

Maternal and Perinatal Outcomes Associated with Previous Two or More Cesarean Sections

First Author


Dr. Shamlath M K P¹

Co-Authors

Dr. Menon Nalini Sekharan²

Dr. Smitha Santhosh³

Government Medical College Kozhikode



INSTITUTIONAL ETHICS COMMITTEE

GOVERNMENT MEDICAL COLLEGE KOZHIKODE

Room No. 1 & 2, Ground Floor, Lecture Theater Complex
 Medical College Campus, Medical College P.O,
 Calicut – 673 008, Kerala

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 Lay Person
 9495870890

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APPROVAL OF RESEARCH PROJECT

The Institutional Ethics Committee, Govt. Medical College, Kozhikode has evaluated the protocol of the study entitled “MATERNAL AND PERINATAL OUTCOMES ASSOCIATED WITH PREVIOUS TWO OR MORE CAESARIAN SECTIONS” submitted by **Dr. SHAMLATH M.K.P, JUNIOR RESIDENT, DEPARTMENT OF OBSTETRICS AND GYNAECOLOGY, GOVT. MEDICAL COLLEGE, KOZHIKODE.**

<p>GUIDE: Dr. MENON NALINI SHEKHARAN ADDITIONAL PROFESSOR, DEPARTMENT OF OBSTETRICS AND GYNAECOLOGY, GOVT.MEDICAL COLLEGE, KOZHIKODE.</p>	<p>CO-GUIDE: Dr. SMITHA SANTHOSH ASSISTANT PROFESSOR, DEPARTMENT OF OBSTETRICS AND GYNAECOLOGY, GOVT.MEDICAL COLLEGE, KOZHIKODE.</p>
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The Committee has provisionally approved the same

Dated: 16/07/2021




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Dr. N. C. Cherian
 CHAIRMAN
 Institutional Ethics Committee
 Govt. Medical College Kozhikode



SECRETARY

 Member - Secretary
 Institutional Ethics Committee
 Govt. Medical College, Kozhikode



STRUCTURED ABSTRACT

➤ *Introduction:*

Cesarean section is the most common obstetric surgery performed worldwide to save life of pregnant patient as well as fetus. However, repeat cesarean sections are associated with increased risk of maternal and perinatal morbidity and mortality. It is associated with postpartum haemorrhage, sepsis, peripartum hysterectomy, adherent placenta, uterine rupture and maternal death.

Scarring and adhesion formation is known to cause increase in the complications depending up on the number of previous cesarean section. As with all types of abdominal surgeries, a cesarean section is also associated with risks of incisional hernias and wound infections.. Along with the risk of anaesthesia, there is also intra operative risks like blood loss requiring blood transfusion due to various causes like adhesions, extension of uterine incision, adherent placenta, risk of previous scar dehiscence, uterine rupture, thinning of lower uterine segment and organ injuries like bowel and bladder injury. The risk of placenta accreta, a potentially life- threatening condition is increased after two cesarean sections, increasing the risk of obstetric hysterectomy. In case of elective cesarean section, if not properly timed, neonatal problems like iatrogenic prematurity and respiratory distress syndrome due to pulmonary immaturity may ensue.

➤ *Objectives:*

My aim is to study the maternal and perinatal morbidity and mortality associated with previous 2 or more cesarean sections.

➤ *Methods:*

This is a prospective observational study conducted in 200 antenatal women in Department of Obstetrics and Gynaecology, Government Medical College, Kozhikode, above 34 weeks of gestation, including both elective and emergency admissions. Data was analysed using SPSS software and the level of significance was employed if p-value < 0.5.

➤ *Results:*

Out of 200 cases randomly selected and studied, who had previous 2 or more cesarean sections 188 had previous two (96%) and 12 had previous three (4%) cesarean sections. The highest number was between 21 to 30 year age group (58%). Most had duration of hospital stay between 6 to 10 days (64%). 8.3% of the previous three cesarean sections, had scar tenderness in contrast to 3.7% of the previous two cesarean sections. . There was 8 cases of abnormal placental invasion (4%), who underwent obstetric hysterectomy. There was difficulty in opening abdomen in 42% of cases and 153 cases (76.5%) lower segment was thinned out. 56.5% of the study participants did not have any adhesions, rest of the 87 (43.5%) participants had occurrence of adhesion as complication. Most common (19%) type of adhesion was between anterior abdominal wall and anterior wall of uterus. 7 among the 200 participants (3.5%) had bladder injury. There was no cases of scar rupture, uterine rupture or bowel injury in the study population. Other intraoperative complications included PPH (3.5%), blood transfusion (9%), tear in lower uterine segment (2%) and pulled up bladder (8%). 13.5% of the babies were admitted to NICU, in which respiratory distress (13 cases) was the most common indication for NICU admission. In the current study, individuals who had previously undergone two or three CS had essentially the same percentage of emergency cesarean sections.

➤ *Conclusion:*

Women with repeat cesarean sections are at high risk of having multiple intraoperative complication that increase the rate of maternal and fetal morbidity. As the number of repeat cesarean section increases there is increased risk of maternal morbidities like sepsis, adhesions, organ injury abnormal placentation, scar tenderness, haemorrhage. Patient should have proper counselling about the risk of repeat cesarean sections, and should be offered permanent sterilisation after two or more cesarean sections. Effort should be made towards decrease in the incidence of the total cesarean sections through decreasing in the number of primary cesarean sections and giving proper chance of vaginal birth after previous one cesarean section (VBAC).

Keywords:- Cesarean Section, Morbidly Adherent Placenta, Obstetric Hysterectomy, PPH, Bladder Injury.

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CHAPTER ONE INTRODUCTION

The delivery of a child by a surgical incision in the mother's abdomen and the uterus is known as a C-section or cesarean section. A C-section may occasionally be scheduled in advance. Nearly a third of women in many affluent nations give birth via cesarean section, making it one of the most frequently performed surgeries for women. Two methods can be used to deliver a baby after a pregnancy reaches term. One involves a vaginal birth, the other a cesarean section. An understanding of the complications and outcomes of a prior cesarean section in a woman's life will be provided by the maternal outcomes, including the morbidity and mortality they experience in subsequent deliveries. ^(6, 7) To ensure that women and their unborn children achieve their maximum potential for health and well-being, each stage should be enjoyable. Despite significant advancement over the past 20 years, 295 000 women died during or after pregnancy and childbirth in 2020. This amount is just too high. ⁽⁸⁾

One of the fundamental, comprehensive intrapartum services is the Cesarean section (CS). In certain situations, such as obstructed labor, a distressed fetus, antepartum hemorrhage, an atypical presentation, and other emergency obstetric problems, CS can be a life-saving intervention for the mother, the foetus, or both. Either maternal or neonatal deaths can be avoided with the proper implementation of CS. A rise in CS could prevent about 160,000 maternal fatalities and 800,000 newborn deaths annually in nations with low country-level CS rates. Additionally, CS at a population level of 10-15% could avert 60% of maternal mortality among expectant mothers in low-income nations. ^(9, 10) Due to older maternal age, defensive obstetric practice, maternal request for a CS, and medico-legal issues, the CS rate has significantly grown over the past few years. The American Center for Disease Control and Prevention reports that the cesarean delivery rate in the United States was 20.7% in 1995 and significantly rose to 31.9% in 2016. Additionally, a study done in Thailand at the King Chulalongkorn Memorial Hospital revealed that over the past ten years, the number of Cesarean sections performed has dramatically increased in a number of nations. They reported that the CS rate increased from 34.4% in 2003 to 46.5% in 2011. The CS rate was 8% in 1993, according to the Turkish Demographic Survey, and it later rose to 37% in 2017, as indicated by various studies. ⁽¹¹⁻¹⁴⁾

According to a global assessment conducted by the World Health Organization (WHO), there were significant regional differences in the CS rates, with country-level rates ranging from less than 10% to more than 50% ⁽¹⁵⁻¹⁷⁾. With a median incidence of 8.8%, the African nations with the lowest CS rates were those that were examined for their health facilities. The median prevalence of CS across Latin American nations was 33%, with private hospital settings reporting the greatest incidence (51%). The high CS rates in Latin American private universities were mostly caused by an increase in elective CS. A total CS rate of 27.3% was found across 122 recruited facilities, according to data gathered from nine Asian nations. ⁽¹⁶⁾ China (46.2%) had the greatest rate of CS, followed by Vietnam (35.6%) and Thailand (34.1%). In addition, China (11.7%), Vietnam (1.0%), and Sri Lanka (0.8%) had the highest rates of CS conducted without a medical reason. A CS can significantly lower the risks of maternal and perinatal mortality and morbidity when medically necessary. ⁽¹⁸⁾

The medical operation known as a cesarean section (CS) frequently saves both the mother's and the baby's life. ⁽¹⁹⁾ One of the primary justifications for cesarean delivery in the present pregnancy is a prior CS. Cephalopelvic disproportion, placenta previa, eclampsia, HELLP syndrome and other conditions are examples of further indicators. Locally, expectant mothers planning to have their fifth or sixth child are frequent sights in many regions of India, where families are encouraged socially and culturally to have several children. The most frequent obstetric procedure performed globally to preserve the life of the pregnant patient as well as the foetus is a cesarean section, which gives the woman the obstetrical status of "prior cesarean section." Repeat cesareans are linked to a higher risk of maternal and perinatal morbidity and mortality, nevertheless, maternal mortality, adherent placenta, sepsis, peripartum hysterectomy, postpartum hemorrhage, and uterine rupture are all linked to it. In most affluent nations as well as many emerging nations, including India, the rate of cesarean sections has steadily increased over the past few decades. ⁽¹⁹⁻²¹⁾

Cesarean section is not an exception to the development of scar tissue, adhesions, following any laparotomy. Multiple Cesarean sections are linked to more challenging operations with greater blood loss. With more cesarean deliveries, there is a higher chance of serious complications. ⁽¹⁹⁻²¹⁾ Due to the rise in c-sections, women will have difficulties with subsequent pregnancies, such as scar dehiscences, scar ruptures, PPH, FGR, foetal discomfort, and unexplained IUD. ^(22,23) Maternal hazards (organ damage, hemorrhage, requirement for urgent care, lengthy surgery, hysterectomy, and maternal mortality) are recognised to be linked to an increasing rate and frequency of cesarean deliveries. ⁽²⁴⁻²⁶⁾ Prematurity, low APGAR (appearance, pulse, grimace, activity, respiration) scores, stillbirth, and early infant death are known to be connected with an increasing rate and number of cesarean deliveries. Even though the severity of the complications is increasing, little is known about the factors influencing the management outcomes. These factors include the timing of the birth, the surgeon's experience, the center's competence, the surgical technique, and the risk of anaesthesia. ⁽²⁷⁻²⁹⁾

Depending on the number of prior cesarean sections, scarring and adhesion formation are known to exacerbate problems. A cesarean section has the same hazards of incisional hernias (which may require surgical repair) and wound infections as other types of abdominal procedures. Numerous things could enhance the danger of the procedure. Along with the risk of anaesthesia, there are intraoperative risks as well, such as blood loss that necessitates transfusion due to adhesions, the extension of the uterine incision, adherent placenta, risk of the previous scar dehiscence, uterine rupture, thinning of the lower uterine segment, and organ injuries like bowel and bladder injury. After two cesarean sections, the chance of placenta accreta, a potentially fatal disease, increasing the likelihood of obstetric hysterectomy. Elective cesarean sections may result in neonatal issues like iatrogenic prematurity and respiratory distress syndrome because of lung immaturity if the procedure is not timed properly. ⁽³⁰⁻³²⁾

In 2010, a systematic review was conducted to investigate the link between maternal morbidity and the rising rate of cesarean deliveries. According to the review, there were more surgical injuries, more blood transfusions were performed, and more adhesions formed as the number of cesarean sections increased. In addition, all studies found that the frequency of hysterectomies increased with the frequency of recurrent cesarean sections. ⁽³³⁾ Using a cohort study with a sample size of 30,132 patients and published in 2006 in the United States, researchers compared the maternal outcome and surgical complications of patients with multiple cesarean sections with a control group who had only one CS. They discovered a correlation between the number of cesarean sections and complications. ⁽³⁴⁾ Contrarily, a case-control study conducted in Finland in 2004 with a sample size of 64 participants found no difference between the CS group and the control group in the incidence of pregnancy-related complications like gestational diabetes, antepartum foetal distress, pre-eclampsia, preterm delivery, and intrahepatic cholestasis of pregnancy ⁽³⁵⁾ As a major surgical procedure, CS increases the risk of long-term obstetric risks such as placenta previa, morbidly adherent placenta, and uterine rupture in the subsequent pregnancy in addition to short-term adverse events for pregnant women, such as higher rates of haemorrhage, transfusions received, infections, prolonged hospital stays, and in infants, such as higher rates of infection, respiratory complications, and admission to neonatal intensive care. The likelihood of negative effects after CS rises as the prevalence of CS rises ⁽³⁶⁾.

The CS performed on nulliparous women and past CS are the main causes of the high CS rate over the past 10 years. With a proportional contribution ranging from 15.4% to 67.1%, a prior CS has the biggest impact on the overall cesarean rate. Between 17.2% and 41.6% of nulliparous women who undergo CS contributes to the overall CS rate. It's possible that increased CS use without a medical reason and incorrect labor induction is to blame for the noticeably elevated CS rates among nulliparous women. Based on these findings, there is an increasing worry over the possibility of unfavorable pregnancy outcomes among women with a history of CS since the number of deliveries following prior CS is increasing ⁽³⁷⁻⁴¹⁾

With prompt management by a qualified health practitioner working in a supportive atmosphere, the majority of maternal morbidities and fatalities can be avoided. The elimination of unnecessary maternal deaths must continue to be a key priority for the world. In prior CS mothers, it's crucial to prevent maternal morbidities and set them up for success. To guarantee that all women have access to respectful and excellent maternity care and outcomes, it is essential to address inequities that affect health outcomes, particularly those related to sexual and reproductive health and rights and gender. ⁽⁸⁾

One way we hunt for proof is through research. Researchers' knowledge-sharing aids in concentrating future research on discovering treatments for diseases or ways to improve quality of life. ⁽⁴²⁾ As far as we are aware, there hasn't been much research on the maternal outcomes of previous cesarean mothers in the Indian context. The creation of a risk-based approach to the treatment of individuals with this condition would benefit from an understanding of the variation and profile of different geographic, demographic, and clinical parameters as a function of disease outcomes. Numerous research has examined the impact of individual cesarean operations on placenta previa, bladder or bowel injury, and intra-abdominal adhesions, but most of these investigations have focused on the combined effects of cesarean sections. Additionally, a small percentage of patients having 5 or 6 cesarean sections are included in the majority of these researches. We designed our study to assess morbidity using a higher number of morbidity criteria in patients with a history of two or more cesarean procedures.

Therefore, as a backdrop, the primary goal of our research is to study the maternal and perinatal morbidity and mortality associated with previous 2 or more cesarean sections.

CHAPTER TWO

OBJECTIVES OF THE STUDY

- A. To study the maternal morbidity and mortality associated with previous 2 or more cesarean sections.
- B. To study the perinatal morbidity and mortality associated with previous 2 or more cesarean sections.

CHAPTER THREE

REVIEW OF LITERATURE AND BACKGROUND

A. Cesarean Section

➤ Introduction

The most frequent abdominal surgery for women today is a Cesarean section (CS). The frequency of cesarean deliveries varies greatly between countries and medical facilities, yet it is still on the rise globally. ^(43, 44) In this surgical technique, an incision is made in the abdominal and uterine walls, and the fetuses that have reached the end of their 28th week are delivered. This does not include the birth of a foetus that is resting freely in the abdominal cavity as a result of uterine rupture or in a subsequent abdominal pregnancy through an abdominal incision. A primary cesarean section is a term used to describe the initial procedure carried out on a patient. The procedure is known as a repeat cesarean section when it is carried out during subsequent pregnancies. ⁽⁴⁵⁾

➤ History

Since the dawn of human society, C-sections have been performed on living mothers and their children, according to stories from both Western and non-Western cultures. Apollo allegedly expelled Aesculapius, the creator of the renowned religion of religious medicine, from his mother's tummy in accordance with Greek mythology. Ancient Hindu, Egyptian, Greek, Roman, and other European folklore all have numerous allusions to cesarean sections. The treatment is depicted on women who appear to be alive in ancient Chinese etchings. When twins are born through cesarean section, primogeniture is forbidden by the Mischnagot and Talmud, and women who give birth surgically are exempt from the purification rites. ^(46, 47, 48) However, the early history of cesarean sections is still obscured by myth and has questionable veracity. Even the term "cesarean-origin" has reportedly changed through time. It is a widely held belief that Julius Caesar was born surgically, but this seems implausible given that his mother Aurelia is said to have lived to witness her son's invasion of Britain. In an effort to rescue the kid for a state looking to boost its population, the treatment was only carried out at a time when the mother was already dead or seriously ill. All women who were destined to give birth had to have a cesarean section, according to Roman legislation under Caesar. Other potential Latin roots include the verb "caedere," which means to cut, and the name "caesonius," which was used to refer to children born by postmortem procedures. However, we are ultimately unsure of how or when the term "cesarean" originated. Cesarean operations were called this until the sixteenth and seventeenth centuries. This started to alter once Jacques Guillimeau's treatise on midwifery, which originated the term "section," was published in 1598. After that, "section" increasingly took the place of "operation." ⁽⁴⁶⁻⁴⁸⁾



Fig 1 The Cesarean Section in Antiquity ⁽⁴⁶⁾

➤ *Incidence of Cesarean Section*

According to earlier research, as a country moves from a lower to a higher Human Development Index, there is a significant increase in the rate of C-sections in both developed and developing countries (HDI). But even within the HDI categories, it is clear that rates are steadily increasing. There isn't yet an internationally recognized C-section classification system that enables meaningful and pertinent comparisons of C-section rates across various institutions, regions, or cities. The 10-group classification (also known as the Robson classification) was one of the first C-section classification schemes, and it has recently gained popularity across many nations. According to the National Family Health Study (NFHS-4), 17% of live births in India in the five years prior to the survey were delivered via C-section. Additionally, it was revealed that 45% of C-section deliveries were scheduled following the start of labor pains (NFHS-4). In India, the prevalence of C-sections was 8.5% in NFHS-3, but figures from NFHS-4 indicate a rise to 17.2%. Thus, the rise over the past ten years has been close to 9%.⁽⁴⁹⁻⁵¹⁾

The number of C-section births has grown from 2015 to 2020, according to NFHS-5. The number of C-section births is high in more than half of the states. In the first round of the NFHS-5, 2019-2020, Telangana had the greatest percentage of C-section births, while Nagaland had the lowest percentage (5.2%). Kerala (42.4%), Andhra Pradesh (42.4%), Lakshadweep (31.3%), Jammu and Kashmir (41.7%), and Goa (39.5%) were the top five states with the highest C-section rates in the NFHS-5. Meghalaya (8.2%), Bihar (9.7%), Mizoram (10.8%), Assam (18.1%), and Himachal Pradesh (21.0%) were the five states with the lowest rates of C-section births.⁽⁵²⁾

➤ *Indications of Cesarean Section*

When vaginal delivery is deemed hazardous for the foetus or the mother, a cesarean delivery is performed. The indications often fall into two categories:

- Absolute
- Relative : Despite the substantial dangers to the mother and/or the infant, a vaginal birth may be achievable (More often multiple factors may be responsible)

Table 1 Indications of Cesarean Section⁽⁴⁵⁾

ABSOLUTE	RELATIVE
Central placenta previa	Previous CS : a) when primary CS was due to recurrent indication (b) Previous two CS (c) Features of scar dehiscence. (d) Previous classical CS
Contracted pelvis	Fetal distress, Dystocia
Pelvic mass causing obstruction	Malpresentation
Advanced carcinoma cervix	Bad obstetric history
Vaginal obstruction	Failed surgical induction
Primigravidae : Failed induction, Fetal distress, Dystocia, Malpresentation, CPD	Hypertensive disorders : pre-eclampsia, eclampsia
Multigravidae : Previous CS, Antepartum hemorrhage, Malpresentation	Medical disorders : Diabetes (uncontrolled), heart disease

➤ *Types of Cesarean Section*

There are two types of approaches in CS. They are :

- *Lower Segment Cesarean Section (LSCS) :*

In this procedure, the newborn is removed using a transperitoneal route using an incision in the lower section. Today's obstetrics only uses this technique, and unless otherwise stated, a cesarean section refers to a lower segment operation. In situations of infection, the extraperitoneal approach to the lower segment procedure is no longer used.

- *Classical CS :*

The baby is removed during this procedure through an incision made in the top part of the uterus. The procedure is only performed under forced circumstances, such as a lower segment approach that is difficult (due to extensive adhesions or a restricted pelvis), a dangerous lower segment approach (because to a large fibroid or a cancerous cervix), or a perimortem CS.⁽⁴⁵⁾

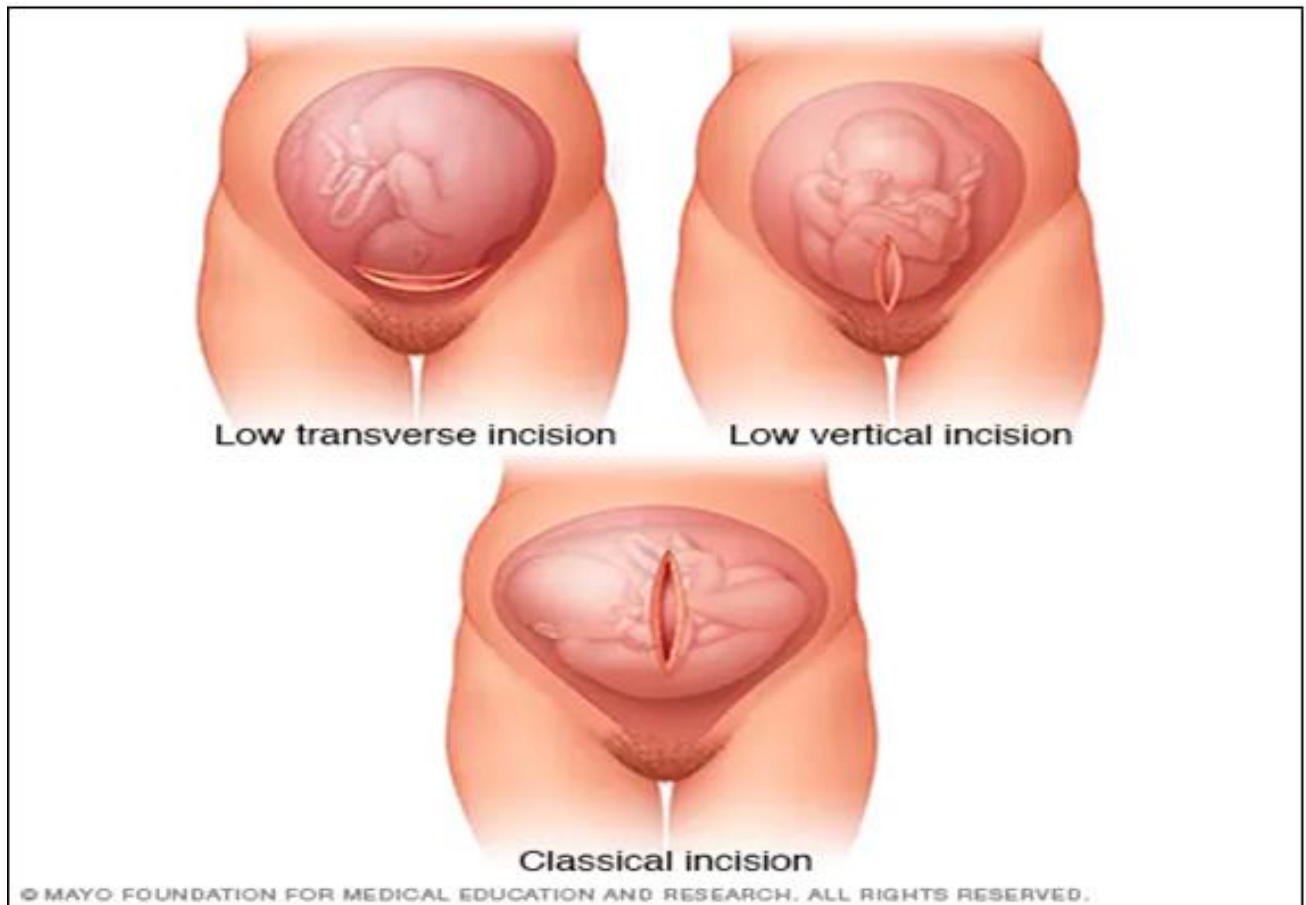


Fig 2 Types of C-Section Delivery Incisions on Uterus ⁽⁵³⁾

➤ *Complications of Cesarean section*

The CS is accompanied by a number of complications. As this brief history indicates, there have been many variations in the indications for cesarean sections throughout our historical record due to these complications. They have been influenced by changes in religion, culture, economy, profession, and technology, all of which have an impact on medical practice. The goal of the procedure was to save the soul, if not the life, of a foetus whose mother was or was close to passing away. However, there have always been sporadic attempts to preserve the mother, and during the nineteenth century, systematic advancements in cesarean section procedures eventually resulted in a decrease in both maternal and foetus mortality rates. In addition to situations where the mother's life was directly in danger, the surgery was increasingly done in situations where the mother's health was thought to be in danger. ⁽⁵⁴⁾

Both the surgical process and the anaesthesia are responsible for the difficulties. Both maternal and foetal problems might occur. Complications from CS have generally been divided into two categories.

- Intraoperative complications
- Postoperative complications

Table 2 Complications of Cesarean Section ⁽⁴⁵⁾

INTRAOPERATIVE	POSTOPERATIVE
Extension of uterine incision on both sides may lead to hemorrhage and hematoma	Postpartum hemorrhage
Uterine lacerations extend to the vagina	Shock
Bladder injury	Anaesthetic hazards
Ureteral injury	Infections
GastroIntestinal tract injury	Intestinal obstruction
Morbid adherent placenta	DVT and thromboembolic disorders
Hemorrhage	Wound complications
Other organ injuries	Late complications : Menstrual irregularities, Chronic pelvic pain, Incisional hernia, adhesions, bands

➤ *Previous Cesarean Section Delivery*

Those who have had a primary cesarean delivery must choose between having another one or trying out labor if they get pregnant again. There is now convincing evidence showing that more than half of patients can deliver vaginally following a cesarean operation without putting the mother or the foetus at great risk. Only individuals who have already undergone a lower-segment cesarean section should take this into consideration. Practically speaking, there is only one cesarean section kind, known as a lower segment procedure. Regarding post-operative complications, its nearly universal adoption has greatly increased the safety of cesarean sections. ^(55,56)

The tensile strength of a cesarean section scar and its behaviour to stretching, particularly during the final few weeks of pregnancy and labour, have not yet been precisely measured. The decision to deliver a baby vaginally after a cesarean operation confounds obstetricians, who are worried about dehiscence and rupture and the risks that come with those events. Therefore, in most maternity centers abroad and in some areas of our nation as well, the usual repeat section is the most prevalent indication of a cesarean section. The hazards to the mother and child as well as the possibility of uterine scar rupture during labour must be taken into consideration while deciding between vaginal and abdominal delivery. ⁽⁵⁷⁾

Patients who have previously had a cesarean section have the choice to proceed with a planned repeat cesarean section (PRCB) or a trial of labour after cesarean section (TOLAC) birth in a subsequent pregnancy. An unanticipated intrapartum cesarean birth or labour with vaginal birth (VBAC) may result from a planned TOLAC. ⁽⁵⁸⁾

The patient's personal preferences, obstetric history, information on the advantages and disadvantages of TOLAC versus PRCB, and the availability of TOLAC in the preferred birth environment must all be taken into account when choosing the mode of delivery. The likelihood of a successful VBAC, which can be calculated, and the risk of uterine rupture, which is low in patients with one prior low transverse incision, are the two main concerns that people have while making this decision. ⁽⁵⁸⁾

A trial of labour is offered to all patients if the initial cesarean section was performed for a one-time reason and the subsequent pregnancy's obstetrical state is normal close to the due date. Patients were deemed qualified for vaginal birth if they had an appropriate pelvis, a known history of a transverse lower uterine segment scar (as observed with LSCS), and a normal vertex presentation. In a study, Menon et al. found that lower segment sections had a scar rupture risk of only 1.8% compared to 5.6% for conventional sections. ⁽⁵⁹⁾

In a facility where it is possible to switch from trying a vaginal delivery to a cesarean section within a very short period of time, a trial of labour after a lower segment cesarean section should be tried. The obstetrician is required to be with the patient throughout the trial of labour and is also required to continuously check the foetal heart rate. Good uterine activity, early vertex engagement, progressive dilatation, and cervical effacement with head descent were all taken into consideration as indicators of a successful vaginal birth. The trial of labour should be abandoned and delivered via cesarean section if the earliest indication of foetal distress is observed, there is failure to progress, or if the requirements for vaginal delivery are not met ⁽⁵⁸⁻⁶¹⁾

➤ *Maternal and Perinatal Morbidities in Multiple Cesarean Section Delivery*

A woman's risk of repeat cesarean sections and feto-maternal problems in subsequent pregnancies is significantly higher if she has already had one. Numerous studies have found a link between cesarean birth and an elevated risk of difficulties in a subsequent pregnancy. However, excess risks were minimized when women who had really had issues in any of their previous births were excluded from the analysis. It is crucial to take into account obstetric history to obtain less biased results about the impact of cesarean birth on subsequent pregnancies. Your options for future deliveries may also be impacted by the number of C-sections you've undergone. After three or more prior C-sections, it is not advised to try labour on your own. Due to these issues, choosing how to deliver your next child after having a previous C-section might be difficult. ^(62,63)

The major maternal outcomes associated with previous cesarean section delivery are :

- *Uterine Rupture*

Uterine rupture is uncommon (in nations with abundant resources), but when it does happen, it frequently co-occurs with TOLAC and may be fatal. A potentially fatal pregnancy complication for both the mother and foetus is uterine rupture. The majority of uterine ruptures in resource-rich nations are linked to an attempt at labour following cesarean delivery (TOLAC). Uterine rupture is more likely in women who have had CS in the past. In certain affluent nations, the reported incidence of uterine rupture among women with past CS ranged from 0.22% to 0.5%. Prior classical incision, labour induction or argumentation, macrosomia, increasing maternal age, post-term birth, small maternal stature, no past vaginal delivery, and prior periviable CS are risk factors for uterine rupture in women with a history of CS. Negative consequences for mothers and babies are significantly more likely in cases of uterine rupture. Women with uterine rupture are more likely than women without uterine rupture to experience maternal and perinatal problems, such as severe post-hemorrhagic anaemia, serious puerperal infection, bladder injury, hysterectomy, and perinatal mortality. ⁽⁶⁴⁻⁶⁸⁾

- *Infections*

Maternal morbidity and mortality are still significantly attributed to puerperal infection. Although the overall risk of maternal infection for TOLAC and PRCB appears to be comparable, individual hazards differ depending on the therapeutic situation. For instance, intrapartum chorioamnionitis only poses a risk to patients who are in labour. In contrast to PRCB, (planned repeat cesarean delivery) VBAC had a lower frequency of postpartum infections, while intrapartum cesarean birth has the highest incidence. ^(69, 70)

- *Placental Abnormalities*

The risks of previa and abruption are higher in subsequent pregnancies if the initial birth was by cesarean section. The chance of previa increases with more prior cesarean deliveries, according to a dose-response pattern. Previa and abruption risks are elevated with a short interpregnancy period. ⁽⁷¹⁾ As a long-term effect of a previous cesarean delivery on subsequent births, several studies have discovered a somewhat elevated incidence of placental abruption and previa. ⁽⁷²⁾ Placenta increta, placenta percreta, and placenta accreta are all examples of the pathologic adhesion of the placenta that are included in the placenta accreta spectrum, formerly known as morbidly adherent placenta. The most popular theory for the cause of placenta accreta spectrum is that a problem with the endometrial-myometrial interface prevents normal decidualization in the vicinity of a uterine scar, allowing unusually deep placental anchoring villi and trophoblast infiltration. Severe and occasionally life-threatening haemorrhage, which frequently necessitates blood transfusion, can cause maternal morbidity and mortality. Clinical risk factors continue to be equally important as predictors of placenta accreta spectrum by ultrasound findings, despite the fact that ultrasound evaluation is important even in the absence of ultrasound findings. Placenta accreta spectrum is at risk for a number of causes. The frequency of placenta accreta spectrum rises with the number of prior cesarean deliveries, with a prior cesarean delivery being the most prevalent. ⁽⁷³⁾

- *Peripartum hysterectomy*

Women who have had at least one prior cesarean birth are more likely to experience issues including later-life hysterectomy and recurrent pregnancies. Many peripartum hysterectomies are performed due to placental attachment abnormalities, which are connected to previous cesarean births, rather than uterine rupture during TOLAC: Placenta previa and the placenta accreta spectrum are both at danger due to an increase in cesarean births. According to several researches, Compared to women giving birth vaginally who had never had a cesarean delivery, women who underwent a primary cesarean delivery were more likely to get a peripartum hysterectomy. Women who had a repeat cesarean delivery were likewise more vulnerable. Therefore, there is a higher chance of peripartum hysterectomy following primary and subsequent cesarean deliveries. ⁽⁷⁴⁾

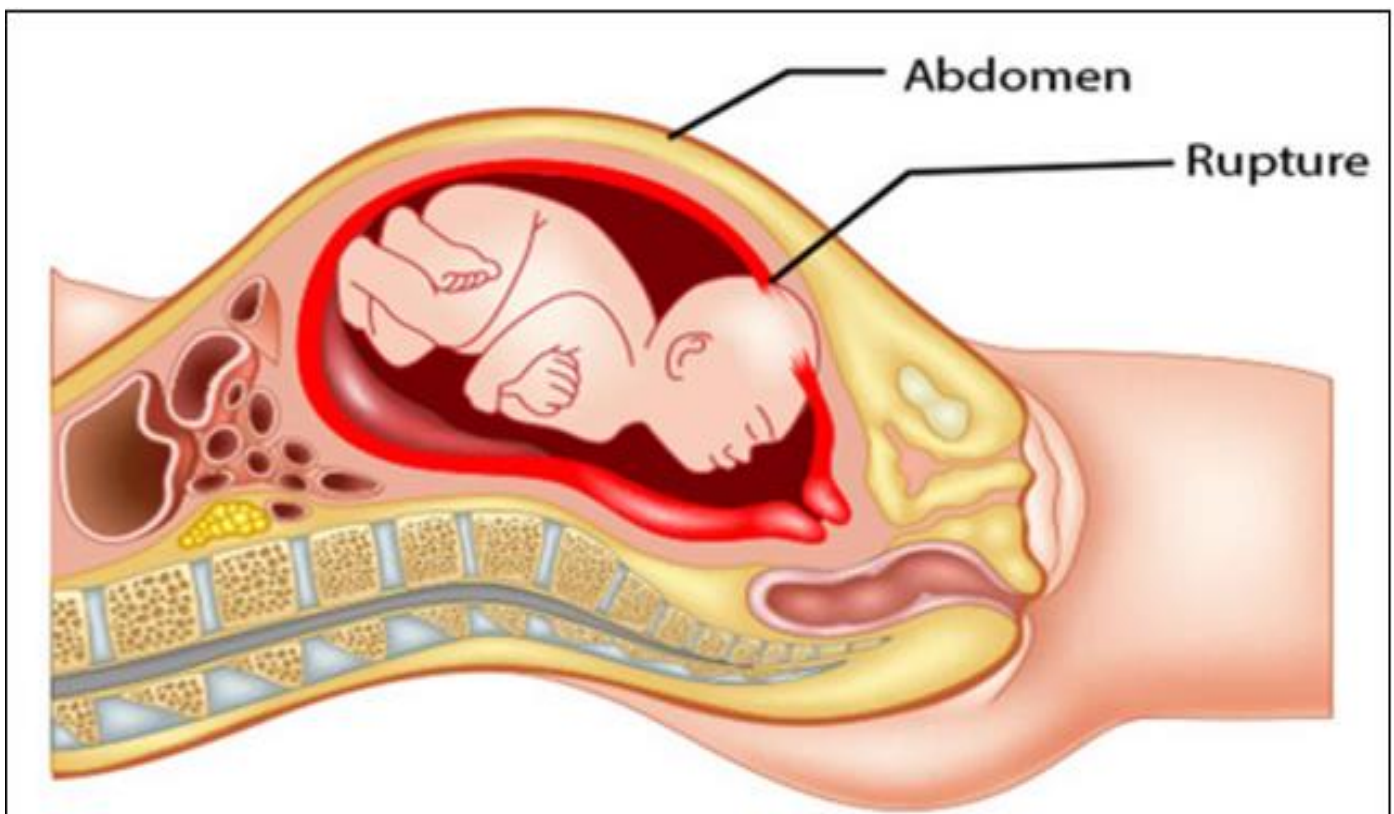
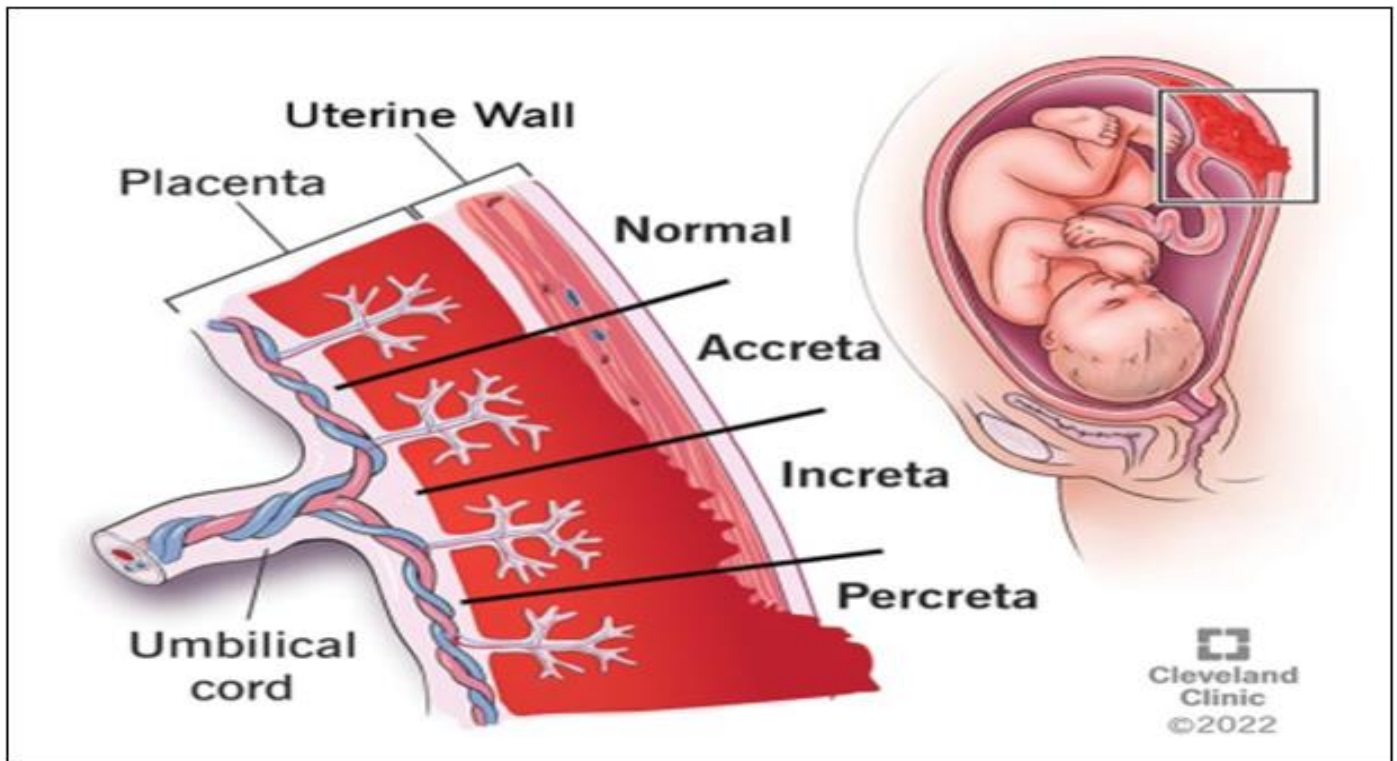


Fig 3 Uterine Rupture ⁽⁷⁵⁾

Fig 4 Placenta Accreta ⁽⁷⁶⁾

- *Pelvic Floor Disorders*

Future pelvic relaxation disorders are at danger just from being pregnant. The majority of the existing research indicates that vaginal birth has a greater impact on the development of pelvic floor diseases later in life than labour exposure. The absolute benefit compared to TOLAC is uncertain and does not seem to outweigh the hazards of PRCB, despite the fact that PRCB avoids the possible dangers and sequelae of pelvic trauma connected to vaginal birth. ^(58, 77)

- *Scar Dehiscence*

A prior cesarean section is the greatest risk factor for uterine scar dehiscence. Pregnant women with cesarean scars may benefit from improved preoperative diagnosis accuracy thanks to better characterization of the ultrasonographic features of uterine scar dehiscence. Uterine rupture will result from this scar dehiscence. ⁽⁷⁸⁾

- *Adhesions*

Adhesions are a mysterious illness with a wide range of clinical presentations; they are characterised by an aberrant fibrous attachment between two surfaces that are anatomically distinct. The rates of adhesion development were lower and ranged from 24% to 46% at a second cesarean section (CS), but they rose to 43% to 75% with a third CS and up to 83% at a fourth CS. Adhesiogenesis is the result of elevated extracellular matrix (ECM) synthesis, reduced matrix breakdown, and lowered fibrinolytic activity. Pregnancy-related physiological changes favour reduced fibrinolysis and a higher tendency for adhesion formation. If the woman has already undergone a cesarean section, adhesions will be more severe in subsequent pregnancies. The best possible care must be exercised in this situation ⁽⁷⁹⁾.

- *Perinatal and Neonatal Mortality*

Despite the fact that the absolute risk is very low, TOLAC had higher rates of perinatal and neonatal mortality than PRCB (perinatal mortality rate: 0.13 compared 0.05 percent; neonatal mortality rate: 0.11 versus 0.06 percent). cesarean delivery. In this case, ideal care must be exercised. ⁽⁵⁸⁾

- *Maternal Mortality*

The number of primary cesarean sections is rising, which means that more pregnant women are considering their options for delivery mode. The risks of severe maternal morbidity associated with an emergency cesarean delivery are higher than those associated with a scheduled cesarean delivery in women who have a history of prior CS, despite the fact that the absolute difference is minor. Women who are thinking about having an elective cesarean delivery, as well as their doctors, should weigh these risks. ⁽⁸⁰⁾

- *Transient Tachypnea of Newborn*

When compared to TOLAC, PRCB caused more newborns to have transient tachypnea (4.2 versus 3.6 percent). However, neonates born after TOLAC tended to utilise neonatal bag and mask ventilation more frequently than those delivered after PRCB (5.4 versus 2.5 percent).⁽⁵⁸⁾

- *Others*

Despite their rarity, these side effects of many cesarean section deliveries should be taken into consideration. Data were insufficient to establish the direction of risk for unfavourable neurologic outcomes, hypoxic-ischemic encephalopathy, sepsis, trauma, neonatal intensive care unit (NICU) admission, maternal intensive care unit admission, surgical injuries, and mother's requirement for blood transfusion. To further understand these risk variables, more research is required.^(58,81)



Fig 5 Postoperative Adhesions Following CS ⁽⁸²⁾

➤ *Risk of Adverse Maternal and Neonatal Outcomes by Mode of Delivery*

Table 3 Risk of Adverse Maternal and Neonatal Outcomes by Mode of Delivery ^(58, 81)

OUTCOME	RISK (after prior multiple CS)	
	Vaginal delivery	Cesarean delivery
Maternal & neonatal		
Overall morbidity	8.6%	9.2%
Overall mortality	0.9%	2.7%
Maternal mortality	3.6 %	13.3%
Amniotic fluid embolism	3.3-7.7%	15.8%
Third degree or fourth degree perineal laceration	1-3%	Nil
Uterine rupture	0.47%	0.026%
Hysterectomy	0.17%	0.28%
Transfusion	0.9%	1.2%
Infection	4.6%	3.2%
Surgical injury	Insufficient data available	
Hemorrhage	Insufficient data available	
Placental abnormalities	Increased with prior cesarean delivery versus vaginal delivery, and risk continues to increase with each subsequent cesarean delivery.	
Urinary incontinence	No difference between cesarean delivery and vaginal delivery at 2 years.	
Postpartum depression	No difference between cesarean delivery and vaginal delivery.	
Neonatal Laceration	NA	1-2%
Respiratory morbidity	<1%	1-4%
Shoulder dystocia	1-2%	0%

B. Literature Review:-

In this study, we are assessing the perinatal and maternal outcomes related to prior two or more cesarean sections. Since the study is based on a operation technique modality that requires technical and surgical support, there have been fewer high-quality studies conducted in the area. For more information, we are still attempting to include studies that are comparable to the goals of our study.

Kshama Vishwakarma et al conducted a study on the maternal and perinatal outcomes of deliveries in Indian women who had previously undergone one or more cesarean sections. It was a 12-month prospective research that was conducted. The study recruited 979 pregnant women who had previously undergone cesarean sections. The success rate for VBAC was 65.69%. Fetal discomfort and failure to progress were the two most typical causes of recurrent cesarean sections. Repeat cesarean section patients experienced significantly greater post-operative maternal and newborn problems. Compared to the VBAC group, the incidence of infectious morbidity was also greater in the repeat cesarean group. The most frequent intraoperative complications were adhesions (10%), thinning out of the LUS (LUS), vascular LUS, and scar dehiscence. The study found that foetal morbidity and mortality resulting from labour trials are comparable to those caused by women giving birth without a scar; hence, labour trials may be recommended. The ideal method for managing prior one or two CS is to give women a trial of labour while carefully monitoring them and take them for emergency LSCS on the smallest possible signal. ⁽⁸³⁾

Furthermore, *C. Kabore et al.* conducted a related study. Those with a TOLAC had significantly greater chances of hospital-based maternal complications (adjusted odds ratio (OR) 1.52; 95% confidence interval (CI) 1.09-2.13; P = 0.013) and perinatal mortality (adjusted OR 4.53; CI 2.30-9.92; P 0.001) than women with an ERCS. Although these differences were not significant when limited to low-risk women (adjusted OR 1.13; 95% CI 0.75-1.86; P = 0.53 for each outcome, respectively), they were when all women were considered. Comparatively, 25 (0.64%) of 3885 low-risk women and 70 (1.66%) of 4198 women with adverse risk characteristics experienced uterine rupture. According to the study's findings, low-risk women do not have an elevated risk of maternal complications or perinatal mortality when compared to women who have one or more risk factors. ⁽⁸⁴⁾

In the interim, in rural Rwanda, *Richard Kalisa et al.* conducted study on the maternal and perinatal outcomes following prior cesarean sections. 435 (11%) of the 4131 women who arrived for delivery had scarred uteri. 297/435 women (68.3%) experienced TOLAC, which frequently began without the proper counselling at home or in health centres, whereas 138 women (31.7%) underwent Elective Repeat CS. In 134/297 (45.1%) women, TOLAC was successful. There were no fatalities of mothers. AOR (adjusted odds ratio) 1.4 (95% CI 1.2-5.4): Twenty-eight of the 435 women with scarred uteruses (6.4%) experienced severe acute maternal morbidity (puerperal sepsis, postpartum haemorrhage, uterine rupture), which was more common in women with TOL (n = 23, 7.7%) than in women with ERCS (n = 5, 3.6%). Between women who had TOL (n = 64/297; 21.5%) and those who delivered by ERCS (n = 35/138; 25.4%: AOR 0.8; CI 0.5-1.6), there was no difference in neonatal hospitalizations. Perinatal hypoxia was the primary cause of hospitalizations, and it happened more frequently in newborns whose mothers underwent TOL (n = 40, 13.4%) than in those who were delivered via ERCS (n = 15, 10.9%; AOR 1.9; CI 1.6-3.6). Infants whose mothers had TOL (n = 8; 27/1000 ToLs) and infants whose moms received ERCS (n = 4; 29/1000 ERCSs) both experienced similar rates of perinatal mortality. According to the study, a sizable percentage of women giving birth in a rural hospital in Rwanda had uteri that were scarred. The TOL group had a greater rate of severe acute maternal morbidity, but perinatal death was similar ⁽⁸⁵⁾ Simultaneously, research similar to our goal was conducted by *Mark B. Landon et al.* 124 women who underwent a trial of labour experienced symptoms of uterine rupture (0.7 percent). No babies born to women who underwent an elective repeated cesarean delivery and 12 babies born at term to mothers who completed a trial of labour experienced hypoxic-ischemic encephalopathy (P 0.001). Seven of these cases of hypoxic-ischemic encephalopathy, including two infant fatalities, were caused by uterine rupture (absolute risk, 0.46 per 1000 women at term undergoing a trial of labour). Women who tried labour had greater rates of endometritis (2.9 percent vs. 1.8 percent) and blood transfusions than women who repeatedly had elective cesarean deliveries (1.7 percent vs. 1.0 percent). There were no appreciable differences in the prevalence of hysterectomy or maternal deaths across the groups (0.2 percent vs. 0.3 percent, and 0.02 percent vs. 0.04 percent, respectively). ⁽⁸⁶⁾

Concurrently, In a paper titled "Pregnancy outcomes of women having prior cesarean sections: Secondary analysis of World Health Organization Multicountry Survey on Maternal and Newborn Health," *Chumnan Kietpeerakool, Pisake Lumbiganon, et al.* An elevated risk of uterine rupture was linked to prior CS (adjusted Odds Ratio (aOR); 7.74; 95% confidence interval (CI) 5.48, 10.92); a morbidly adherent placenta (aOR 2.60; 95% CI 1.98, 3.40); Maternal Near Miss (aOR 1.91; 95% CI 1.59, 2.28); SMO (aOR 1.80; 95% CI 1.52, 2.13); and a site Prior CS was linked to higher odds of NICU admission (aOR 1.31; 95% CI 1.23, 1.39), neonatal near miss (aOR 1.19; 95% CI 1.12, 1.26), preterm delivery (aOR 1.07; 95% CI 1.01, 1.14), and lower odds of macerated stillbirth (aOR 0.8). Overall, the most frequent unfavourable maternal outcomes were placenta previa (5.1 per 1,000 women), maternal near miss (5.5 per 1,000 livebirths), and severe maternal outcome (6.5 per 1,000 livebirths). A total of 161 maternal deaths occurred, resulting in a ratio of 0.9 per 1,000 live births. As the frequency of prior CS increased, so did the risks of MNM, SMO, placenta previa, and morbidly adherent placenta in subsequent pregnancies. The likelihood of poor newborn outcomes and the number of prior CS did not significantly differ in their amount of connection. The study came to the conclusion that past CS was linked to significant morbidity in subsequent pregnancies. The absence of information on signs of prior CS, however, should be taken into consideration when interpreting these findings. ⁽⁸⁷⁾ Researcher *Kenichiro Motomura et colleagues* were interested in the prevalence and consequences of uterine rupture among women who had previously undergone cesarean sections. Data on

deliveries from 359 facilities in 29 countries were analysed as part of the World Health Organization Multicountry Survey on Maternal and Newborn Health. Women having at least one prior CS had a 0.5% (170/37,366) incidence of uterine rupture, with rates ranging from 0.2% in high-HDI countries to 1.0% in low-HDI nations. Giving birth in medium- or low-HDI countries (adjusted odds ratio [AOR] 2.0 and 3.88, respectively), lower maternal education level (6 years) (AOR 1.71), spontaneous labour beginning (AOR 1.62), and gestational age at birth 37 weeks were all factors that were significantly associated with uterine rupture (AOR 3.52). The risk of maternal death (AOR 4.45) and perinatal death was considerably higher in women with uterine rupture (AOR 33.34). The study came to the conclusion that women with prior CS are more likely to experience uterine rupture and negative outcomes, especially in environments with minimal resources. They recommended that more research be done on preventative and management techniques in these circumstances⁽⁸⁸⁾

Besides, A comprehensive review on the effects of multiple cesarean births on maternal morbidity was conducted by *Nicole E. Marshall et al.* They included 21 studies (2,282,922 deliveries) in their analysis. With more cesarean deliveries, there were more hysterectomy cases, blood transfusions, adhesions, and surgical injuries. From 10 per 1000 pregnancies with one prior cesarean delivery to 28 per 1000 deliveries with three or more cesarean deliveries, the prevalence of placenta previa increased. Women with previa and 3 cesarean deliveries had a statistically significant higher risk of accreta (3.3-4% vs 50-67%), hysterectomy (0.7-4% vs 50-67%), and composite maternal morbidity (15% vs 83%; odds ratio, 33.6; 95% confidence interval, 14.6-77.4) compared to those with previa and no prior cesarean deliveries. The study came to the conclusion that as the frequency of prior cesarean deliveries increased, serious maternal morbidity also increased.⁽⁸⁹⁾

Further, Maternal morbidity related to several repeat cesarean births was the subject of a study by *Robert M. Silver et al.* There were at least six cesarean sections performed: 6,201 first (primary), 15,808 second, 6,324 third, 1,452 fourth, 258 fifth, and 89 sixth. With more cesarean deliveries, there was a significant increase in the risks of placenta accreta, cystotomy, bowel injury, ureteral injury, and ileus, as well as the need for postoperative ventilation, intensive care unit admission, hysterectomy, blood transfusion requiring 4 or more units, and the length of the operation and hospital stay. 15 (0.24%), 49 (0.31%), 36 (0.57%), 31 (2.13%), 6 (2.33%), and 6 (6.74%) of the women having their first, second, third, fourth, fifth, or more cesarean deliveries, respectively, had placenta accreta. In 40 (0.65%) first, 67 (0.42%) second, 57 (0.90%) third, 35 (2.41%) fourth, 9 (3.49%) fifth, and 8 (8.99%) sixth cesarean deliveries or more, hysterectomy was necessary. For the first, second, third, fourth, and fifth or more repeat cesarean births, respectively, the probability for placenta accreta in the 723 previa patients was 3%, 11%, 40%, 61%, and 67%. According to the study's findings, since serious maternal morbidity rises steadily with the number of cesarean deliveries, the number of intended pregnancies should be taken into account when counselling patients about whether to have an elective repeat cesarean operation rather than try labour or when weighing the benefits of an elective primary cesarean delivery.⁽⁹⁰⁾

Furthermore, *Victoria Nisenblat et al.* conducted a similar study. They discovered that the multiple-cesarean group had significantly higher rates of excessive blood loss (7.9% versus 3.3%; P .005), challenging neonatal delivery (5.1% versus 0.2%; P .001), and dense adhesions (46.1% versus 25.6%; P .001). The multiple-cesarean group had a higher rate of placenta accreta (1.4%) and hysterectomy (1.1%) but not substantially higher rates. The percentage of women who experienced any major complications increased with the delivery index number: 4.3% for a second cesarean delivery, 7.5% for a third, and 12.5% for a fourth or more (P for trend =.004). This percentage was higher in the multiple-cesarean group, 8.7% versus 4.3% (P =.013). According to the study's findings, compared to a second scheduled cesarean delivery, many cesarean deliveries are linked to more difficult surgery and higher blood loss. The frequency of cesarean deliveries increases the risk of serious consequences.⁽⁹¹⁾ Meanwhile, *William A. et al.* focused at the outcomes of pregnancies for women with placenta previa in relation to the number of prior cesarean deliveries. With more prior cesarean deliveries, several markers of maternal morbidity (such as coagulopathy, hysterectomy, and pulmonary edoema) occurred more frequently. The risk of an adverse maternal outcome (a composite of transfusion, hysterectomy, operative injury, coagulopathy, venous thromboembolism, pulmonary edoema, or death) increased by even one prior cesarean delivery from 15% to 23%, which, in multivariable analysis, corresponded to an adjusted odds ratio of 1.9(95% confidence interval 1.2-2.9). On the other hand, the number of past cesarean deliveries had no effect on gestational age at delivery or severe neonatal outcomes (a composite measure of respiratory distress syndrome, necrotizing enterocolitis, intraventricular haemorrhage grade 3 or 4, seizures, or death). According to the study, among women who have had a placenta previa, having more prior cesarean deliveries is linked to an increase in maternal morbidity but not perinatal morbidity.⁽⁹²⁾

At the same time, *Robert M. Silver et al* conducted studies on the long-term effects of deliveries after prior cesareans. They contend that women who had a cesarean delivery are also more likely to experience chronic issues. There may be an increased risk of infertility or subfertility as well as perinatal difficulties in subsequent pregnancies, in addition to pain and surgery adhesions. They discovered that a significantly elevated risk for life-threatening bleeding and morbidity in the presence of placenta accreta is the most serious concern for women who undergo numerous repeat cesarean births.⁽⁹³⁾ Likewise, Long-term maternal morbidity related to subsequent cesarean deliveries was the subject of research by *Erin A. S. Clark et al.* Observational data from the study indicates that as the number of cesarean deliveries rises, so does the risk of morbidity. The placenta accreta spectrum condition and its consequences are the main maternal risk in subsequent pregnancies. The main risk factor for this illness is a history of multiple cesarean deliveries. Pregnancies after cesarean delivery also carry a higher risk of premature birth, stillbirth, impaired foetal growth, and other types of aberrant placentation. Pelvic discomfort and adhesions are chronic maternal morbidities linked to cesarean birth. Reduced fertility, an increased incidence of spontaneous abortion, and ectopic pregnancy are only a few examples

of the negative consequences on fertility. The study indicated that while choosing the delivery method for the first and future deliveries, doctors and patients should be aware of the long-term hazards connected to cesarean delivery. ⁽⁹⁴⁾

At the same time, *Turki Gasim and colleagues* conducted a study with comparable objectives. The research patients had longer operating times ($p = 0.0001$) due to significant adhesions ($p = 0.0005$), with greater blood loss and blood transfusion ($p = 0.0001$) in the case control study involving past repeated cesarean birth cases and others. Significant findings in the research group included uterine rupture ($p = 0.0015$), placenta previa ($p = 0.0372$), gestational age at delivery ($p = 0.0002$), preterm birth ($p = 0.0497$), and Apgar scores 7 at 5 minutes ($p = 0.0140$). Placenta accreta, bladder and bowel damage, cesarean hysterectomy, wound infection, and postoperative pyrexia did not differ significantly between the two groups. In the series, no mothers succumbed. Women who had $>$ or $=$ 4 cesarean births had a greater likelihood of a single significant complication ($p = 0.0011$). The study came to the conclusion that patients who undergo repeated cesarean sections are at higher risk for uterine rupture and intraoperative complications. The total number of repeat cesarean deliveries has no set upper limit. Patients must be urged to have tubal ligation and told of the dangers of multiple cesarean sections. ⁽⁹⁵⁾ The maternal outcomes of multiple cesareans were the subject of decision-analytic future study by *Karla N. Solheim et al.* They discovered that by 2020, 56.2% of deliveries will be by cesarean section, and there will be an additional 6236 placenta previas, 4504 placenta accretas, and 130 maternal fatalities annually if primary and secondary cesarean rates continue to climb as they have in recent years. The increase in cesareans will increase faster than the increase in these complications by about 6 years. The study came to the conclusion that if cesarean rates keep rising, placenta previa, placenta accreta, and maternal deaths will all occur more frequently each year. ⁽⁹⁶⁾

Furthermore, According to a study conducted at *NIMS Medical College in Rajasthan*, the incidence of adhesions was 38% in first repeat cesarean sections and 72% in second repeat cesarean sections. Both the first and second repeat cesarean deliveries had a 5% haemorrhage rate. Scar dehiscence increased from 2% in the first repeat cesarean section to 7% in the second. Contracted pelvis, placenta previa, malpresentations, and prior two or more cesarean sections were all indications for elective repeat cesarean sections. Fetal distress (26%) and CPD (%) were among the reasons for emergency repeat cesareans in that research, along with malpresentation (10%), meconium-stained liquor (10%), and foetal distress (6%). Dense adhesions were the most frequent complication (35.5%) in the previous two cesarean sections. Other complications included a thinned out lower segment (16.6%) and a ruptured uterus (1.1%). Dense adhesions were the most frequent complication (35.5%) in the previous two cesarean sections. Other complications included a thinned out lower segment (16.6%) and a ruptured uterus (1.1%). With 3 or more cesarean operations, the incidence of aberrant placentation was higher (2%) than with the prior 2 cesarean sections. Adhesion between the bladder and the uterus was the most prevalent form, followed by that between the parietal peritoneum and the front surface of the uterus. Infection of the wound occurred 3% of the time with the first repeat cesarean section and 10% of the time during the second. ⁽⁹⁷⁾

Meanwhile, A study on the short-term effects of numerous cesareans on mothers was conducted by *Mona T. Lydon-Rochelle et al.* In comparison to an elective repeat cesarean delivery, a successful trial of labour offers several distinct, consistently reproducible benefits to women who have already had a cesarean section. These benefits include a decreased risk of hysterectomy, a decreased risk of thromboembolic events, a decreased need for blood transfusions, and a shorter hospital stay. A longer hospital stay, higher uterine rupture, hysterectomy, surgical damage, blood transfusion, and endometritis are all risks associated with emergency cesarean in women who have had more than two previous cesarean sections. ⁽⁹⁸⁾ Adhesions and perioperative complications of repeat cesarean delivery were the subjects of research by *Deirdre J. Lyell et al.* According to the study, a previous cesarean section is linked to a number of maternal morbidities. These dangers, according to their observations, include hysterectomy, prolonged operations, prolonged hospital stays, increased adhesions, infections and wound complications, bleeding, intestinal damage, and blockage. ⁽⁹⁹⁾

Furthermore, *Mustafa Kaplanoglu et al.* conducted research on the maternal morbidity effects of repeated repeat cesarean procedures in southern Turkey. According to the number of cesarean sections, the patients were classified into 5 groups, and the maternal and neonatal outcomes of the groups were retrospectively assessed. Maternal age, education level, length of hospital stay, length of surgery, presence of dense adhesions, bowel and bladder injury, presence of placenta previa, need for hysterectomy, need for blood transfusions, and requirement for intensive care were found to be statistically different between the groups ($p < 0.05$). Placenta accreta (OR, 12.2; 95% CI, 3.9-37.8) and placenta previa (OR, 11.7; 2.6-53.2) were discovered to be significant risk factors for the requirement of hysterectomy. For the majority of the significant problems, a critical level of 4 or more cesarean sections was determined. The investigation came to the conclusion that severe maternal problems are occurring with an increase in cesarean sections. The importance of four or more cesarean sections is very crucial. Relative complications must be reduced, which calls for fewer cesarean sections. ⁽¹⁰⁰⁾ *F. W. Makoha et al.* conducted a five-year study from 1997 to 2002, analysing the morbidity associated with multiple cesarean sections. According to every parameter looked at, morbidity increased with each subsequent CS up until the third CS. The risk of major morbidity was, however, significantly higher with the fifth CS than with the third, and it was much worse at the sixth CS for placenta previa (odds ratio [OR]=3.8, 95% confidence interval [CI]=1.9-7.4), placenta accreta (OR=6.1, 95% CI=2.0-18.4), and hysterectomy (OR=5.9, 95% CI=1.5-24.4). However, the probability of significant morbidity for placenta previa (OR=1.4, 95% CI=0.8-2.2), placenta accreta (OR=1.0, 95% CI=0.3-2.9), and hysterectomy (OR=0.3, 95% CI=0.0-2.7) was the same for the third and fourth cesarean sections. The third CS does not establish a threshold for greater risk to the mother, according to the study's conclusion. Instead, with each additional CS, the

overall morbidity continues to increase. The fourth CS provides the same risk as the third in terms of significant morbidity from the triad of placenta previa, placenta accreta, and hysterectomy during CS. ⁽¹⁰¹⁾

Concurrently, In a study titled Outcomes and Complications After Repeat Cesarean Sections, *Khalid A. Alshehri, Ahmed A. Ammar, et al* done a research. In order to perform this case-control study, records of all women who had undergone numerous cesarean sections between 2013 and 2018 were examined. The 394 women in their study case group with four or more cesarean sections. 394 people made up the control group as well. In all, 788 patients participated in our study. With a significant increase in the number of both moderate and severe adhesions in the study group compared to the controls and a p-value of 0.001, we discovered that adhesions were the most frequent complications in our study group. The study came to the conclusion that having more cesarean sections increases the chance of problems. Adhesions and intraoperative haemorrhage were the two problems that affected our research group the most frequently. ⁽¹⁰²⁾ In a 2012 study at *Rajiv Gandhi University of Health Sciences in Bangalore*, it was shown that repeat cesarean procedures had a wide range of intraoperative problems (43%). The most common age range for problems was 20 to 29 years old.(44.4%). Adhesions were the most frequent condition (41.1%), followed by a thinned-out lower segment (17.11%), haemorrhage (4.81%), aberrant placentation (3.7%), extension of the uterine incision (2.67%), scar dehiscence (2.13%), and bladder injury (0.53%). Scar rupture, bowel damage, and cesarean hysterectomy cases were nonexistent. The operative time of a cesarean delivery with complications were longer , when compared to those with no complications ⁽¹⁰³⁾

Similar to this, Multiple repeat cesarean sections, their complications, and outcomes were the subject of a solid study by *Adekunle Sobande et al*. Regarding the mean maternal age, parity, gestation at delivery, and surgeon experience, there were statistically significant variations between the two groups (P 0.05). 38 (32.9%) and 186 (72.6%) of the patients in groups 1 and 2 underwent CS as an emergency, respectively (P 0.05). 215 (84.6%) of the patients who had already undergone CS had the consultant participate in the decision to undertake CS. The type of skin incision, the presence of dense adhesions during surgery, and bladder injury were significantly different between the two groups (P 0.05). The study concluded that Women having a history of three or more prior CS had a greater prevalence of dense intra-abdominal adhesions and bladder damage than women with only one prior CS. Both cesarean hysterectomy and placenta previa occurred equally frequently in each group, and wound dehiscence and uterine rupture were infrequent. ⁽¹⁰⁴⁾ Meanwhile, *H A Alchalabi et al*. conducted a comparable study in Jordan. The medical files of 1739 individuals who underwent cesarean deliveries were examined. It showed that patients with placenta praevia and a prior cesarean section had a 14-fold higher probability of undergoing a cesarean hysterectomy than patients with placenta praevia and no prior cesarean section. With more prior cesarean sections, the likelihood of a cesarean hysterectomy increased. The risk of blood transfusion was significantly higher for those who had had three or more prior cesarean procedures. Compared to women having their first cesarean section, those who had three or more prior cesarean sections were more likely to experience post-operative pyrexia ⁽¹⁰⁵⁾

Meanwhile, The effect of maternal and foetal outcome in recurrent CS was examined by *Hussein S. Qublan et al*. Women who had more than three cesarean deliveries exhibit a substantial increase in terms of prolonged operating time, uterine scar dehiscence, uterine rupture, placenta previa, placental adherence, and mild adhesion formation as compared to those who had one or two cesarean deliveries. In terms of damage to adjacent tissues, the requirement for blood transfusion, anaesthetic complications, hematoma development, thromboembolism, and incisional hernia, we did not find any differences between the 3 study groups that were statistically significant. The three groups were comparable in terms of Apgar score >7 at one and five minutes, neonatal intensive care unit, multiple pregnancy rate, early delivery rate, and perinatal mortality rate. According to the study, women who have had more than three cesarean deliveries are considerably more likely than those who have only had one or two to experience uterine scar rupture and aberrant placentation in their subsequent pregnancies. Despite this, patients who underwent lower-order cesarean sections had different maternal and newborn outcomes. ⁽¹⁰⁶⁾

A study by *Hacer Uyanikoglu et al*. had a comparable goal. 58 (48.3%) patients had several cesarean sections that totaled four or more, compared to 62 (51.7%) patients who had undergone three cesarean sections. Comparatively to the other group, patients who had four or more prior cesareans experienced a higher rate of intra-abdominal adhesions. There was no discernible difference between the two groups in terms of gestational weeks, neonatal admission rate, cesarean hysterectomy incidence, uterine scar rupture, placenta previa with placental invasion anomalies, bladder and bowel injuries, peripartum haemorrhage incidence, or blood transfusion rate. Contrary to other research, this one found that patients who had four or more prior cesareans did not have a higher risk of maternal problems, with the exception of intra-abdominal adhesions. ⁽¹⁰⁷⁾ Similar research was conducted on the sequelae of repeated cesarean sections by *M. H. Soltan et al*. Dense adhesions were strongly related with four or more prior cesarean operations. Contrarily, the number of cesarean sections was unaffected or barely influenced by height, parity, antenatal clinic attendance, postoperative problems, foetal weight, or foetal prognosis. According to the study's findings, single cesarean sections often carry no additional risks that are associated with repeat cesarean operations. The study's findings were unique from those of earlier studies. ⁽¹⁰⁸⁾

CHAPTER FOUR MATERIALS AND METHODS

- *Study Design:*
Prospective observational study.
- *Study Setting:*
Department Of O B G, Government Medical College, Kozhikode
- *Period of Study:*
1 year (from August 2021 To July 2022).
- *Sample Population:*
Pregnant women with history of previous 2 or more cesarean sections who are been admitted in ward and labour room , above 34 weeks of gestation, including both elective and emergency admissions.
- *Sample Size:*
From a study by Suhasini ⁽¹⁰⁹⁾, 41.1% of the study population had adhesions intraoperatively. Expecting similar results , the minimum sample size required by the formula $n=4pq/d^2$, where $d=20\%$ of p , is 143. Hence calculated to 200 patients.
- *Inclusion Criteria:*
All pregnant women with history of previous 2 or more cesarean sections, irrespective of age and parity, with gestational age more than 34 weeks who were admitted in IMCH Kozhikode both elective and emergency.
- *Exclusion Criteria:*
Women who have undergone other abdominal surgeries.
- *Method:*
Patients are selected according to the inclusion criteria, excluding those who are not willing to participate in the study and those who have already had a previous abdominal surgery other than cesarean section. A proforma was designed for each patient.
- After getting written informed consent detailed history was taken, followed by general and obstetric examination.
- Antenatal history and problems addressed during antenatal period, intraoperative and postoperative period was collected.
- This is a prospective observational study conducted in women with 2 or more repeat cesarean sections. The particular difficulties we encounter while operating a repeat cesarean section was meticulously noted. The collected data was analyzed for the nature of the intraoperative complications. The observed intraoperative complications were analyzed and categorized in relation to age, parity, number of cesarean sections, indication for cesarean sections for both previous and present.
- The routine investigations like hemoglobin , blood grouping and rhesus typing, urine for albumin, sugar and microscopy was done.
- Antenatal ultrasound was done to assess the placental location and to exclude any placenta accreta spectrum.
- On admission, gestational age was confirmed by available parameters.
- Obstetric examination was done.
- To note fundal height.
 - Uterine activity.
 - Signs of scar tenderness/dehiscence.
 - Presentation, lie, position of the fetus.

During vaginal examination dilatation and effacement of cervix, position and station of presenting part, presence of membrane, colour and smell of the liquor, pelvic assessment for cephalopelvic disproportion was done .

The indication for cesarean section has been noted .

Type of anaesthesia, intraoperative details, complications and its management has been analysed .

Presence of paediatrician at the time of cesarean section was confirmed.

Post operative monitoring and complications were noted and analysed.

Neonatal complications were noted.

Collected data has been analysed and statistical analysis was performed.

Quantitative variables include maternal age at delivery, gestational age at delivery, BMI ,duration of hospital stay, preoperative and postoperative hemoglobin levels ,number of blood transfusions if required , post transfusion Hb, birth weight of the baby, APGAR score at 1' and 5' was calculated using mean , median and standard deviation.

➤ *Data Analysis:*

The data was entered in MS-excel worksheet and analyzed by SPSS 23. The test used were Chi square test and Fishers exact test to find out the relationship between variables. p value < 0.05 was taken as significant.

➤ *Results:*

Were tabulated and discussed

➤ *Ethical Considerations:*

- Informed written consent in Malayalam was taken from all patients.
- Study was commenced only after receiving approval from the Institutional Research Committee and Institutional Ethics Committee.
- Only routine and case-specific investigations were sent for the patient.
- Patient can any time withdraw from the study and this shall in no way affected the further standard of care the patient requires.
- No financial burden was incurred by the patient as part of the study.
- Strict confidentiality was ensured and maintained throughout the study.

CHAPTER FIVE RESULTS

➤ *Age Distribution*

Table 4 Age Distribution

	Frequency	Percent
<20 YEARS	9	4.5
21-30 YEARS	116	58.0
31-40 YEARS	72	36.0
>41 YEARS	3	1.5
TOTAL	200	100.0

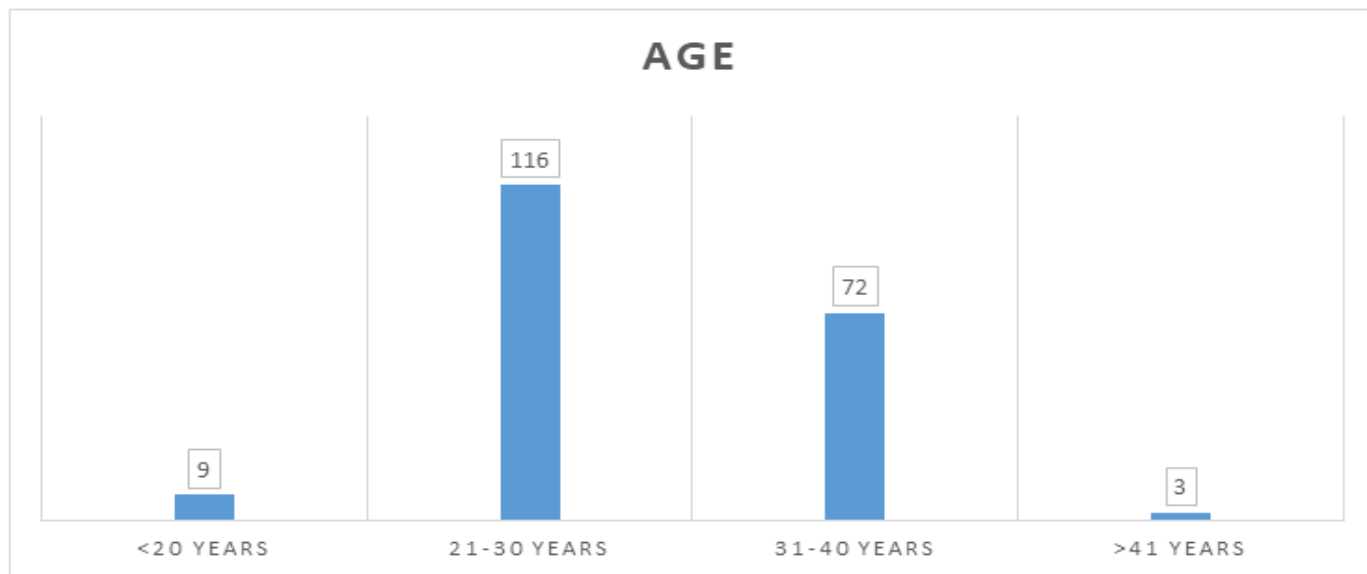


Fig 6 Age Distribution

The present study has got majority of participants from 21–30-year age group (58.0%) followed by 31-40 years group (36.0%). Those below 20 and above 40 were comparatively less.

➤ *Religion*

Table 5 Religion

	Frequency	Percent
HINDU	47	23.5
MUSLIM	153	76.5
TOTAL	200	100.0

76.5% of the study population belonged to the Muslim community and the rest 23.5% Hindu community.

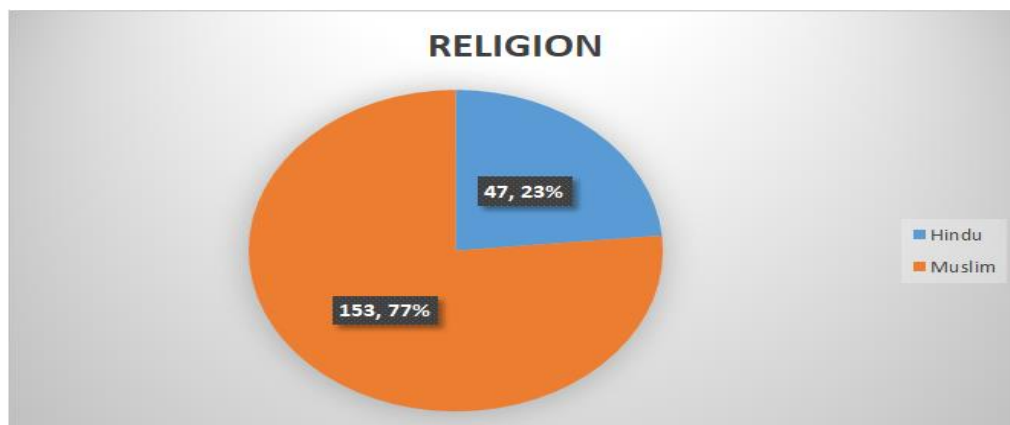


Fig 7 Religion

➤ *Type of Visit*

Table 6 Type of Visit

	Frequency	Percent
BOOKED	160	80.0
REFERRED	40	20.0
TOTAL	200	100.0

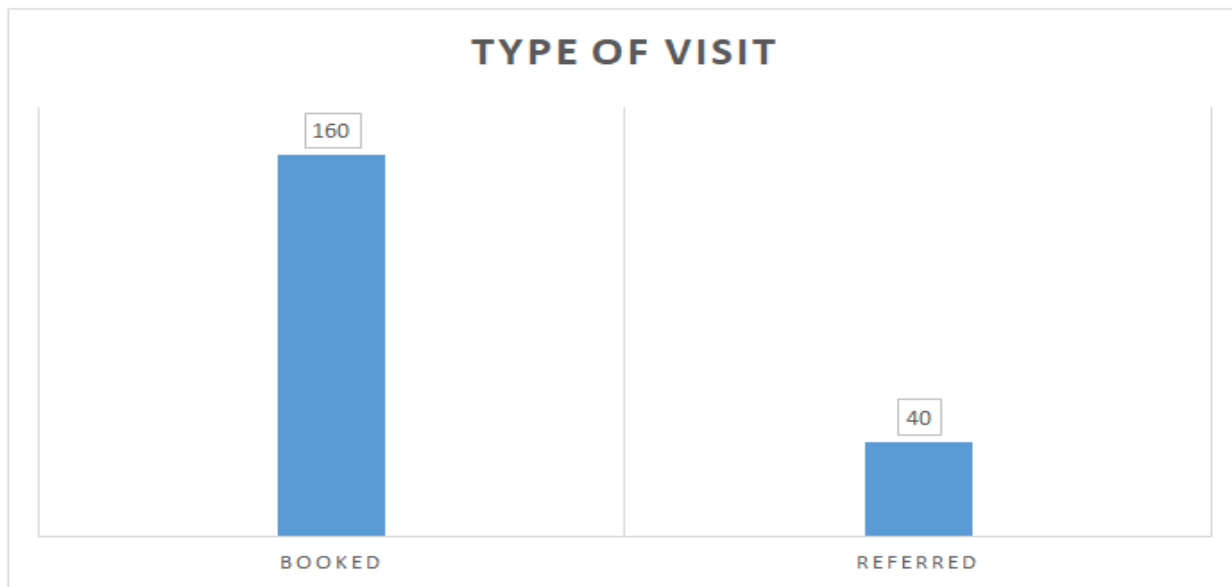


Fig 8 Type of Visit

80.0% of the cases were booked visits, only 20% were referred type.

➤ *Duration of Stay*

Table 7 Duration of Stay

	Frequency	Percent
<5 DAYS	31	15.5
6-10 DAYS	128	64.0
11-15 DAYS	34	17.0
16-20 DAYS	5	2.5
>21 DAYS	2	1.0
TOTAL	200	100.0

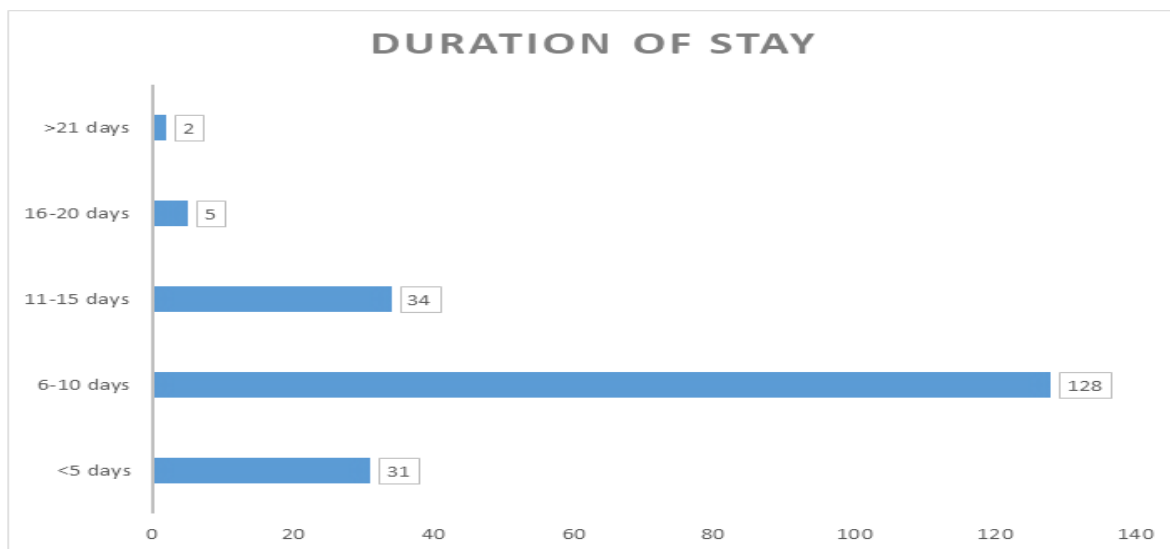


Fig 9 Duration of Stay

Most of the study participants had duration of stay between 6 to 10 days (64.0%), which was followed by a stay of 11-15 days among 17.0% (n=34). Only 2 among the study participants had a stay duration more than 21 days, in which one patient had wound infection requiring resuturing and the other one had preterm premature rupture of membranes.

➤ *Gestational Age at Delivery*

Table 8 Gestational Age at Delivery

	Frequency	Percent
34-36W+6D	54	27.0
37-40 W	146	73.0
Total	200	100.0

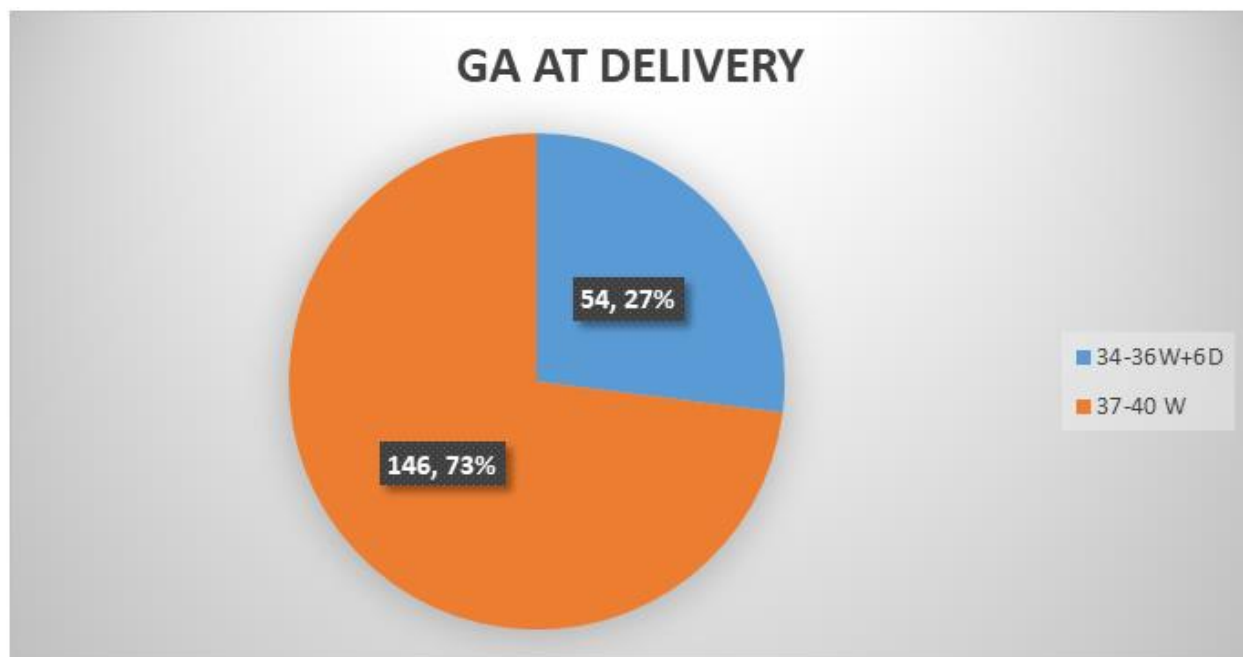


Fig 10 Gestational Age at Delivery

73.0% had gestational age between 37-40 weeks of age during the time of delivery.

➤ *Elective/ Emergency*

Table 9 Elective/ Emergency

	Frequency	Percent
ELECTIVE	50	25.0
EMERGENCY	150	75.0
Total	200	100.0

75.0% of the study participants had undergone emergency Cesarean section.

➤ *Number of Cesarean Section*

Table 10 Number of Cesarean Section

	Frequency	Percent
PREVIOUS 2 CS	188	94.0
PREVIOUS 3 CS	12	6.0
Total	200	100.0

94.0% of the participants had previous 2 cesarean section, whereas 6% (n=12) had undergone previous 3 cesarean sections.

➤ *Indications of First Cesarean Section*

Table 11 Indications of First Cesarean Section

	Frequency	Percent
FAILED INDUCTION	56	28.0
FAILURE TO PROGRESS	29	14.5
MSAF	28	14.0
BREECH	21	10.5
FETAL DISTRESS	20	10.0
SEVERE PRE-ECLAMPSIA	7	3.5
OLIGAMNIOS	7	3.5
ARREST OF DESCENT	6	3.0
CPD,FAILED TRIAL	5	2.5
ABRUPTIO PLACENTA	5	2.5
PLACENTA PRAEVIA	3	1.5
MACROSOMIA	3	1.5
LOOP OF CORD AROUND NECK	3	1.5
POLY-HYDRAMNIOS	3	1.5
TWIN	2	1.0
FIBROID COMPLICATING	2	1.0
TOTAL	200	100.0

When evaluating the indication for first CS, failed induction was the most common reason followed by failure to progress and MSAF

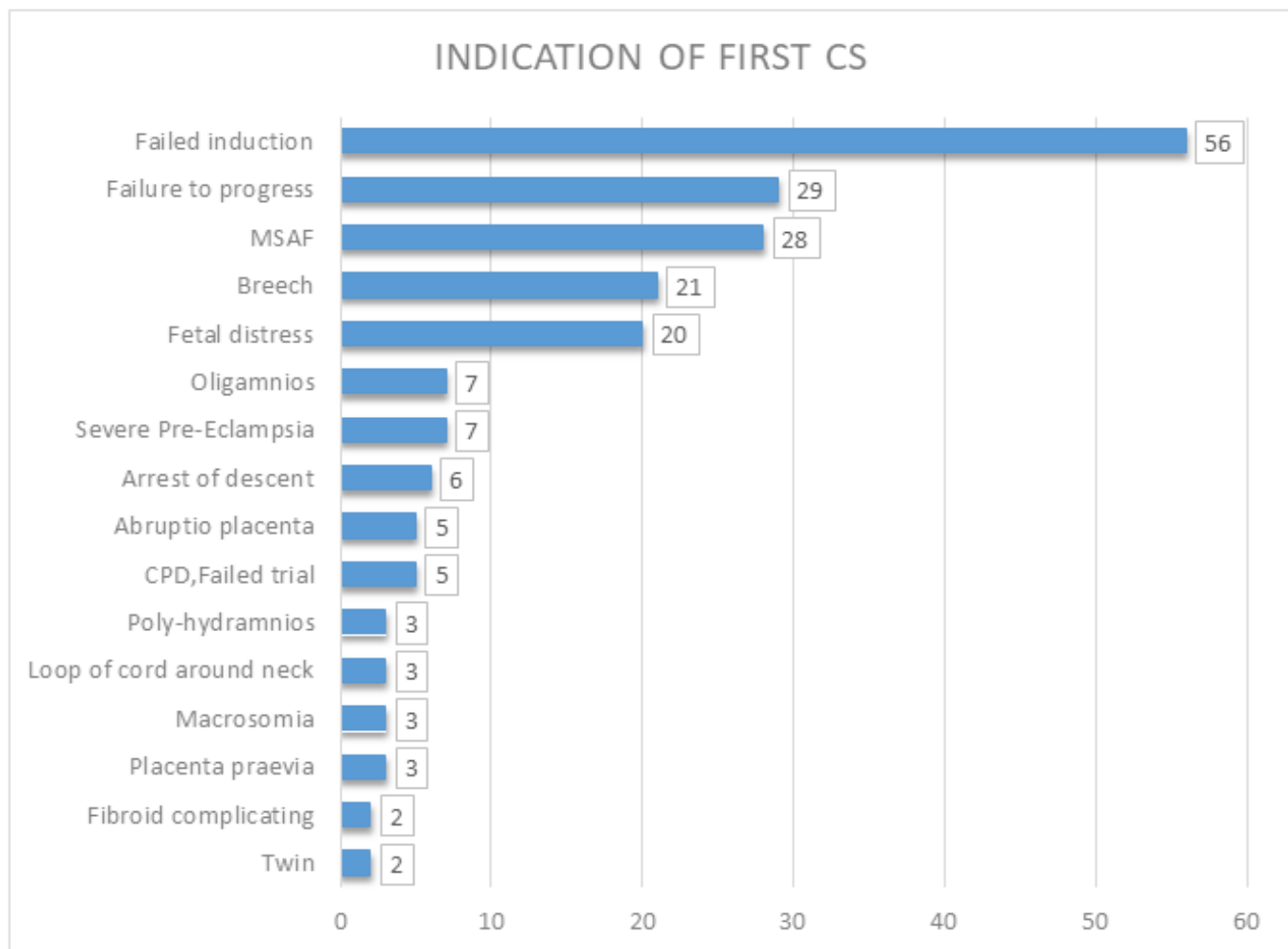


Fig 11 Indications of First Cesarean Section

➤ Indication of Second Cesarean Section

Table 12 Indication of Second Cesarean Section

	Frequency	Percent
PREVIOUS CS,1° CPD	196	98.0
PREVIOUS CS & OLIGAMNIOS	2	1.0
PREVIOUS CS ,GHTN	1	.5
PREVIOUS CS,APH	1	.5
TOTAL	200	100.0

Previous CS and CPD was the most common reason for second cesarean section (98.0%)

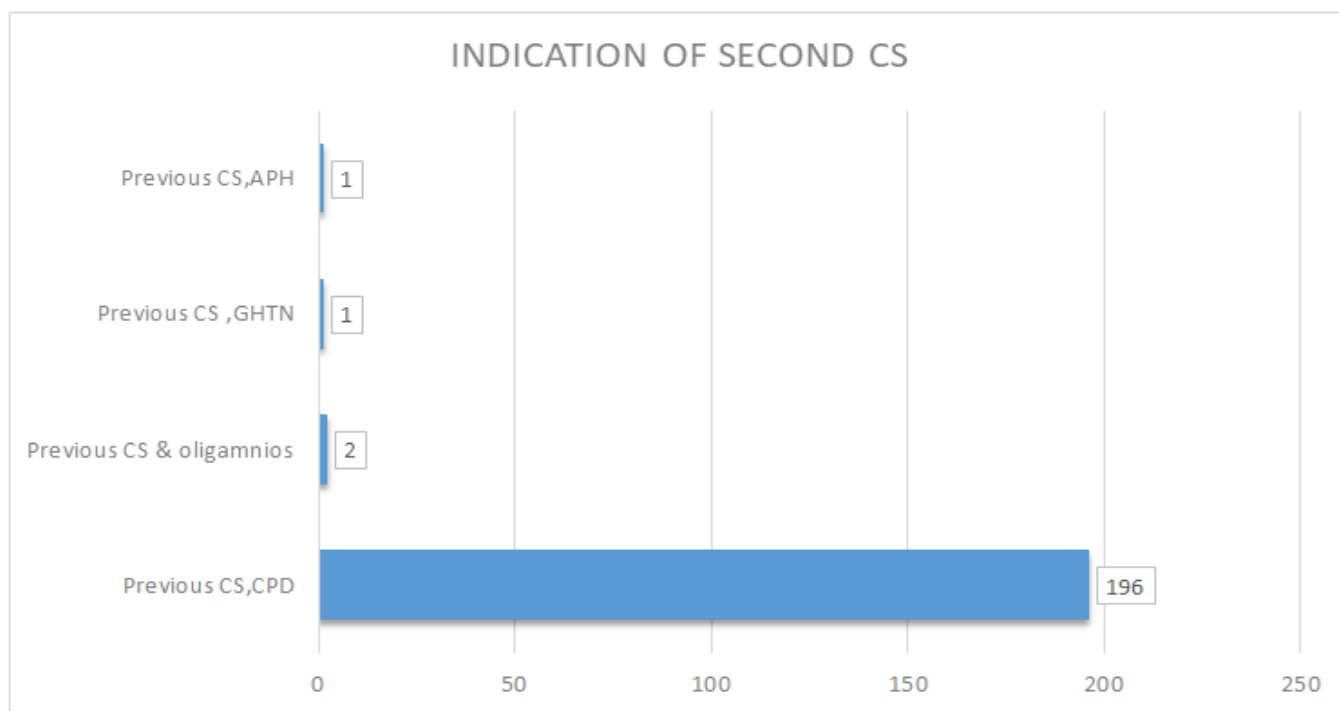


Fig 12 Indication of Second Cesarean Section

➤ Indication of Third Cesarean Sections

Table 13 Indication of Third Cesarean Section

	Frequency	Percent
NA	188	94.0
PREVIOUS 2 CS,CPD	12	6.0
TOTAL	200	100.0

➤ Intraoperative Complications During Previous Cs

Table 14 Intraoperative Complications During Previous CS

	Frequency	Percent
NIL	188	94.0
LOWER SEGMENT THINNED OUT	3	1.5
DENSE ADHESION BETWEEN ANTERIOR WALL OF UTERUS AND ANTERIOR ABDOMINAL WALL	3	1.5
ATONIC PPH	6	3.0
TOTAL	200	100.0

94.0% of the study participants did not have any intra-operative complications in previous CS, Atonic PPH was the most occurring complication .

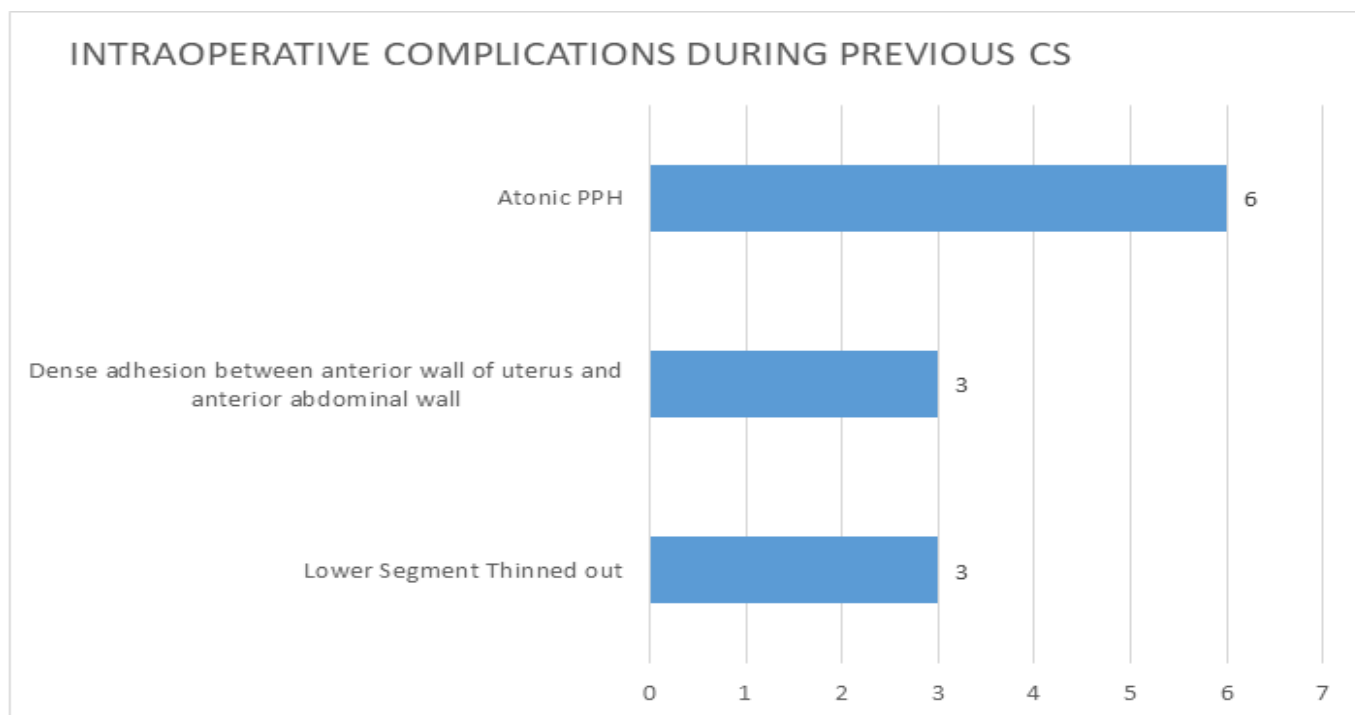


Fig 13 Intraoperative Complications During Previous CS

➤ Postoperative Complications During Previous Cs

Table 15 Postoperative Complications During Previous CS

	Frequency	Percent
NIL	176	88.0
BLOOD TRANSFUSION	7	3.5
WOUND INFECTION	7	3.5
PARALYTIC ILEUS	5	2.5
WOUND RESUTURING	4	2.0
SCAR ENDOMETRIOSIS	1	0.5
TOTAL	200	100.0

3.5 % of the study participants required blood transfusion and another 3.5% had wound infection during the post op period. The majority (88%) of the participants had uneventful post-op period.

➤ Contraception Following Previous Cs

Table 16 Contraception Following Previous CS

	Frequency	Percent
NIL	182	91.0
CuT	10	5.0
BARRIER	6	3.0
STERILISATION	2	1.0
TOTAL	200	100.0

Only 9 % of participants had used a Method of contraceptions after previous cesarean. There were 2 cases of sterilisation failure.

➤ Bmi Kg/M²

Table 17 BMI

	Frequency	Percent
UNDERWEIGHT	14	7.0
NORMAL	58	29.0
OVERWEIGHT	47	23.5
PRE-OBESE	68	34.0
OBESE	13	6.5
TOTAL	200	100.0

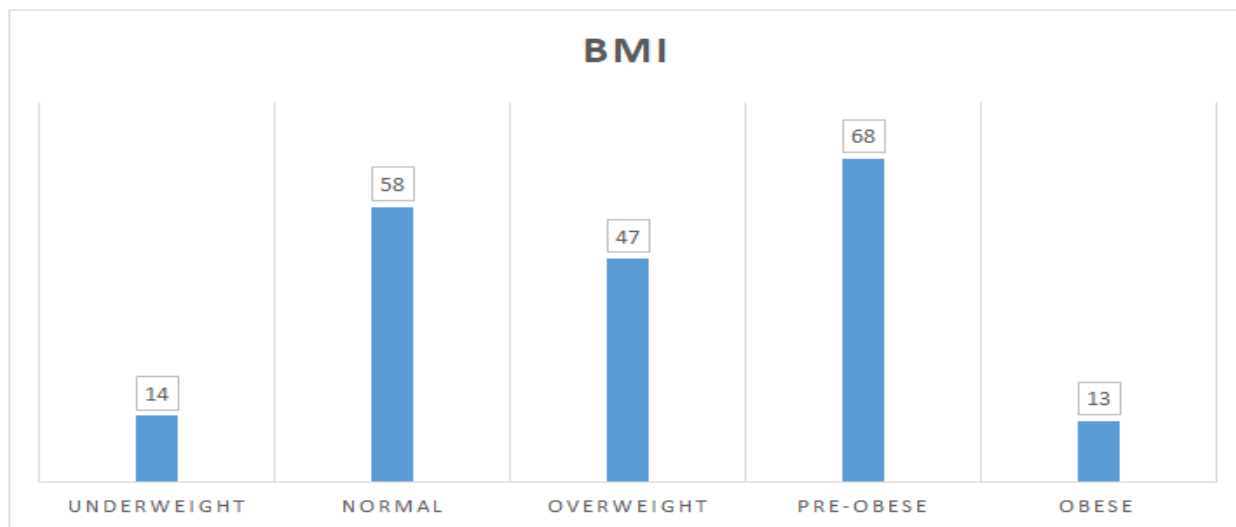


Fig 14-BMI

34.0% of the study population were pre-obese and 23.5% were over-weight. 6.5% were obese while 7.0% were underweight. 29.0% had a normal BMI as per the WHO-Asian

➤ Scar Tenderness

Table 18 Scar Tenderness

	Frequency	Percent
NIL	192	96.0
PRESENT	8	4.0
TOTAL	200	100.0

4.0% had an incidence of tenderness over the previous scar.

➤ Presentation

Table 19 Presentation

	Frequency	Percent
CEPHALIC	188	94.0
BREECH	9	4.5
TRANSVERSE	3	1.5
TOTAL	200	100.0

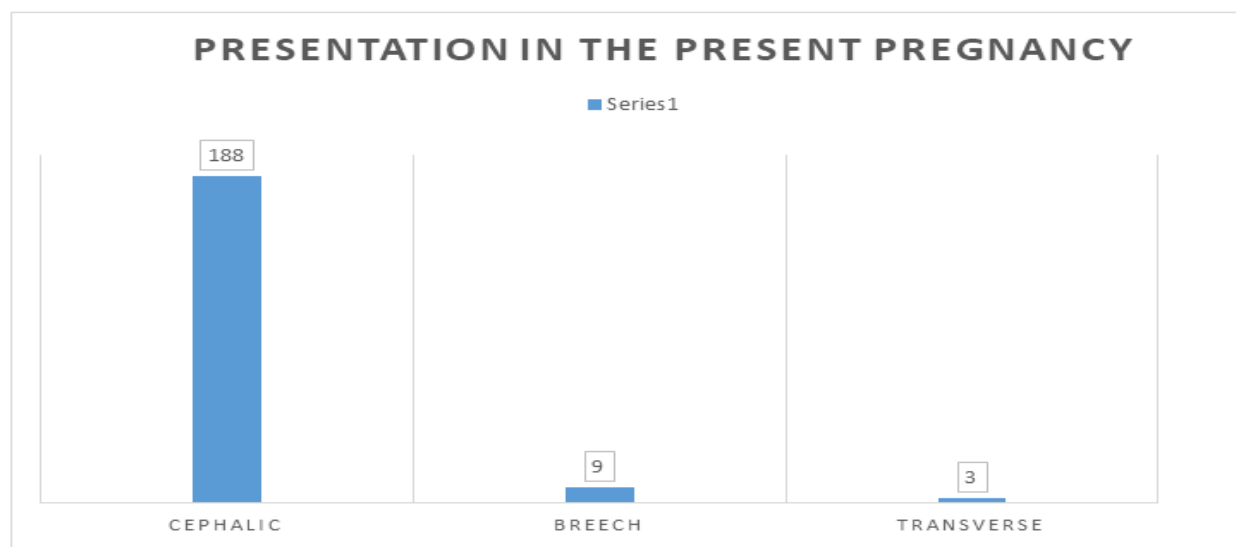


Fig 15 Presentation

Most of them were having cephalic presentation (94.0%), followed by 4.5% with breech presentation and 1.5% with transverse lie.

➤ Indication of Present Cs

Table 20 Indication of Present CS

	Frequency	Percent
PREVIOUS 2 CS, CPD	131	65.5
PREVIOUS 3 CS,CPD	11	5.5
PREVIOUS 2 CS,PLACENTA ACRETA,INCRETA/PERCRETA	7	3.5
PREVIOUS 2 CS,GDM ON INSULIN	7	3.5
PREVIOUS 2 CS,SEVERE PE	6	3.0
PREVIOUS 2 CS,PPROM	6	3.0
PREVIOUS 2 CS,PROM	5	2.5
PREVIOUS 2 CS,FGR	5	2.5
PREVIOUS 2 CS,TRANSVERSE LIE	5	2.5
PREVIOUS 2 CS,MSAF	4	2.0
PREVIOUS 2 CS,MACROSOMIA	4	2.0
PREVIOUS 2 CS, PLACENTA PREVIA	3	1.5
PREVIOUS 2 CS,APH	2	1.0
PREVIOUS 2 CS, OLIGAMNIOS	1	0.5
PREVIOUS 2 CS,FETAL DISTRESS	1	0.5
PREVIOUS 2 CS,SCAR ENDOMETRIOSIS	1	0.5
PREVIOUS 3 CS,PLACENTA ACRETA,INCRETA/PERCRETA	1	0.5
TOTAL	200	100.0

The major indication for the present cesarean section was previous 2 CS with CPD which account 65.5% of all cases.

➤ Previous Abdominal Incision

Table 21 Previous Abdominal Incision

	Frequency	Percent
TRANSVERSE	199	99.5
VERTICAL	1	.5
TOTAL	200	100.0

199 of 200 had transverse skin incision for the previous CS

➤ Previous Uterine Incision

Table 22 Previous Uterine Incision

	Frequency	Percent
LOWER SEGMENT	200	100.0

➤ Hemoglobin

Table 23 Hemoglobin

	Frequency	Percent
<7	1	.5
7-9.9	27	13.5
10-10.9	75	37.5
>11	97	48.5
TOTAL	200	100.0

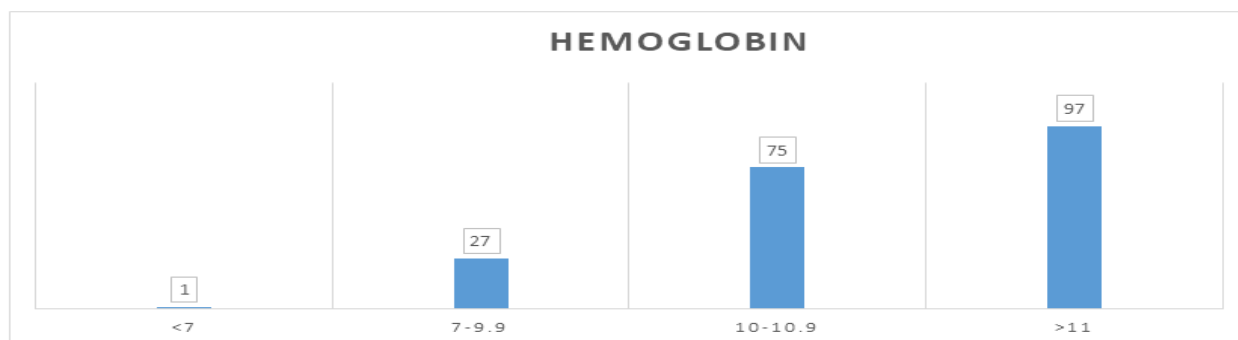


Fig 16 Hemoglobin

48.5% of the mothers had a Hb value above 11gm% and the rest below 11 gm%. Among them 37.5% had Hb ranging from 10-10.9 and 13.5% have Hb between 7-9.9 gm%

➤ Antenatal USG Findings

Table 24 Antenatal USG Findings

	Frequency	Percent
SCAR ENDOMETRIOSIS	1	0.5
FIBROID COMPLICATING	1	0.5
PLACENTA PREVIA WITHOUT PAS	4	2.0
FGR ABNORMAL DOPPLER	4	2.0
ADHERENT PLACENTA	8	4.0
NORMAL FETAL WELL BEING	182	91.0
TOTAL	200	100.0

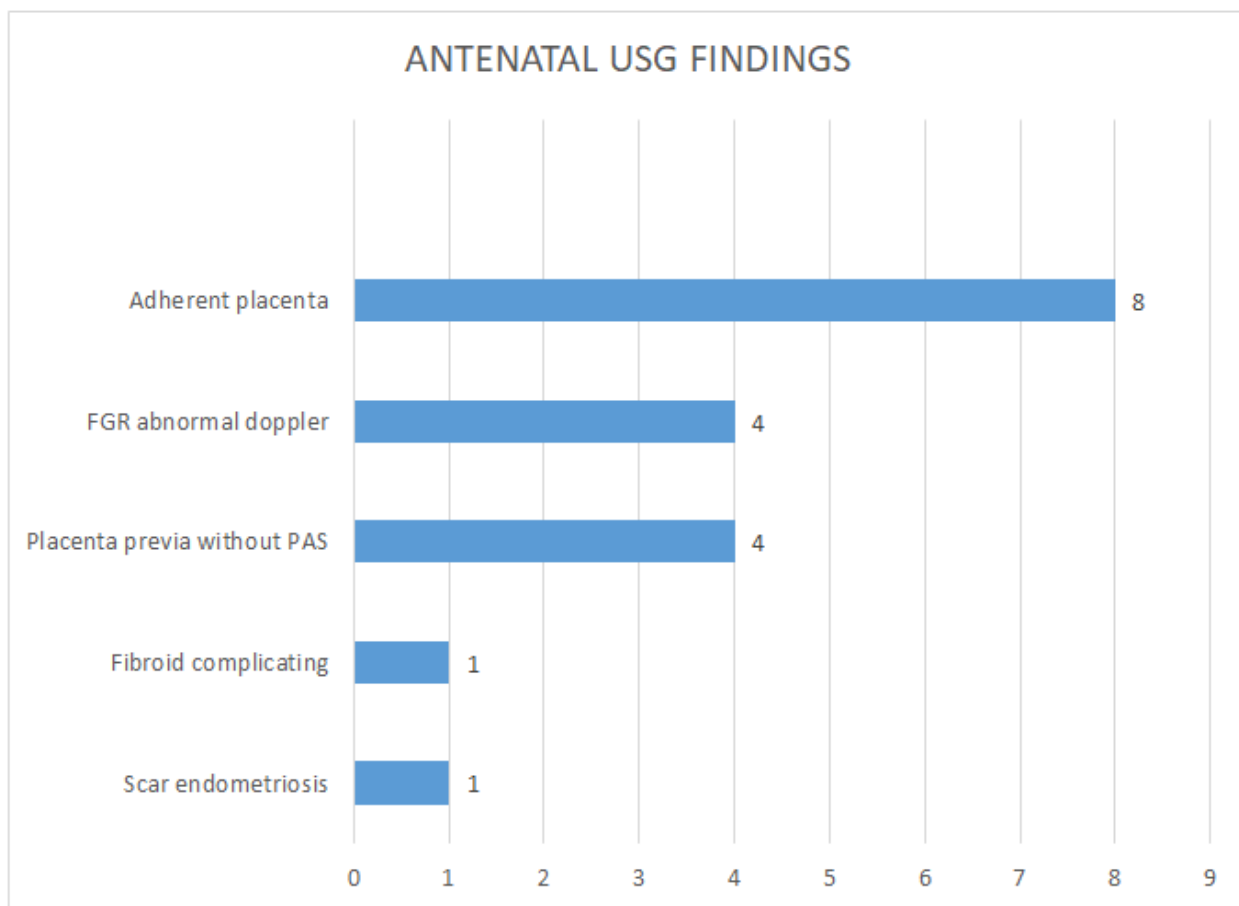


Fig 17 Antenatal USG Findings

➤ Placental Location in Antenatal Usg

Table 25 Placental Location in Antenatal USG

		Frequency	Percent
PAS	ANTERIOR UPPER SEGMENT	82	41.0
	POSTERIOR UPPER SEGMENT	69	34.5
	FUNDO POSTERIOR	26	13.0
	LATERAL	12	6.0
	LOW LYING	4	2.0
	ACCRETA	3	1.5
	INCRETA	3	1.5
	PERCRETA	1	.5
TOTAL	200	100.0	

➤ *Intraoperative Details of Present Cs*

Table 26 Intraoperative Details of Present CS

		Frequency	Percent
ANAESTHESIA	SAB	191	95.5
	CSEDB	1	0.5
	GA	8	4.0
PRESENT ABDOMINAL INCISION	TRANSVERSE	192	96.0
	MIDLINE VERTICAL	8	4.0
DIFFICULTY IN OPENING ABDOMEN	NO	115	57.5
	YES	84	42.0
	THICKENING OF SUBCUTANEOUS TISSUE	1	0.5
LS THINNED OUT	NO	46	23.0
	YES	153	76.5
	LS NOT APPROACHABLE	1	0.5
	TOTAL	200	100.0

95.5% of the study population was under SAB for the current CS and transverse skin incision was put for 96.0% of all cases. 42.0% of the cases had difficulty in opening of abdomen whereas LS was thinned out in 76.5% of all cases. All the 8 cases of obstetric hysterectomy and one case of placenta previa with atonic PPH was transferred to HDU, rest of 191 patients were transferred to postoperative ICU.

➤ *Present Uterine Incision*

Table 27 Present Uterine Incision

		Frequency	Percent
PRESENT UTERINE INCISION	LOWER SEGMENT	184	92.0
	LOWER SEGMENT HIGHER UP	8	4.0
	CLASSICAL	8	4.0

92.0% of the participants had Lower Segment uterine incision.

➤ *Details of Delivery of Baby and Placenta*

Table 28 Details of Delivery of Baby and Placenta

		Frequency	Percent
DIFFICULTY IN DELIVERY OF BABY	NO	192	96.0
	YES	8	4.0
PLACENTA DELIVERY	ADHERENT PLACENTA	8	4.0
	SPONTANEOUS	192	96.0
	MROP	0	0
	TOTAL	200	100.0

96.0% did not had any difficulty in delivery of baby. Regarding the placenta delivery 96.0% had spontaneous delivery of placenta. 4% had abnormal placental invasion.

➤ *Abnormal Placental Invasion*

Table 29 Abnormal Placental Invasion

	Frequency	Percent
NIL	192	96.0
ACCRETA	5	2.5
INCRETA	2	1.0
PERCRETA	1	0.5
TOTAL	200	100.0

4.0% of cases had abnormal placental invasion which was distributed between Accreta, increta and percreta. All the cases of abnormal placental invasion were managed surgically by cesarean hysterectomy.

➤ *Intraoperative Adhesion Type*

Table 30 Intraoperative Adhesion Type

	Frequency	Percent
NIL	113	56.5
ANTERIOR ABDOMINAL WALL & ANTERIOR WALL OF UTERUS	38	19.0
OMENTUM & ANTERIOR WALL OF UTERUS	13	6.5
ANTERIOR UTERINE WALL & PERITONEUM	9	4.5
ANTERIOR ABDOMINAL WALL & OMENTUM	9	4.5
ANTERIOR UTERINE WALL & RECTUS SHEATH	7	3.5
ANTERIOR ABDOMINAL WALL & PERITONEUM	5	2.5
BLADDER & UTERUS	5	2.5
ANTERIOR ABDOMINAL WALL & LOWER UTERINE SEGMENT	1	.5
TOTAL	200	100.0

56.5% of the study participants did not have any adhesions, rest of the 87 (43.5%) participants had occurrence of adhesion as complication. Most common (19 %) type of adhesion was between anterior abdominal wall and anterior wall of uterus. Of all those who had adhesion 86 (43.0%) underwent sharp dissection whereas one of them was managed by blunt dissection.

➤ *Intraoperative Organ Injury*

Table 31 Intraoperative Organ Injury

	Frequency	Percent
NIL	193	96.5
BLADDER	7	3.5
TOTAL	200	100.0

7 among the 200 participants had incidence of organ injury and the organ being bladder and all of them were managed with bladder repair. 3 cases were of abnormal placental invasion and 4 were cases of previous 2 CS.

➤ *Other Intra Operative Complications*

Table 32 Other Intraoperative Complications

	Frequency	Percent
NIL	155	77.5
PPH	7	3.5
BLOOD TRANSFUSION	18	9.0
UTERINE TEAR IN LOWER UTERINE SEGMENT	4	2.0
BLADDER PULLED UP	16	8
TOTAL	200	100.0

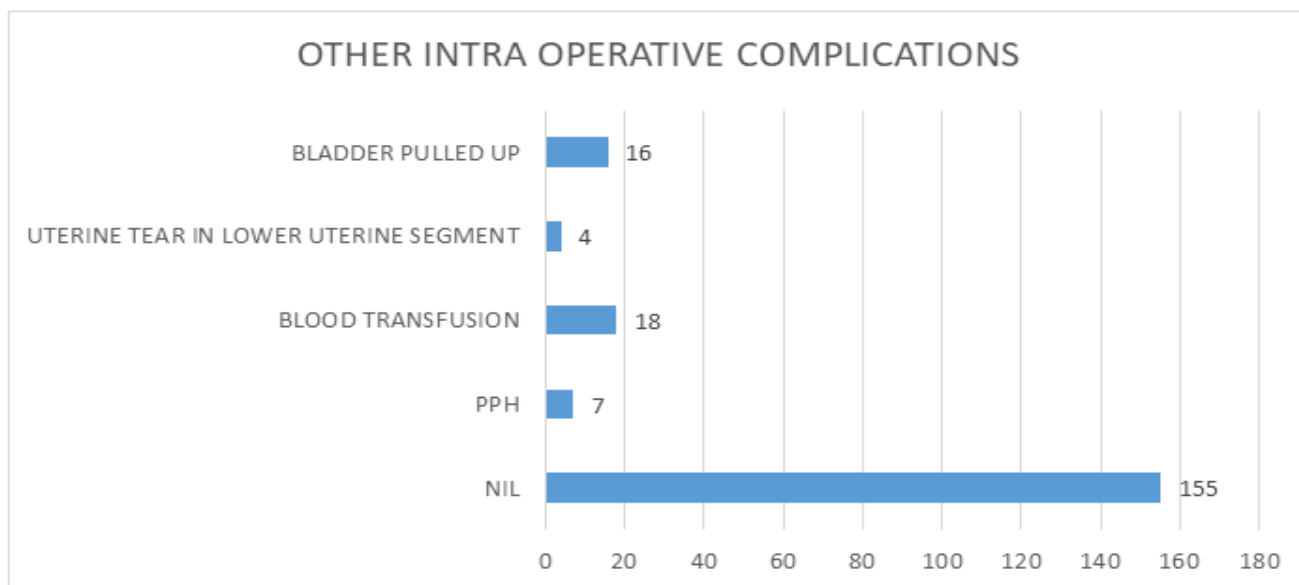


Fig 18 Other Intraoperative Complications

➤ *Contraception after Present Cs*

Table 33 Contraception after Present CS

	Frequency	Percent
STERILISATION	194	97
NIL	3	1.5
RESTERILISATION	2	1.0
CuT	1	0.5
TOTAL	200	100.0

97.0% had done sterilisation after the present CS and 1.5% did not opt for any contraceptive methods and those were cases of previous 2 CS.

➤ *Postoperative Complications*

Table 34 Postoperative Complications

	Frequency	Percent
NIL	164	82.0
BLOOD TRANSFUSION	11	5.5
SEPSIS	4	2.0
PARALYTIC ILEUS	5	2.5
WOUND INFECTION	6	3.0
CONTINUOUS BLADDER DRAINAGE (CBD) > 24 HOURS	10	5.0
TOTAL	200	100.0

82.0% did not have any post-op complications, the most occurring complication was blood transfusion followed by CBD for more than 24 hours and wound infection. There was 4 cases of sepsis in which one had urinary tract infection, 2 had lower respiratory tract infection and 1 case of surgical site infection.

➤ *Details of Baby*

Table 35 Details of Baby

		Frequency	Percent
BABY SEX	MALE	99	49.5
	FEMALE	101	50.5
BABY WEIGHT	1.5-2.4KG	23	11.5
	2.5-3.9 KG	177	88.5
APGAR	4-7	1	.5
	>7	199	99.5
NICU ADMISSION	NO	173	86.5
	YES	27	13.5

The gender of babies was even with females consisting of 50.5% of all delivered ones. 88.5% had a birth weight of 2.5-3.9 kg, only one among the delivered had an APGAR score below 7 .86.5% did not required any NICU admission whereas 13.5% (n=27) was admitted to NICU.

➤ *Reason for Nicu Admission*

The reasons for the NICU admission are as follows, respiratory distress was the most common reason for NICU admission.

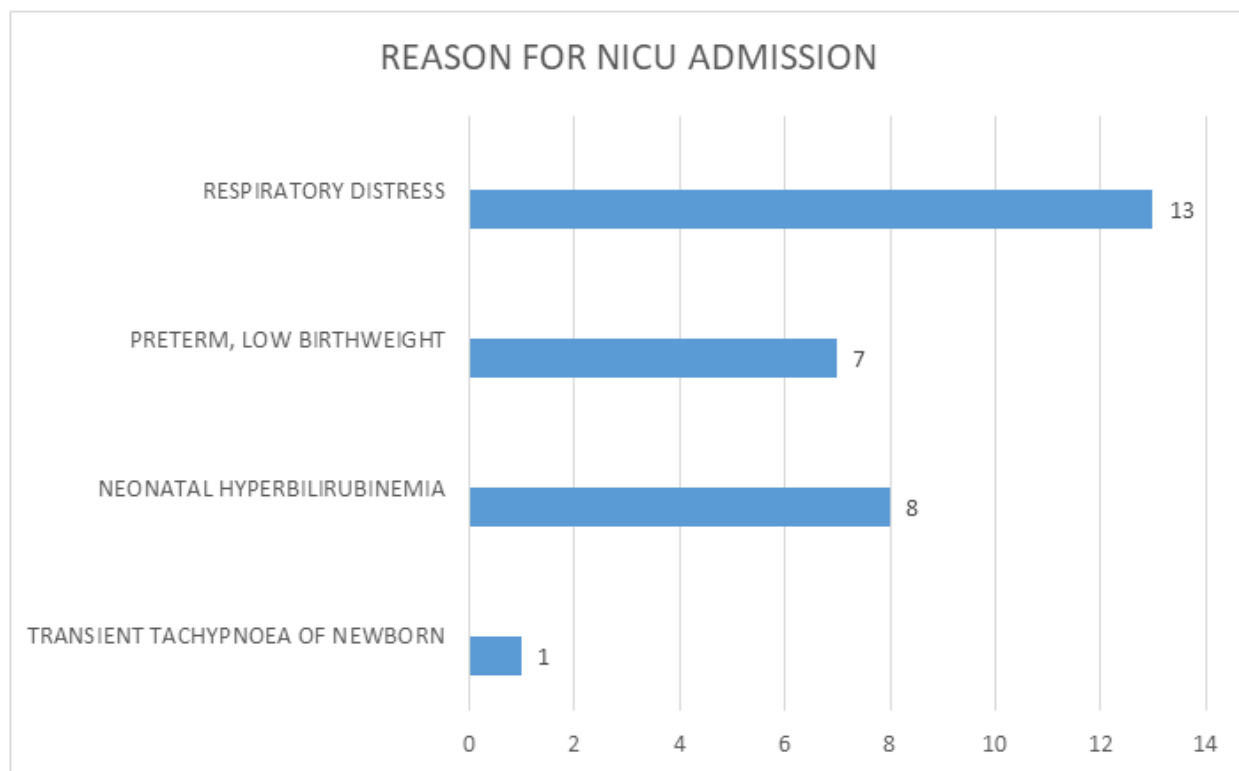


Fig 19 Reason for NICU Admission

➤ Comparison of Number of Cesarean Section with Type of Cs

Table 36 Comparison of Number of Cesarean Section with Type of CS

		ELECTIVE/ EMERGENCY		Total	P value
		ELECTIVE	EMERGENCY		
NO OF CS	PREVIOUS 2 CS	47	141	188	0.615
		25.0%	75.0%	100.0%	
	PREVIOUS 3 CS	3	9	12	
		25.0%	75.0%	100.0%	
Total		50	150	200	
		25.0%	75.0%	100.0%	

There was no significant difference in the proportion of subjects undergone the elective and emergency cesarean section among the groups previous 2 cesarean section and 3 CS.75.0% of the study population underwent Emergency CS and the rest elective in both the groups.

➤ Comparison of Number of Cesarean Section with Scar Tenderness

Table 37 Comparison of Number of Cesarean Section with Scar Tenderness

		SCAR TENDERNSS		Total	P value
		Nil	Present		
NO OF CS	PREVIOUS 2 CS	181	7	188	0.396
		96.3%	3.7%	100.0%	
	PREVIOUS 3 CS	11	1	12	
		91.7%	8.3%	100.0%	
Total		192	8	200	
		96.0%	4.0%	100.0%	

The present study noted that 3.7% of the previous 2 cesarean section had a scar tenderness whereas the previous 3 cesarean section had incidence of scar tenderness of 8.3%. Even though this result had a clinical significance the study failed to elicit a significant statistical association

➤ *Comparison of Number of Cesarean Section with Hemoglobin Category*

Table 38 Comparison of Number of Cesarean Section with Hemoglobin Category

		HB				Total	P value
		<7	7-9.9	10-10.9	>11		
NO OF CS	PREVIOUS 2 CS	1	22	72	93	188	0.034
		0.5%	11.7%	38.3%	49.5%	100.0%	
	PREVIOUS 3 CS	0	5	3	4	12	
		0.0%	41.7%	25.0%	33.3%	100.0%	
Total		1	27	75	97	200	
		0.5%	13.5%	37.5%	48.5%	100.0%	

The study found that 33.3% of those who underwent previous 3 cesarean section had a haemoglobin greater than 11.0gm% while 49.5% of those among the previous 2 CS group had Hb values greater than 11.0gm%. This result had a statistically significant association (p<0.05)

➤ *Comparison of Number of Cesarean Section with Difficulty in Delivery of Baby*

Table 39 Comparison of Number of Cesarean Section with Difficulty in Delivery of Baby

		DIFFICULTY IN DELIVERY OF BABY		Total	P value
		NO	YES		
NO OF CS	PREVIOUS 2 CS	180	8	188	0.604
		95.7%	4.3%	100.0%	
	PREVIOUS 3 CS	12	0	12	
		100.0%	0.0%	100.0%	
Total		192	8	200	
		96.0%	4.0%	100.0%	

➤ *Comparison of Number of Cesarean Section with Difficulty in Opening Abdomen*

Table 40 Comparison of Number of Cesarean Section With Difficulty in Opening Abdomen

		DIFFICULTY IN OPENING ABDOMEN			Total	P value
		NO	YES	THICKENING OF S/C TISSUE		
NO OF CS	PREVIOUS 2 CS	111	76	1	188	0.201
		59.0%	40.4%	0.5%	100.0%	
	PREVIOUS 3 CS	4	8	0	12	
		33.3%	66.7%	0.0%	100.0%	
Total		115	84	1	200	
		57.5%	42.0%	0.5%	100.0%	

The study found that 40.4% of the study participants among the previous 2 CS group had difficulty in opening abdomen and this proportion was higher among the previous 3 CS group (66.7%). This result did not have any significant statistical association.

➤ *Comparison of Number of Cesarean Section with Abnormal Placental Invasion.*

Table 41 Comparison of Number of Cesarean Section with Abnormal Placental Invasion.

		ABNORMAL PLACENTAL INVASION				Total	P value
		NIL	ACCRETA	INCRETA	PERCRETA		
NO OF CS	PREVIOUS 2 CS	181	4	2	1	188	0.582
		96.3%	2.1%	1.1%	0.5%	100.0%	
	PREVIOUS 3 CS	11	1	0	0	12	
		91.7%	8.3%	0.0%	0.0%	100.0%	
Total		192	5	2	1	200	
		96.0%	2.5%	1.0%	0.5%	100.0%	

There was only single case of abnormal placental invasion among the previous 3 CS category compared to 7 among the previous 2 CS category, but this must be due to the low number of previous 3 cases among the study population.

Table 42 Comparison of Number of Cesarean Section with Adhesion Type

		ADHESION TYPE									Total
		NIL	OMENTUM & ANTERIOR WALL OF UTERUS	ANTERIOR ABDOMINAL WALL & LUS	ANT UTERINE WALL & PERITONEUM	ANT UTERINE WALL & RECTUS SHEATH	ANT ABD WALL & PERITONEUM	ANT ABD WALL & OMENTUM	BLADDER & UTERUS	ANT ABD WALL & ANT UTERUS WALL	
NO OF CS	PREVIOUS 2 CS	110	13	1	5	7	5	7	5	35	188
		58.50%	6.90%	0.50%	2.70%	3.70%	2.70%	3.70%	2.70%	18.60%	100.00%
CS	PREVIOUS 3 CS	3	0	0	4	0	0	2	0	3	12
		25.00%	0.00%	0.00%	33.30%	0.00%	0.00%	16.70%	0.00%	25.00%	100.00%
Total		113	13	1	9	7	5	9	5	38	200
		56.50%	6.50%	0.50%	4.50%	3.50%	2.50%	4.50%	2.50%	19.00%	100.00%

➤ Comparison of Number of Cesarean Section with Presence of Adhesion

Table 43 Comparison of Number of Cesarean Section with Presence of Adhesion

		ADHESION		Total	P value
		NIL	YES		
NO OF CS	PREVIOUS 2 CS	110	78	188	0.034
		58.5%	41.5%	100.0%	
CS	PREVIOUS 3 CS	3	9	12	
		25.0%	75.0%	100.0%	
Total		8	192	200	
		4.0%	96.0%	100.0%	

The current study found out the presence of adhesions to different structures following the surgery. When the researcher tried to evaluate the association between presence of adhesion and the number of previous cesarean deliveries it was noted that 58.5% of the previous 2 CS delivery group did not have any adhesions whereas only 25% among the previous 3 CS adhesion group did not have adhesion. This results states that there’s increased chance of adhesions among higher order previous CS compared to the lower order ones. This result had a statistically significant association also.

➤ Comparison of Number of Cesarean Section with Presence of Intraoperative Organ Injury

Table 44 Comparison of Number of Cesarean Section with Presence of Intraoperative Organ Injury

		ORGAN INJURY		Total	P value
		NAD	BLADDER		
NO OF CS	PREVIOUS 2 CS	181	7	188	0.644
		96.3%	3.7%	100.0%	
CS	PREVIOUS 3 CS	12	0	12	
		100.0%	0.0%	100.0%	
Total		193	7	200	
		96.5%	3.5%	100.0%	

The organ injury incidence did not have any statistically significant association with the number of previous CS. The previous 3 CS category did not have any incidence of organ injury compared to the 3.7% among the 2 CS category, this may be due to low sample size of Previous 3 CS

➤ Comparison of Number of Cesarean Section with Other Intra-Operative Complications

Table 45 Comparison of Number of Cesarean Section with Other Intra-Operative Complications

		OTHER INTRA OP COMPLICATIONS		Total	P value
		NIL	YES		
NO OF CS	PREVIOUS 2 CS	146	42	188	0.73
		77.65%	22.34%	100.0%	
CS	PREVIOUS 3 CS	9	3	12	
		75.0%	25.0%	100.0%	
Total		155	45	200	
		77.5%	22.5%	100.0%	

The various intra operative complications of the study participants were discussed in detail in the earlier parts. The study compared the presence or absence of intra op complication with the number of previous CS. It was noted that 77.65% of previous 2 CS were devoid of any intra-op complications whereas it was only 75.0% among the previous 3 CS category. But this result did not have any statistically significant association.

➤ *Comparison of Number of Cesarean Section with Post-Operative Complications*

Table 46 Comparison of Number of Cesarean Section with Post-Operative Complications

		POSTOP COMPLICATION						Total
		NAD	BLOOD TRANSFUSION	SEPSIS	PARALYTIC ILEUS	WOUND INFECTION	CBD	
NO OF CS	PREVIOUS 2 CS	154	10	4	5	5	10	188
		81.9%	5.3%	2.1%	2.7%	2.7%	5.3%	100.0%
PREVIOUS 3 CS		10	1	0	0	1	0	12
		83.3%	8.3%	0.0%	0.0%	8.3%	0.0%	100.0%
Total		164	11	4	5	6	10	200
		82.0%	5.5%	2.0%	2.5%	3.0%	5.0%	100.0%

The post op complications were similar in proportion among the groups. It was slightly higher among the previous 2 CS group.

➤ *Comparison of Number of Cesarean Section with Baby Weight*

Table 47 Comparison of Number of Cesarean Section with Baby Weight

		BABY WEIGHT		Total
		1.5-2.4KG	2.5-3.9 KG	
NO OF CS	PREVIOUS 2 CS	22	166	188
		11.7%	88.3%	100.0%
PREVIOUS 3 CS		1	11	12
		8.3%	91.7%	100.0%
Total		23	177	200
		11.5%	88.5%	100.0%

➤ *Comparison of Number of Cesarean Section with Nicu Admission*

Table 48 Comparison of Number of Cesarean Section with NICU Admission

		NICU ADMSN		Total	P value
		NO	YES		
NO OF CS	PREVIOUS 2 CS	163	25	188	0.667
		86.7%	13.3%	100.0%	
PREVIOUS 3 CS		10	2	12	
		83.3%	16.7%	100.0%	
Total		173	27	200	
		86.5%	13.5%	100.0%	

16.7% of the previous 3 CS group required NICU admission which included preterm babies and low birth weight, whereas the admission to NICU rates were only 13.3% among the previous 2 CS group. Even if this result had a significant clinical importance the study could not establish a statistical association (p>0.05).

CHAPTER SIX DISCUSSION

Cesarean section is one of the essential, comprehensive intrapartum services (CS). Births by cesarean section are on the rise, and there are many different factors contributing to this. Due to this tendency, more and more women are having difficulty deciding on the technique of delivery for their following pregnancies. A previous CS is one of the foremost reasons for a cesarean delivery in the current pregnancy. Despite this, a higher risk of maternal and perinatal morbidity and mortality is associated with repeated cesareans. It is associated with maternal death, adherent placenta, sepsis, peripartum hysterectomy, postpartum haemorrhage, and uterine rupture. The prevalence of cesarean sections has risen substantially over the past few decades in the majority of developed countries as well as many emerging ones, including India. As a result, my research's main objective was to investigate the morbidity and mortality of mothers and babies who have had two or more prior cesarean sections.

The present study was aimed at providing an insight into the “Maternal and perinatal outcomes related to prior two or more cesarean sections”. A prospective cross-sectional observational study was conducted in order to assess the same. The specific challenges we face while doing a repeat cesarean section were extensively recorded. The types of intraoperative complications were determined by an analysis of the obtained data. The outcomes were compared.

A. Socio-Demographic and Clinical Characteristics:

In the present study, The age group of 21–30 years made up the bulk of participants (58.0%), followed by that of 31–40 years (36.0%). Muslims made up the majority (76.5%) of the population. The majority of research participants (64.0%) spent between six and ten days in the hospital. When the mother was delivered, her gestational age was between 37 and 40 weeks in 73.0% of cases. Seventy-five percent of the study's participants had an urgent cesarean section. 94% of individuals had already had two cesarean sections, whereas just 6% had three. The most frequent justification for a second Cesarean section (98.0%) was previous CS and CPD.

The findings show that 188 (94%) of the cases were second gravida, 12 (6%), third gravida, and none, gravida >3. This is because the majority of parents currently want to have a small number of kids, namely 2 or 3, who can be cared for more effectively. Research by *AD Kugler et al.* and *K. Shutts et al.* supported our findings. The main justification appears to be the availability of more family members' “Personal space”. Many people are interested in the idea because today's youth believe it to be the best way to raise a family. These couples argue that nuclear families have several benefits. ^(111,112)

Choudary GA et al. included 224 patients in their study. Of them, 77 (34%) received CS in an emergency (em) for various reasons, whereas 147 (66%) underwent elective (el) CS. Of the 224 women, 157 had already had two CSs (El: 102, Em: 55), 49 had already had three CSs (El: 31, Em: 18), 16 had already had four CSs (El: 12, Em: 4), and two had already had five CSs. The median age of the mothers was 33 +/- 2.4. The average gestational age was 36.2 +/- 4 weeks, and the mean parity was 2.5 +/- 1.4. ⁽¹³¹⁾ According to *Rajapreethi et al.* study 's on the causes of recurring LSCS in 65 prenatal women, 32.3% of cases involved cephalopelvic disproportion, 13.8% involved pre-eclampsia, 10.8% involved unsuccessful inductions, and 10.8% involved diabetes mellitus. Eclampsia accounted for 7.7% of the total, followed by foetal distress (6.2%), malpresentation (6.2%), placenta previa (4.6%), abnormal uterine contraction (4.6%), and IUGR (3.1%). CPD was therefore the Most Common Indication for LSCS. ⁽¹¹⁷⁾ It was discovered that every indication and cause for repeat CS matched those in our study. The outcomes were all consistent with our study. The similarities may be explained by the inclusion of children in both studies who fall within the same age range. The sample sizes for both trials were comparable.

Demographic factors included maternal age (32 4.6 years), gravidity (4.7 1.1), parity (3.2 0.6), presence of additional disease (53.6%), and tubal ligation (56.1%), according to a related study by *Alper Biler et al.* Additionally provided were the gestational age at birth (37.9 1.6 wk v), mean birth weight (3173.8 556.6), and Apgar scores at 5 minutes (7 0.8). ⁽¹³⁴⁾ *Meresa Berwo Mengesha et al.* carried out a comparative study. Mothers' median age was 27. The majority of the mothers (264/78.1%) were between the ages of 20 and 34. Of the total number of mothers who have cesarean deliveries, 128 (37.9%) are primipara, and 182 (53.8%) are between Paras 2 and 4. 18 (5.3%) moms with C/s were not scheduled for ANC at any medical facility. 229 (67.8%) of the moms with CS received referrals from other institutions. ⁽¹³⁵⁾ Even though there were slight differences in the mean age of mothers, almost similar findings were given by most of the studies. The fact that the outcomes agreed with our study's findings could be attributed to the study population's similar features and the sample size used.

Mebrahtu et al. conducted a similar investigation. The mothers' average ages ranged from 21.5 to 3.9 years, with an (SD) standard deviation. The percentage of respondents who lived in cities and who were married was about two-thirds (69.2% and 63.0%, respectively). The majority of the mothers (92.2%) identified as Orthodox Christians. Of the total responders, 41 (11.5%) had had at least one abortion, and 9 (2.5%) had experienced at least one stillbirth. The majority of responders (72%) employed contemporary family planning techniques to avoid unintended pregnancies. Eighty-nine mothers (24.9%) experienced at least one illness while pregnant. ⁽¹³⁶⁾ Some results were discovered to be at odds with our findings because of differences in age range group. The difference could be brought on by the reduced sample size and methodology.

B. To Investigate the Maternal and Perinatal Morbidity and Mortality of Mothers and Babies who have had Two or More Prior Cesarean Sections.

In the present study, 4.0% of the participants had tenderness around an old scar. 94.0 percent of them had cephalic presentations, while 4.5% had breech presentations. The most common reason for the current cesarean section, which accounts for 65.5% of all cases was the prior two CS with CPD. For the prior CS, the majority of them (99.5%) received transverse skin incisions. 48.5% of the mothers had Hb values above 11 gm%, with the remaining mothers having values below 11 gm%. Among them, 13.5% had Hb between 7-9.9 gm% and 37.5% had Hb between 10 and 10.9 gm%. In 42.0% of cases, the abdomen was difficult to open and in 76.5% of cases, the LS was thinned out.

In the current study, 4% of women experienced trouble delivering the placenta and the infant. 4.0% of cases, which included accreta, increta, and percreta, exhibited abnormal placental invasion. All adherent placenta cases underwent obstetric hysterectomy. Adhesion was a problem that occurred in 43.5% of the patients. Seven out of the 200 volunteers experienced organ injury; the bladder was the most injured organ in all of them, and bladder repair was done. The other problems included PPH, blood transfusion, uterine tears, and pulled up bladder. Blood transfusion was the most frequent postoperative complication, followed by continuous bladder drainage and wound infection.

In the current study, mothers in the previous three CS groups were more likely to have adhesions (75%). According to these findings, higher-order previous CS had a larger likelihood of adhesions than lower-order ones. The previous three CS groups experienced more intraoperative problems. While just 13.3% of the prior 2 CS group needed to be admitted to the NICU, 16.7% of the previous 3 CS group did.

In a related investigation by *Kshama Vishwakarma et al*, adhesions (10%), thinning of the LUS, vascular LUS, and scar dehiscence was discovered to be the most frequent intraoperative complications. Thinned out LUS most common problem discovered in our study (76.5%). Repeat cesarean section patients had significantly more postoperative and intraoperative complications with their mothers and babies. ⁽⁸³⁾ The findings of the study agreed with those ours. In a related study, *Kenichiro Motomura et al*. discovered that women who had experienced at least one prior CS had a 0.5% (170/37,366) risk of uterine rupture. In women with uterine rupture, the risk of maternal death (AOR 4.45) and perinatal death was noticeably higher (AOR 33.34). ⁽⁸⁸⁾ The study's findings were congruent with ours in that it concluded that women with a history of CS are more likely to have adverse outcomes. Similar sociodemographic findings may be to blame for the studies' similarities.

In a related study, *Jinturkar AA et al*. found that repeat cesarean deliveries resulted in a greater rate of perinatal morbidity (12.12%). Individuals who underwent a repeat LSCS had greater rates of maternal problems (12.76%) than patients who underwent typical labour. Repeat CS patients also had greater rates of scar dehiscence. ⁽¹¹³⁾ The subject of research by *Rao MS, et al*. was the frequency of complications according to the mode of delivery. He examined 50 LSCS cases with prior LSCS and came to the conclusion that repeat CS mothers and babies were more likely to experience fetomaternal problems. In repeat CS mothers, a serious morbidity linked to scar dehiscence was discovered. ⁽¹¹⁴⁾ The conclusions agreed with our findings.

In the current study, 88.5% of babies were born between 2.5 and 3.9 kg. Only one of the newborns had an APGAR score below 7, and only 13.5% (n=27) of them needed to be admitted to the NICU. Among the reasons for the NICU admissions respiratory distress was the most frequent cause.

In a related study, *Esike OUC et al*. discovered that one of the problems was a retained placenta. A postpartum hemorrhage affected 7% of patients, uterine rupture affected 0.98 percent, and scar dehiscence affected 1.62%. ⁽¹¹⁵⁾ Prior CS was observed to be associated with greater risks of NICU admission (aOR 1.31; 95% CI 1.23, 1.39), neonatal near miss (aOR 1.19; 95% CI 1.12, 1.26), and preterm delivery (aOR 1.07; 95% CI 1.01, 1.14), according to *Chumnan Kietpeerakool, Pisake Lumbiganon, et al*. ⁽⁸⁷⁾ *CA Iyoke et al*. indicates that risks of newborn special care and NICU admission rates (RR=2.5) are more frequent in patients with prior 2 or more LSCS. ⁽¹¹⁶⁾ In the *Rajapreethi et al*. study, 78.4% of pregnant women had no foetal problems, 13.8% had foetal distress, and 7.7% were in the NICU. ⁽¹¹⁷⁾ The slight discrepancy in results may also be ascribed to the geographical and rural-urban variations in the study population.

According to *Rao et al*, In patients with repeated CS, perinatal problems like foetal distress and difficult placenta and baby delivery were frequent. ⁽¹¹⁴⁾ *Chumnan Kietpeerakool, Pisake Lumbiganon, et al* secondary study of the World Health Organization Multicountry Survey on Maternal and Newborn Health found that prior CS (adjusted Odds Ratio (aOR); 7.74), a morbidly adherent placenta (aOR 2.60), MNM (aOR 1.91), and SMO were all associated with a higher risk of uterine rupture (aOR 1.80). Placenta previa (5.1 per 1,000 women), MNM (maternal near miss) (5.5 per 1,000 live births), and severe maternal outcome made up the majority of unfavorable maternal outcomes overall (6.5 per 1,000 live births). With 161 maternal deaths overall, there were 0.9 maternal deaths per every 1,000 live births. The odds of Maternal Near Miss, Severe Maternal Outcomes, placenta praevia, and morbidly adherent placenta in subsequent pregnancies rose along with the frequency of past CS. Similar to our research, their study also found a substantial connection between prior CS and considerable morbidity in subsequent pregnancies.

A comparable investigation by *C. Kabore et al.* produced contradictory findings. Compared to women who had a repeated CS, those who had a trial of labour had significantly higher odds of perinatal mortality (adjusted odds ratio (OR) 4.53; 95% confidence interval (CI) 2.30-9.92; P 0.001) and hospital-based maternal problems (adjusted OR 1.52; 95% CI 1.09-2.13).⁽⁸⁴⁾ *Richard Kalisa et al.* studied the maternal and perinatal outcomes following past cesarean operations in rural Rwanda. Of the 4131 women who showed up for delivery, 435 (11%) had uteri that were scarred. Those with ToL (n = 23, 7.7%) were more likely to develop severe acute maternal morbidity (puerperal sepsis, postpartum haemorrhage, uterine rupture) than women with ERCS (n = 5, 3.6%). There was no difference in newborn hospitalisations between women who had ToL (n = 64/297; 21.5%) and those who delivered by ERCS (n = 35/138; 25.4%: aOR 0.8; CI 0.5-1.6). Hospitalizations were primarily due to perinatal hypoxia, which was more common in infants whose moms underwent ToL (13.4%) than in infants delivered via ERCS (10.9%).⁽⁸⁵⁾ According to *Rajapreethi et al* study on the incidence of maternal difficulties and foetal complications, out of 65 patients, 80% had no complications, and 4.6% had breast abscesses and PPH. 3.1% of people got UTI and wound gaping. 4.6% had a fever and an infection. The majority of them were trouble-free.⁽¹¹⁷⁾ The study results were contrary to our findings. Although *Yang YZ's* thorough clinical analysis identified retained placenta and co-occurring placenta praevia as the most common causes of haemorrhage and found a statistical significance, this study found no association between previous two CS and three CS and heavy bleeding, retained placenta, and intraoperative complications.⁽¹²⁹⁾ The differences in the study tool, geographic region, sampling techniques, and lack of study population uniformity may be to blame for these discrepancies in the results. The difference could also be explained by the potential influence of other social and economic factors in the various research populations. Our analysis could not identify the specific scenario, maybe due to the smaller sample size. Obstetric surgeons may use slightly different methods and levels of expertise.

In the current study, the percentage of emergency cesarean sections was essentially the same in patients who had previously had two or three CS. In contrast to the 3.7% of the previous two cesarean sections that experienced scar tenderness, 8.3% of the prior three cesarean sections had the same issue. According to the study, mothers with two or fewer prior CS had a normal percentage of Hb than mothers with three or more prior CS. The proportion of study participants who had trouble opening their abdomen was 40.4% in the previous 2 CS group and higher in the previous 3 CS group (66.7%). In those who had three prior CS, the difficulties in delivering the baby and placenta were greater.

Nicole E. Marshall et al. discovered that the prevalence of placenta previa increased from 10 per 1000 births with one prior cesarean delivery to 28 per 1000 deliveries with three or more cesarean deliveries. In comparison to women with previa and no prior cesarean deliveries, those with previa and three prior cesarean deliveries had a statistically significant higher risk of accreta (3.3-4% vs 50-67%), hysterectomy (0.7-4% vs 50-67%), and composite maternal morbidity (15% vs 83%; odds ratio, 33.6; 95% confidence interval, 14.6-77.4).⁽⁸⁹⁾ Similar research by *CA Iyoke et al.* indicates that risks like placenta previa (RR=5.0), labour dystocia (RR=6.4), intraperitoneal haemorrhage (RR=5.0), primary postpartum haemorrhage (RR=5.0), and blood transfusion (RR=6.0), are more frequent in patients with prior two or more LSCS.⁽¹¹⁶⁾ Similar studies by *Robert M. Silver et al.* found that the risk of placenta accreta, cystotomy, bowel injury, ureteral injury, and ileus increased significantly with the number of cesarean deliveries. These studies also found an increase in the need for postoperative ventilation, intensive care unit admission, hysterectomy, blood transfusions requiring four or more units, and the length of the procedure and hospital stay. Placenta accreta was present in 15, 49, 36, 31 (2.13%), 6, 23, and 6 (6.74%) of the women having their first, second, third, fourth, or more cesarean deliveries, respectively.⁽⁹⁰⁾ The findings supported our study that when advising patients we have to tell them regarding the serious maternal morbidity that rises steadily with the number of cesarean deliveries. Comparable sample sizes and geographic locations allowed for the same results to be obtained as in our study.

A comparable investigation was carried out by *Victoria Nisenblat et al.* In addition, they found that the multiple-cesarean group had a significantly higher incidence of dense adhesions (46.1% compared to 25.6%; P.001), severe blood loss (7.9% versus 3.3%; P.005), and difficult infant delivery (5.1% versus 0.2%; P.001). The rate of placenta accreta was greater (1.4%) in the multiple-cesarean group. According to the delivery index number, a higher percentage of women had serious complications: 4.3% for a second cesarean delivery, 7.5% for a third, and 12.5% for a fourth or more (P for trend =.004).⁽⁹¹⁾ In their study, *M.A. Ramakrishna Rao et al.* discovered various intraperitoneal adhesions in 73 out of 287 cases (25.43%). The fact that the majority of the main sections in our analysis were performed by either inexperienced surgeons or resident doctors with less training may be the cause of the higher-than-average adhesion rates.⁽¹¹⁸⁾ The inclusion of research participants in both studies who fall within the same age range may help to explain the parallels. In addition, the sample sizes for the two trials were comparable.

In a research, *Loebel et al.* also discovered that women who had more than two cesarean sections experienced higher newborn and maternal morbidity and death than women who had less than two. Admission to the NICU was observed in 2.8% of repeat LSCS cases and in 1.1% of other instances. Perinatal death was observed in 2.1% of cases in prior repeated CS, but in other situations, it was only detected in 0.5% of cases. The results confirmed our findings.⁽¹¹⁹⁾ In contrast, *William A. et al* discovered that even one prior cesarean delivery increased the risk of an adverse maternal outcome (a composite of transfusion, hysterectomy, operative injury, coagulopathy, venous thromboembolism, pulmonary edoema, or death) from 15% to 23%. According to the study, having more cesarean births in the past is associated with an increase in maternal morbidity but not perinatal morbidity in women who have had placenta previa. The studies complemented our own study.⁽⁹³⁾ Our analysis indicated a significant amount of overlap with both of these studies because of the same sample sizes and methodologies used in each of these investigations.

According to *Shazia Jamshad et al.*, women who had repeat CS had a 3-fold greater chance of having a severe maternal outcome than those who had previous CS deliveries via vaginal delivery. ⁽¹²⁰⁾ This result was consistent with what we discovered. Maternal near-miss (MNM) incidents and maternal deaths should be combined to indicate SMO (severe maternal outcome), according to two earlier studies by *Souza JP et al.* and *Haddad SM et al.*, which would provide a more reliable variable for research. It has been investigated how past cesarean births affect MNM and SMO, and it was discovered that those who have had previous CS are more likely to develop MNM and SMO in subsequent CS. ^(121,122)

According to several research like *Al Rowaily et al.*, women who had pre-eclampsia were three times more likely to have repeat CS. In our study, preeclampsia led to repeat CS for about 3% of study participants. Pre-eclampsia and pregnancy may be associated. In comparison to gravida 1, women giving birth to their fourth child through CS maybe three times more likely to develop pre-eclampsia. ⁽¹²³⁾ In line with our findings, *Klemm P. et al.* discovered that women with a history of multiple CS were more likely to experience uterine dehiscence and be admitted to the intensive care unit. After a CS procedure, there is a chance of late scar dehiscence, which could result in uterine rupture during a subsequent pregnancy. The cause of this can be that both an enlarged uterus and uterine contractions make the uterine scar from prior CS vulnerable to injury. ⁽¹²⁴⁾ The rate of infection is expected to increase along with the global increase in CS frequency, which is why it has clinical significance. Only 2% of women in our research who had multiple pregnancies suffered infection or sepsis. Repeat CS patients had a twofold increased risk of infection compared to vaginal delivery patients. An earlier study by *Zuarez-Easton S, Zafran N, et al.* revealed that past CS was one of the infection risk factors in multiple CS women, which lends weight to this conclusion. ⁽¹²⁵⁾ The reason might be that a bacterial infection at the surgical site of the incision frequently causes Post-CS infections. Women who give birth vaginally are less prone to get this infection.

In the current study, women who had more than two repeat cesarean sections (CS) had almost double the chance of developing placenta praevia and abnormal placental invasion than women who had a vaginal delivery or less than two CS. This result is linked to endometrial abnormalities brought on by prior scarring from prior CS. Studies conducted by *Asicioglu O, Sahbaz A, et al.* made analogous findings. ⁽¹²⁶⁾ Additionally, maternal age plays a crucial role in pregnancies with placenta previa and accreta. Naturally, the mother's age rises as the order of pregnancies does. Additionally, as intramyometrial and endometrial arteries deteriorate with increasing maternal age, higher maternal age reduces normal placental growth. These characteristics may have contributed to the unusual placental invasion in certain CS births. One of the most significant morbidities in subsequent cesarean births is placenta accreta. The risk is reportedly linked to an increase in CSs, particularly those with placenta previa on the anterior wall of the uterus. According to research by *Makoha FW et al.*, the concurrence of placenta previa and placenta accreta was less than 24% in the second CS group, 40% in the third CS group, and over 60% in the fourth and more CS. The findings matched those of our research. ⁽¹³²⁾

The results of studies conducted by *Akinlusi FM et al* and *Eyelade O et al* revealed that multiple CS has a significant risk of blood transfusion. In patients with multiple CS, preoperative anaemia, high parity, and significant blood loss during surgery all contribute significantly to the need for blood transfusion. ^(127, 128) These outcomes agreed with what we discovered. In a related study, *Turki Gasim et al* discovered that repeated cesarean sections put patients in this high-risk category at an increased risk of uterine rupture and intraoperative complications. The total number of repeat cesarean deliveries has no set upper limit. Patients must be urged to have tubal ligation and told of the dangers of numerous CSs. ⁽¹³⁰⁾ The findings were found to be remarkably similar to those of our inquiry. The same traits of the research population may provide an explanation.

A related study by *Constantin Zwergel and Constantin S von Kaisenberg et al.* found that after two cesarean procedures, the likelihood of uterine rupture increased to around 4%. Up to 5% of patients require blood transfusions, which is common. Less than 2% of patients require intensive care, which is a little rise (and may also be due to underlying diseases). Less than 1% for up to three cesarean sections, but 2.5–3% for more than four, are associated with hysterectomy and placenta accreta. Already, multiple cesarean sections frequently result in severe adhesions. ⁽¹³⁾ The results were discovered to be nearly identical to our investigation. It might be explained by the similar characteristics of the research population.

The outcomes from the many research may differ due to clinician experience. An experienced obstetrician with better knowledge and competence in the discipline may have participated in the trials. Experience is crucial for mastering the art of caesarean. In decision-making rules also practice, psychomotor skills, and experience plays an important role. Therefore, the clinicians' and obstetric surgeons learning curve may be taken into account as a component that implied the outcome.

Even though there are many commonalities, some studies reveal very slight variations in the final outcome. The difference observed in the parameters assessed by our study could be attributed to the comparatively lower sample size, different study designs, geography, socio-economic variations, the difference in culture techniques, different caesarean techniques, and variable psychomotor skills.

Research has its limitations all the time. The limitations and shortcomings are an inevitable result of not having unlimited resources, funding, access to information, or a flawless system to follow. Although a thorough sample size assessment was done prior to the investigation, the small sample size may be seen as a constraint. There was a chance of selection bias because the study was conducted on those who visited the hospital's op room. It can be expected that our research sample was significantly different from the general population as a result. We were unable to evaluate many social and familial factors in our inquiry. We were unable to control for a number of variables, including socioeconomic class, geography, employment status, education, and psychological stress. Women from other social classes, with different levels of education, or from other geographical places might not be able to use our results. Last but not least, it is crucial to consider any other factors that could influence the outcome of a cesarean section, such as lifestyle decisions and the use of self-reporting or underreporting of co-morbidities. Because the study outcomes could be influenced by these variables, which could act as confounders. To determine more precise and generalizable outcome features of mother and child in recurrent CS, future studies should use a sizable, multi-center investigation.

CHAPTER SEVEN SUMMARY

- The age group of 21–30 years made up the bulk of participants (58.0%), followed by that of 31–40 years (36.0%).
- The majority of research participants (64.0%) spent between six and ten days in the hospital.
- 188 (94%) of the cases were previous 2 CS, 12 (6%) previous 3 CS.
- 75 percent of the individuals in the research underwent an emergency Caesarean Section.
- Individuals who had previously undergone two or three CS had essentially the same percentage of emergency cesarean sections.
- 4.0% of the participants had tenderness around an old scar. Scar tenderness was present in 8.3% of the previous 3CS cases, in contrast to 3.7% of the previous 2 CS cases that had the problem.
- The study found that moms with two past CS had a normal percentage of Hb compared to mothers with three prior CS .
- In 42.0% of cases, the abdomen was difficult to open and in 76.5% of cases, the LS was thinned out.
- 40.4% of research participants in the previous 2 CS groups and 66.7% in the previous 3 CS groups reported difficulty opening their abdomen.
- 4% of the women in the current study had difficulty in delivering the baby and the placenta.
- 4% of the study population had abnormal placental invasion as placenta accreta, increta, and percreta who underwent obstetric hysterectomy.
- The difficulties in delivering the infant and placenta were increased in those who had three prior CS. The findings were statistically significant and in accordance with other research.
- Adhesion was a problem that occurred in 43.5% of the patients.
- 75% of previous 3 CS cases had intraoperative adhesions.
- Seven out of the 200 volunteers experienced organ injury; the bladder was the most injured organ in all of them, and bladder repair was done.
- Blood transfusion was the most frequent postoperative complication.(5.5%).
- The previous three CS groups experienced more intraoperative problems.
- 88.5% of the infants in the current study were born weighing between 2.5 and 3.9 kg. Only 13.5% (n=27) of the babies required NICU admission, and only one had an APGAR score below 7.
- 13.3% of the prior 2 CS group needed NICU admission, whereas it was 16.7% for previous 3 CS .

CHAPTER EIGHT

LIMITATIONS

- Sample size of previous three CS was very much less compared to that of previous two CS.
- Cases of early preterm CS was not included, which can itself have complications and morbidities.
- Comparison of primary CS with previous two or more cesarean sections was not done in the study.

CHAPTER NINE CONCLUSION

The number of multiple repeat cesarean sections significantly raised the risks of rare but potentially dangerous maternal morbidities like sepsis, severe adhesions, visceral damage, haemorrhage, placenta previa, abnormal placentation, scar tenderness, anaemia, blood transfusion, infections, prolonged hospital stays. These hazards grow statistically significantly along with the number of cesarean sections. In my study 4% of women had abnormal placental invasion requiring obstetric hysterectomy. 43.5% of patients had adhesions. 75% of previous 3 CS cases had intraoperative adhesions. 3.5% of the patients had bladder injury.

Greater order repeat cesarean sections have been observed to have a higher incidence of adverse neonatal outcomes, such as low birth weight and NICU admission because of infections and respiratory problems. These findings should be carefully considered by maternal care providers in order to adequately inform women and to improve clinical surveillance aiming to identify early signs of adverse outcomes.

Patient should have proper counselling about the risk of repeat cesarean sections, and should be offered permanent sterilisation after two or more cesarean sections. Effort should be made towards decrease in the incidence of the total cesarean sections through decreasing in the number of primary cesarean sections and giving proper chance of vaginal birth after previous one cesarean section(VBAC)

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ANNEXURES

CONSENT

I have been informed by Dr.Shamlath M K P about the nature of the study,

MATERNAL AND PERINATAL OUTCOMES ASSOCIATED WITH PREVIOUS TWO OR MORE CESAREAN SECTIONS

Being aware of the implications of the study, I consent to enroll myself in the study.

- I have assured that my medical records will be kept confidential and that no personal reference will be made in the study data.
- I am also informed that by taking part in this study no cost of treatment shall be incurred by me.
- I am fully aware that I am free to withdraw from the study at anytime without any reason and that my withdrawal will not make any difference to my treatment.
- The study doesn't include any procedures that cause harmful effect in the body.

Signature :

Name :

Address :

Principal Investigator: **Dr.Shamlath M K P**
Department of Obstetrics and Gynaecology
Government Medical College,
Kozhikode:
Signature:

ACKNOWLEDGEMENT

*I wish to express my sincere gratitude to **Dr. JYOTI RAMESH CHANDRAN**, Professor and Head, Department of Obstetrics & Gynaecology, Government Medical College, Kozhikode for her invaluable suggestions and expert guidance throughout the period of study.*

*I am also deeply indebted to my research Guide, **Dr. MENON NALINI SEKHARAN**, Associate Professor in Department of Obstetrics & Gynaecology for the magnanimity she has shown in helping for taking up this project and also for her timely advice, unreserved support and efficient guidance throughout the course of my thesis work.*

*I am thankful to **Dr. SMITHA SANTHOSH**, Assistant Professor in department of Obstetrics & Gynaecology for her generous support and guidance throughout the study.*

*I am thankful to all my **Teaching faculties**, and my **Colleagues** who helped me in all phases of this study. Last but not the least; humble thanks to my **patients** and my **family** especially my husband, my daughter, my parents and my brother without which I would not have accomplished my goal.*

*Finally I thank “**The Lord Almighty**” for the wisdom and grace to complete this work.*

Dr. SHAMLATH M K P

LIST OF ABBREVIATIONS

APH	Antepartom Haemorrhage
BMI	Body Mass Index
CS	Cesarean Section
CPD	Cephalo Pelvic Disproportion
CuT	Copper T
CBD	Continous Bladder Drainage
DVT	Deep Vein Thrombosis
ERCS	Elective Repeat CS
FGR	Fetal Growth Restriction
GHTN	Gestational Hypertension
HDI	Human Development Index
HELLP	Hemolysis Elevated Liver enzymes Low Platelet
IUD	Intra Uterine Death
LUS	Lower Uterine Segment
MNM	Maternal Near Miss
MSAF	Meconeum Stained Amniotic Fluid
NICU	Neonatal Intensive Care Unit
PAS	Placenta accreta spectrum
PRCB	Planned Repeat Cesarean Delivery
PPH	Postpartum Hemorrhage
PROM	Premature Rupture Of Membranes
SMO	Severe Maternal Outcome
TOL	Trail Of Labour
TOLAC	Trail Of Labour After Cesarean
USG	Ultra Sonogram