	1	0	0	1	0	0	SAB	0	1	0	<7	0	1	0	0
116	621754	28	G2P1L1	1	39	PLSL	3	50	30	20	8	108	0	0	1	0	0	1	0	1	0	0	SAB	0	1	0	>7	0	1	0	0
117	614776	24	PRIMI	0	37	OLIGO	3	70	30	20	6	126	0	1	0	1	0	1	1	1	0	0	SAB	1	0	0	>7	1	0	0	0
118	525609	20	PRIMI	0	40+6	FD	2	15	20	15	5	55	0	0	0	0	0	1	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
119	620266	17	PRIMI	0	39+2	FD	2	25	20	25	6	76	0	0	0	1	1	1	0	1	0	0	SAB	1	0	0	>7	1	0	0	0
120	605801	32	G2P1L1	1	36+4	PLSR	1	20	10	12	10	52	0	1	1	0	0	0	0	0	0	1	SAB	0	1	0	<7	0	3	0	0
121	620390	22	G2A1	0	40+2	FD	2	25	25	15	8	73	0	0	0	0	1	1	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
122	534285	31	G3P1L1A1	1	38	OLIGO	3	70	20	15	6	111	0	1	0	0	0	1	1	0	0	0	SAB	1	0	0	>7	1	0	0	0
123	618317	34	G3P2L2	2	37	P2LS	3	75	20	15	10	120	0	1	0	0	0	1	0	0	0	1	SAB	1	0	0	>7	1	0	0	0
124	600702	20	PRIMI	0	37	CONTRACTED	3	75	20	15	8	118	0	1	0	1	1	1	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
125	602473	24	PRIMI	0	39+4	OLIGO	3	40	30	25	6	101	0	1	0	0	1	1	1	1	0	0	SAB	1	0	0	>7	1	0	0	0
126	512690	26	PRIMI	0	40	FD	2	30	15	15	8	68	0	0	0	0	1	0	0	0	0	0	SAB	0	1	0	<7	0	0	1	0
127	622461	24	G2P1L1	1	39	PLSL	3	60	30	20	8	118	0	1	0	0	0	1	1	1	0	0	SAB	1	0	0	>7	1	0	0	0
128	569951	28	G2P1L1	1	39+3	BREECH IN LL	3	50	20	25	10	105	0	0	0	1	0	1	0	1	0	0	SAB	1	0	0	>7	1	0	0	0
129	619430	29	G2P1L1	1	38+5	PLSL	3	75	20	25	8	128	0	1	0	1	0	1	0	1	0	0	SAB	1	0	0	>7	1	0	0	0
130	506357	30	PRIMI	0	40+6	FD	2	15	20	15	7	57	0	0	0	0	0	1	0	0	0	0	SAB	0	1	0	<7	0	2	0	0
131	618293	35	G2P1L1	1	40+3	FD	2	25	25	15	8	73	0	0	0	0	1	1	0	0	0	0	SAB	0	1	0	<7	0	1	0	0

132	619239	28	G2P1L1	1	40+4	PLSL	3	50	20	15	8	93	0	1	0	1	1	1	1	0	0	0	SAB	0	1	0	<7	0	1	0	0
133	484949	24	PRIMI	0	40+4	FD	2	15	20	15	6	56	0	0	0	0	0	0	1	0	0	0	SAB	1	0	0	>7	1	0	0	0
134	548779	26	G2P1L1	1	38+6	PP	1	40	10	20	4	74	0	1	1	1	1	0	0	1	0	0	SAB	1	0	0	>7	1	0	0	0
135	597062	22	G2A1	0	39+3	FDB	1	15	8	8	5	36	0	0	0	0	0	0	0	0	0	0	SAB	0	1	0	<7	0	2	0	0
136	574962	22	G2A1	0	39+4	BREECH IN AL	2	20	15	10	8	53	0	0	0	0	1	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
137	575680	25	PRIMI	0	38	FID	1	15	4	5	4	28	1	0	0	0	0	0	0	0	0	0	SAB	0	1	0	<7	0	2	0	0
138	519179	28	PRIMI	0	38	FD	2	30	15	20	6	71	0	0	0	0	1	0	0	1	0	0	SAB	0	1	0	<7	0	0	1	0
139	565804	31	G2P1L1	1		PLSA	2	30	20	20	8	78	0	0	0	1	0	1	0	1	0	0	SAB	1	0	0	>7	1	0	0	0
140	608448	32	G3P1L1A1	1	38+2	OLIGO	3	50	20	20	6	96	0	1	0	0	0	1	0	1	0	0	SAB	1	0	0	>7	1	0	0	0
141	616797	24	PRIMI	0	39+3	FD	2	20	15	15	6	56	0	0	0	0	1	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
142	571908	22	PRIMI	0	40	BREECH IN AL	2	30	10	8	5	53	0	0	0	0	1	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
143	618074	28	PRIMI	0	40	FD	2	15	30	15	6	66	0	0	0	0	0	0	1	0	0	0	SAB	1	0	0	>7	1	0	0	0
144	584693	28	PRIMI	0	37+3	PP	1	25	20	8	5	58	0	1	1	0	0	1	1	0	0	0	SAB	1	0	0	>7	1	0	0	0
145	587738	26	PRIMI	0	39+4	PP	1	30	20	15	5	70	0	1	1	1	1	1	1	0	0	0	SAB	1	0	0	>7	1	0	0	0
146	543135	29	G3P1L1A1	1	39+3	PLSR	1	20	8	12	8	48	0	0	1	0	0	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
147	610168	28	G2P1L1	1	40+4	FD	2	15	25	20	6	66	0	0	0	0	0	1	0	1	0	0	SAB	0	1	0	<7	0	1	0	0
148	587287	22	PRIMI	0	37	PPS	2	45	20	15	8	88	0	0	1	1	1	1	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
149	582760	17	PRIMI	0	38	BREECH IN LL	3	70	20	15	10	115	0	1	0	0	0	0	1	0	0	0	SAB	1	0	0	>7	1	0	0	0
150	635533	24	G2P1L1	1	39+4	OL	1	15	5	15	5	40	0	0	0	0	0	0	0	0	0	0	SAB	0	1	0	<7	0	2	0	0
151	626831	26	PRIMI	0	39+2	CPD	3	80	18	10	5	113	0	1	0	1	0	1	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
152	630356	28	G3P2L1D1	2	38	P2LSR	1	15	5	12	8	40	0	0	0	0	0	0	0	0	0	0	SAB	0	1	0	<7	0	2	1	0
153	518003	26	PRIMI	0	39+2	FD	2	15	20	20	5	60	0	0	0	0	0	1	0	1	0	0	SAB	0	1	0	<7	0	1	0	0
154	584690	28	PRIMI	0	38	BREECH IN LL	3	50	30	20	8	108	0	1	0	0	0	1	1	1	0	0	SAB	1	0	0	>7	1	0	0	0
155	587910	24	PRIMI	0	36+4	PP	1	40	10	10	8	68	0	1	1	1	1	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
156	552510	24	PRIMI	0	38+2	FD	2	25	20	15	6	66	0	0	0	0	1	1	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
157	634587	28	G2P1L1	1	38+6	PLSL	3	50	25	15	8	98	0	1	0	0	0	1	1	0	0	0	SAB	1	0	0	>7	1	0	0	0
158	582760	28	PRIMI	0	38+3	BREECH IN AL	2	30	20	8	6	64	0	0	0	0	1	1	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
159	631445	26	G2P1L1	1	38+4	PLSL	3	50	15	15	8	88	0	1	0	0	0	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
160	598792	28	PRIMI	0	41+2	FD	2	25	15	20	5	65	0	0	0	1	1	0	0	1	0	0	SAB	1	0	0	>7	1	0	0	0
161	629108	19	G2A1	0	38+2	ABRUPTIO	1	20	10	10	6	46	0	1	1	0	1	0	0	0	0	0	SAB	0	1	0	<7	0	0	1	0
162	634292	24	G2P1L1	1	39+2	PLSL	3	50	30	20	5	105	0	0	1	0	1	1	1	0	0	0	SAB	1	0	0	>7	1	0	0	0
163	633755	26	PRIMI	0	38	CPD	3	50	30	20	5	105	0	1	0	0	0	1	1	1	0	0	SAB	0	1	0	<7	0	1	0	0
164	633752	28	PRIMI	0	39	FD	2	15	15	15	5	50	0	0	0	0	0	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
165	634321	19	PRIMI	0	40	OL	1	15	5	15	5	40	0	0	0	0	0	0	0	0	0	0	GA	1	0	0	>7	1	0	0	0
166	621634	28	G2P1L1	1	39	PLSA	2	30	15	15	8	68	0	0	0	0	1	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
167	578762	18	PRIMI	0	36+5	BREECH IN LL	3	50	30	15	8	103	0	1	0	1	1	1	1	0	0	0	SAB	1	0	0	>7	1	0	0	0
168	619538	22	G2A1	0	40+1	FD	2	15	15	15	6	51	0	0	0	0	0	0	0	0	0	0	SAB	0	1	0	<7	0	1	0	0
169	634192	24	G2P1L1	1	38+4	PLSL	3	40	30	20	8	98	0	1	0	0	0	1	1	1	0	0	SAB	1	0	0	>7	1	0	0	0
170	607581	28	G2P1L1	1	39+2	FD	2	15	15	15	6	51	0	0	0	0	0	0	0	0	0	0	SAB	0	1	0	<7	0	1	0	0
171	628400	26	G2P1L1	1	38+6	PLSA	2	70	15	20	10	115	0	1	0	0	1	0	0	1	0	1	SAB	1	0	0	>7	1	0	0	0
172	628678	28	PRIMI	0	38	ABRUPTIO	1	20	20	8	6	54	0	1	1	1	0	1	0	0	0	0	SAB	0	1	0	>1	0	1	0	0
173	620206	28	G2P1L1	1	39	PLSL	3	50	30	15	8	103	0	0	0	1	1	0	1	0	0	0	SAB	1	0	0	>7	1	0	0	0
174	632822	24	PRIMI	0	40	FD	2	15	15	15	6	51	0	0	0	0	0	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
175	624234	22	G2P1L1	1	38+4	PLSA	2	30	25	15	8	78	0	1	0	0	0	1	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
176	568545	26	G2P1L1	1	38+5	PLSA	2	30	20	25	8	83	0	1	0	0	0	1	1	1	0	0	SAB	1	0	0	>7	1	0	0	0
177	532994	30	G3P2L2	2	37+3	P2LSL	3	60	25	15	10	110	0	1	1	0	0	1	0	0	0	1	SAB	1	0	0	>7	1	0	0	0

178	627582	32	G3P2L2	2	38+2	FD	2	25	20	15	6	66	0	0	0	0	1	1	1	0	0	0	SAB	0	1	0	<7	0	1	0	0
179	627567	28	G2P1L1	1	40	PLSL	3	45	30	20	8	103	0	1	0	0	0	1	1	1	0	0	SAB	1	0	0	>7	1	0	0	0
180	631392	25	G3P1L1A1	1	38+4	PLSA	2	40	25	15	8	88	0	0	0	1	0	1	1	0	0	0	SAB	1	0	0	>7	1	0	0	0
181	625747	26	G2P1L1	1	38+6	PLSA	2	40	30	15	8	93	0	0	1	0	1	1	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
182	514779	17	PRIMI	0	40+3	FD	2	15	15	15	6	51	0	0	0	0	0	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
183	635088	24	G2P1L1	1	38+2	PLSL	3	65	35	15	8	123	0	1	0	0	0	1	1	0	0	0	SAB	1	0	0	>7	1	0	0	0
184	648401	26	PRIMI	0	40	OL	1	15	5	10	8	38	0	0	0	0	0	0	0	0	0	0	SAB	0	1	0	<7	0	0	1	0
185	623057	22	G2A1	0	40	CONTRACTED	3	80	25	15	6	126	0	1	0	1	0	1	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
186	622991	32	G5P1L1A3	1	37+5	BREECH IN AL	2	30	15	8	8	61	0	0	0	1	0	0	0	0	0	0	SAB	0	1	0	<7	0	1	0	0
187	632143	23	PRIMI	0	40	PPS	2	45	15	15	8	83	0	0	1	0	1	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
188	636358	21	PRIMI	0	40	OL	1	20	8	12	8	48	0	0	0	1	1	0	0	0	0	0	SAB	0	1	0	>7	0	1	0	0
189	634316	26	G3P1L1A1	1	39+4	PLSA	2	25	15	15	6	61	0	0	0	0	1	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
190	622861	24	PRIMI	0	38+2	FD	2	20	10	15	8	53	0	0	0	0	1	0	0	0	0	0	SAB	0	1	0	<7	0	2	0	1
191	630416	26	PRIMI	0	39+6	CPD	3	80	25	25	6	136	0	1	0	0	0	1	0	1	0	0	SAB	1	0	0	>7	1	0	0	0
192	636332	28	G2P1L1	1	38+4	PLSL	3	50	15	15	8	88	0	0	1	0	0	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
193	635442	22	PRIMI	0	38+2	ABRUPTIO	1	35	8	12	6	61	0	0	1	0	1	0	0	0	0	0	SAB	0	1	0	>7	0	1	0	0
194	540736	25	PRIMI	0	39	CPD	3	80	15	10	6	111	0	1	0	0	1	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
195	530001	26	G2P1L1	1	39+1	FD	2	15	15	15	5	50	0	0	0	0	0	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
196	632271	28	G2P1L1	1	38+6	PLSA	2	25	15	15	8	63	0	0	0	1	0	0	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
197	588202	24	G2A1	0	39+4	BREECH IN LL	3	50	30	20	10	110	0	0	0	0	1	1	0	1	0	1	SAB	1	0	0	>7	1	0	0	0
198	634084	32	PRIMI	0	38+2	FD	2	30	15	8	8	61	0	0	0	1	1	0	0	0	0	0	SAB	0	1	0	<7	0	1	0	0
199	622812	20	PRIMI	0	39	CPD	3	50	30	15	6	101	0	1	0	0	0	1	0	0	0	0	SAB	1	0	0	>7	1	0	0	0
200	634626	25	G2P1L1	1	38	PLSL	3	70	20	15	8	113	0	1	0	1	0	0	1	0	0	0	SAB	1	0	0	>7	1	0	0	0