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Comparative study of maternal morbidity in primary versus secondary cesarean section

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Abstract

Background: Caesarean section is one of the most common surgical interventions in modern obstetrics. Caesarean section rate has steadily increased from 5 to 15%, the reason being avoidance of mid forceps, vaginal breech delivery, use of electronic fetal monitoring during labor and due to the most common concept that caesarean section will reduce perinatal natal mortality.

Aims and Objectives: To study the intraoperative and postoperative complications in primary as well as secondary Caesarean section up to one week post-operative period.

Methods: Prospective observational study of which 200 women were primary caesarean section and 200 secondary sections. Patients evaluated for intraoperative and postoperative complication and followed up to discharge.

Results: Out of 400 cases 200 women were in primary caesarean section and 200 secondary caesarean section women were in group. Out of 400 cases 182 women were in the age group of 20 -25 years followed by 150 between 26-30 years. In present study most common indications of primary caesarean section were fetal distress 84 (42%). The most common intra operative complications in primary c section is postpartum hemorrhage 47 (23.5%) and adhesions 48% in secondary caesarean section. Post-operative complications being post-operative anemia 10% is significant. The findings are observed are statistically significant $p < 0.05$.

Conclusion: Caesarean section is the common procedure in modern obstetrics. Attention to detail is essential to minimize morbidity. Anticipation of problem and awareness of technique together with senior obstetrician which to lead to the best outcome.

Keywords: Caesarean section, morbidity, postpartum haemorrhage, adhesion

Introduction

Cesarean section is an operation where the baby is delivered after period of viability through incision made on the abdominal wall and intact uterus ^[1]. Cesarean section is one of the common obstetric procedures performed all over world.

Caesarean section was initially performed on dead women, as this was forbidden by the Roman law to bury the pregnant woman with the fetus in utero. The first-time caesarean section done by a sow gelder, named Jacob Nufer in 1500 AD on live women. In earlier the maternal mortality was as high as 50-70% because of failure to suture the uterine wound, leads to haemorrhage.

Sanger in 1882 sutured the uterine wound and controlled the bleeding. With the adaption of this practice, the maternal mortality is reduced to 8-10%. Caesarean section is now performed with increasing impunity, with good surgical techniques, improved anesthesia, antibiotics and availability of blood transfusion. Earlier they were used to classical type of caesarean section resulting increased mortality and morbidity mainly due to haemorrhage, Munro-kerr who did lower segment operation which is resulting in the drastic changes in the morbidity and mortality. Lower segment caesarean section will be done routinely and the classical caesarean for limited indications.

Incidence

The incidence of caesarean section is increasing all over the world. Increased incidence in caesarean section nowadays due to maternal request may be the obvious reason. WHO claimed that a caesarean section rate in the region of less than 10-15% is not justified?

A systematic review recently concluded that, caesarean section rates more than 10% didn't reduce the maternal and newborn mortality rates [2].

In both established and emerging countries, the caesarean rate is increasing. In a global report published in 2018, the caesarean section rates globally have nearly doubled, from 12% in 2000 to 21% in 2015 [3].

In India, the incidence of cesarean section is 10-15%. However, in recent years have seen an upsurge in the number of caesarean births and in institutional deliveries, the cesarean section rate is as high as 30% [4].

Various studies indicated that as compared to vaginal deliveries, cesarean section has got more risk of maternal morbidity and mortality hence proper assessment of the case is necessary for cesarean sections is necessary [5].

Aims and Objectives

- To study the intraoperative and postoperative complications in primary as well as secondary

Caesarean section up to one week post-operative period.

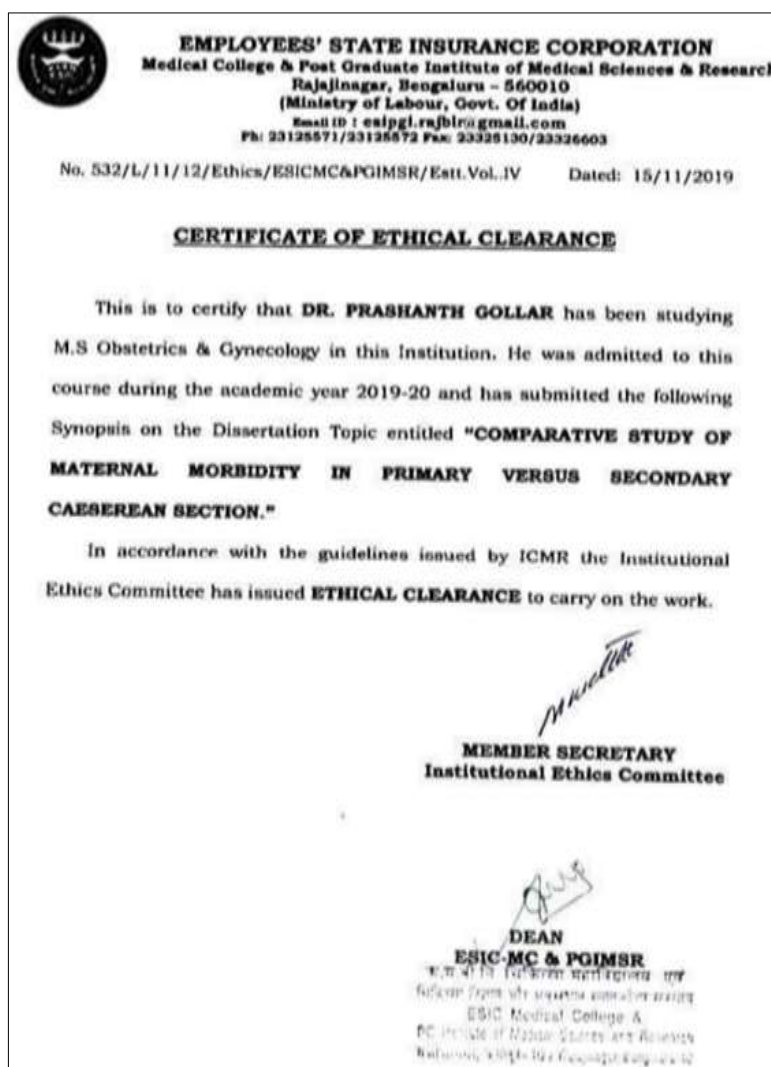
- To compare maternal morbidity in primary and secondary caesarean section.

Methodology

Source of data and materials

- The present study will be done in all pregnant women who underwent Caesarean section during the study period, those who are willing to participate and give consent for the study.
- Ethical committee approval has taken with the ethical clearance
No.532/L/11/12/Ethics/ESICMC&PGIMSR/Estt. Vol. IV Dated on 15/11/2019.
- Cases of age group of 18-40 years are selected.
- Done in Obstetrics and Gynaecology department, ESIC-PGIMSR Bangalore between JAN 2020 to JUNE 2021.

Ethical committee clearance letter



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No. 532/L/11/12/Ethics/ESICMC&PGIMSR/Estt.Vol.IV Dated: 15/11/2019

CERTIFICATE OF ETHICAL CLEARANCE

This is to certify that **DR. PRASHANTH GOLLAR** has been studying M.S Obstetrics & Gynecology in this Institution. He was admitted to this course during the academic year 2019-20 and has submitted the following Synopsis on the Dissertation Topic entitled "**COMPARATIVE STUDY OF MATERNAL MORBIDITY IN PRIMARY VERSUS SECONDARY CAESAREAN SECTION.**"

In accordance with the guidelines issued by ICMR the Institutional Ethics Committee has issued **ETHICAL CLEARANCE** to carry on the work.

M. Srinivas
MEMBER SECRETARY
 Institutional Ethics Committee

[Signature]
DEAN
ESIC-MC & PGIMSR
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Inclusion Criteria: Pregnant women who underwent Caesarean section during study period and willing to participate and give consent for the study, aged 18-40 years.

Exclusion Criteria: Patients who have uterine anomalies, fibroid uterus, previous hysterotomy, myomectomy, patients not willing to participate in the study, multiple pregnancy, GDM.

Method of collection of data

Pregnant women who are undergoing caesarean section, within age group of 18-40 years participated in the study after informed consent. In detail history will be obtained with relevance to age, last menstrual period, period of gestation and indication for caesarean section and complication during the procedure will be noted such as like in primary caesarean section - difficulty in extraction,

extension of the angle, postpartum haemorrhage, peripartum hysterectomy. In case of secondary Caesarean section complications during procedure will be noted like adhesions, injury to the adjacent structures, postpartum haemorrhage and peripartum hysterectomy. These patients are followed up for one week and post-operative complications like paralytic ileus, secondary post partum haemorrhage, postpartum anemia, puerperal sepsis, wound infection and wound gape are noted. Routine investigations will be done before the procedure.

- Informed consent was taken. (Annexure 1)
- History with respect to period of gestation, risk factors, past history; complications during present and past pregnancy history, drug usage were taken and entered in proforma. (Annexure 3)
- General physical examination were done.
- All women underwent routine blood tests and other special investigations when required.

Duration of the study: Eighteen months (January 2019 to June 2022)

Type of study: A comparative Prospective Study.

Sample Size: According to previous study we presume that the proportion of the patient with post-partum anemia among primary and secondary caesarean section where 20% and 10% respectively, we calculated sample size with 80%

power,95% confidence interval, ratio of case to control as 1:1.

Estimated sample size for the study was 200 for each group. Total sample size 400.

Equation

$$\text{Sample size } n = \frac{[DEFF * Np(1-p)]}{[(d2/z2 \ 1-\alpha/2 * (N-1) + p*(1-p))]}$$

Statistical Analysis: Microsoft excel data sheet (SPSS 22 version) was used for statistical analysis. Data that was categorical was displayed as frequencies and proportions.

The Test of significance for qualitative data was Chi-square test

Continuous data was presented as mean and standard deviation and independent t test was used to calculate p value.

Various types of graphs such as bar diagram, Pie diagram and line diagram were obtained by MS Excel and MS word p value (Probability) of <0.05 was considered as statistically significant

Statistical software: MS Excel, SPSS version 22 was used for data analysis.

Observations: The Study was conducted in ESIC & PGIMR Rajaji Nagar Bangalore. From Jan 2019 to June 2022. With sample size of 400 which includes both primary and multigravida.

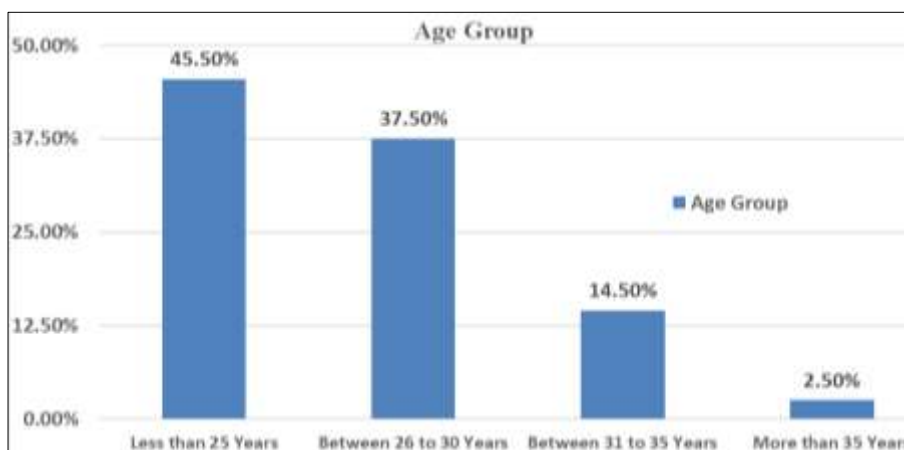


Fig 1: Graph wise distribution of study subjects based on the Age group

Table 1: Comparison of Study subjects based on the age groups in both the groups

		Group			
		Primary		Secondary	
		Frequency	%	Frequency	%
Age Group	Less than 25 Years	96	48.0%	86	43.0%
	Between 26 to 30 Years	72	36.0%	78	39.0%
	Between 31 to 35 Years	31	15.5%	27	13.5%
	More than 35 Years	1	0.5%	9	4.5%

Chi Square =7.465 p=0.058

Overall, in our study out of 400 cases, the number of women 182 (45.5%) were in the age group of 20 -25 years followed by 150 (37.5%) between 26-30 years. This is the most fertile period. With mean age of 27 years.

There is a statistically significant difference in the gestational age in between groups $p > 0.05$

Table 2: Comparison of Study subjects based on Gestational Weeks among both the groups

		Group			
		Primary		Secondary	
		Frequency	%	Frequency	%
Gestational Weeks	Less than 37 Weeks	23	11.5%	13	6.5%
	Between 37 to 39 Weeks	140	70.0%	181	90.5%
	More than 39 Weeks	37	18.5%	6	3.0%

Chi Square = 30.326 p=0.0001

In the primary C-S group, majority of them 140(70%) were in the gestational age of 37-39 weeks and in secondary C-S group 181 (90.5%) were in the gestational age of 37-39weeks.

No statistically significant difference was found in the gestational age, $p>0.05$.

Table 3: Indication of primary caesarean section.

Indications	Total number	Percentage (%)
Fetal distress	84	42
Deep transverse arrest	13	6.5
Breech in labor	13	6.5
Failed induction	20	10
Transverse lie	2	1
CPD in labour	44	22
Brow presentation	3	1.5
Severe PIH with imminent signs	7	3.5
Severe PIH with FPI (IUGR with FPI)	8	4
Cord prolapse	1	0.5
DCDA twin	1	0.5
Active molluscum contagiosum	3	1.5
Herpes genitalis	1	0.5
Total	200	100

In Our study, fetal distress 84 (42%) was the most common indication of primary caesarean section
Other common indications of Primary Caesarean section were CPD in labor 44 (22%) and failed induction 20 (10%).

6.5% of subjects in the present study had malpresentation as an indication for cesarean section. Most common mal presentation in present study was breech.

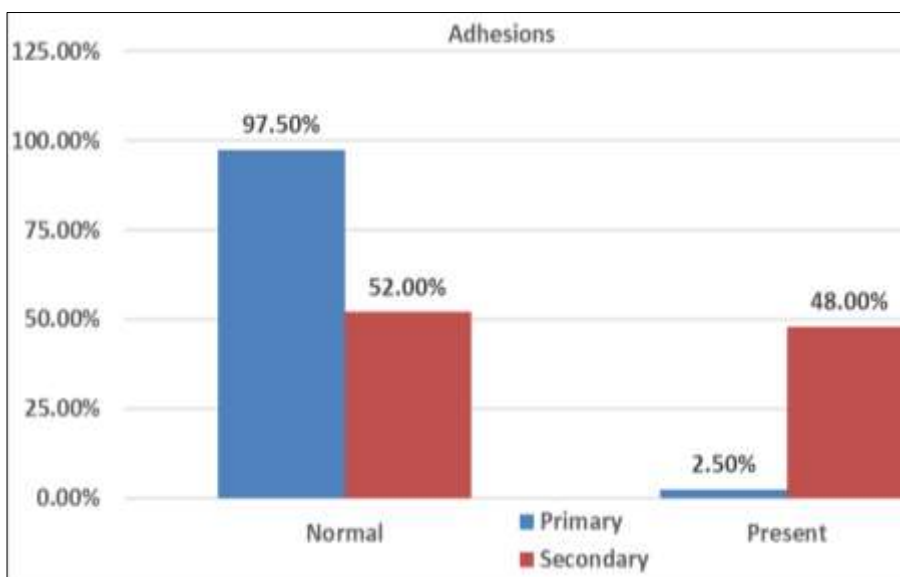


Fig 2: Graph wise Comparison of Study subjects based on wound Adhesion among both the groups

In secondary caesarean section the adhesions was found to be 96(48%) and of 5(2.5%) in primary c section, with a statistically significant p value of 0.001

Table 4: Comparison of Study subjects based on Difficulty of Extraction among both the groups

		Group			
		Primary		Secondary	
		Frequency	%	Frequency	%
Difficulty in Extraction	Normal	181	90.5%	188	94.0%
	Present	19	9.5%	12	6.0%

Chi Square = 1.713 p= 0.191

Extraction was difficult in 19 (9.5%) of primary caesarean section and 12(6%) of secondary caesarean section observed in our study with statistically insignificant p value of 0.191

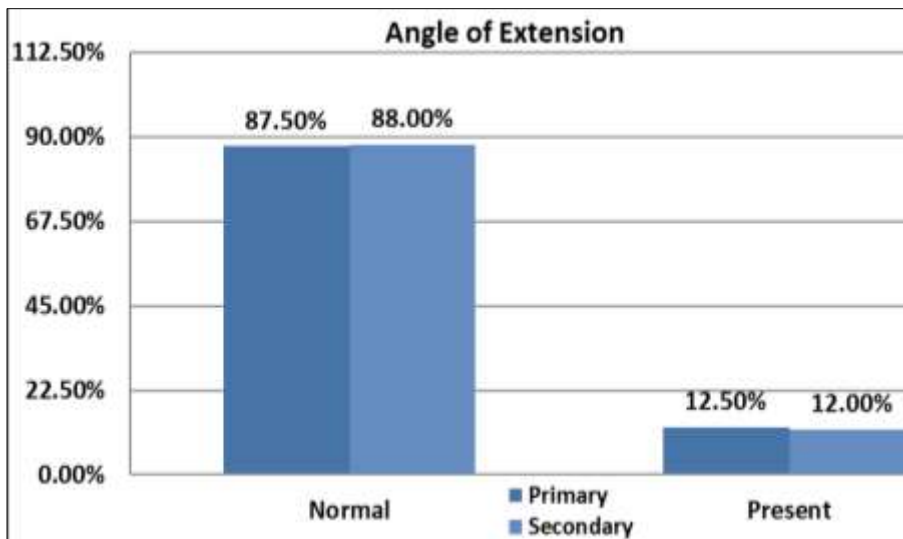


Fig 3: Graph wise Comparison of Study subjects based on Angle of extension among both the groups

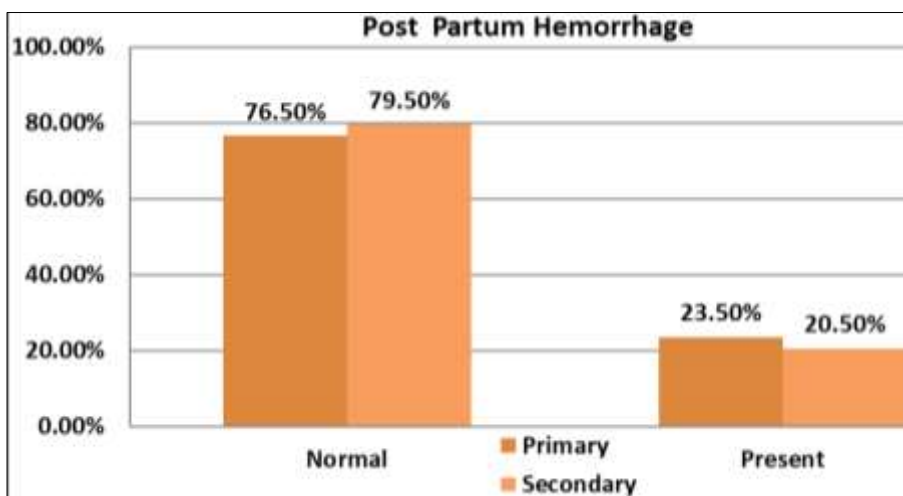


Fig 4: Graph wise Comparison of Study subjects based on Post-Partum Hemorrhage among both the groups

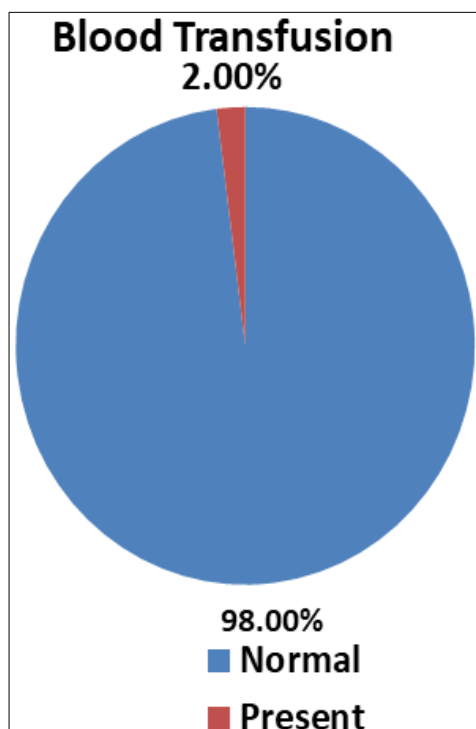


Fig 5: Graph wise Comparison of Study subjects based on Blood Transfusion among both the groups

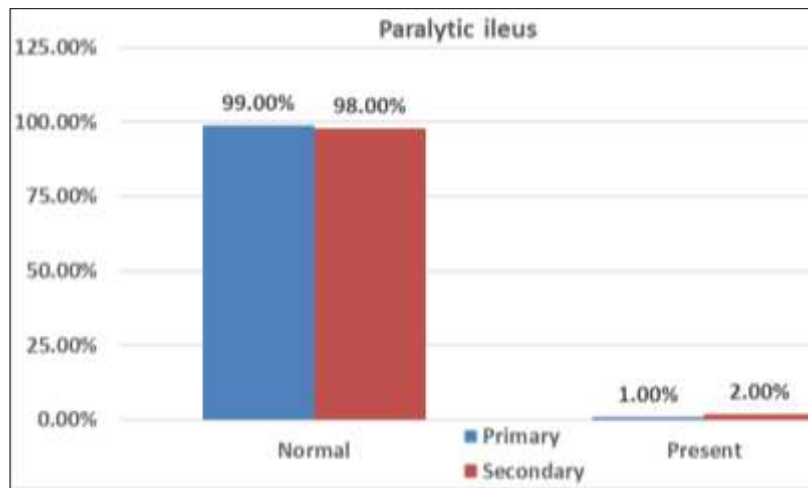


Fig 6: Graph wise Comparison of Study subjects based on Paralytic ileus among both the groups

Table 5: Comparison of Study subjects based on Post-Operative Blood Transfusion among both the groups

		Group			
		Primary		Secondary	
		Frequency	%	Frequency	%
Post-Operative Blood Transfusion	Normal	180	90.0%	183	91.5%
	Present	20	10.0%	17	8.5%

Chi square = 0.268 p=0.605

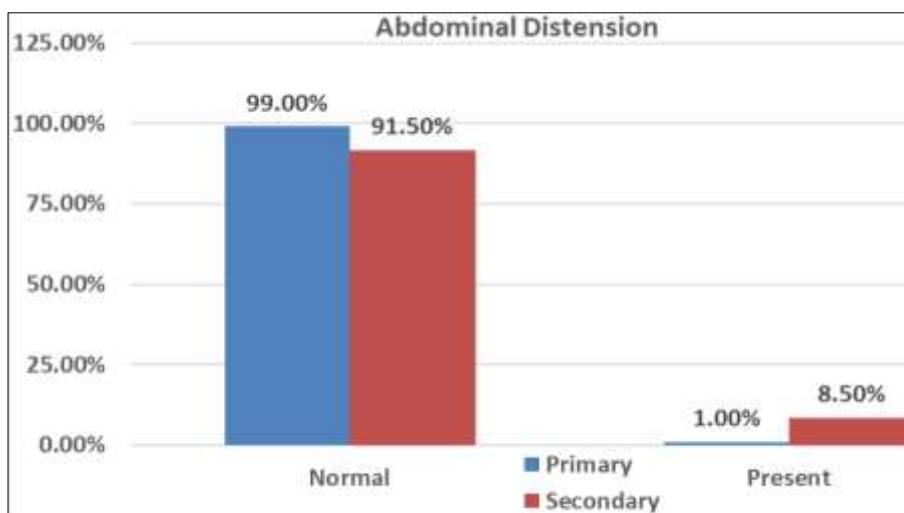


Fig 7: Graph wise Comparison of Study subjects based on Abdominal Distension among both the groups

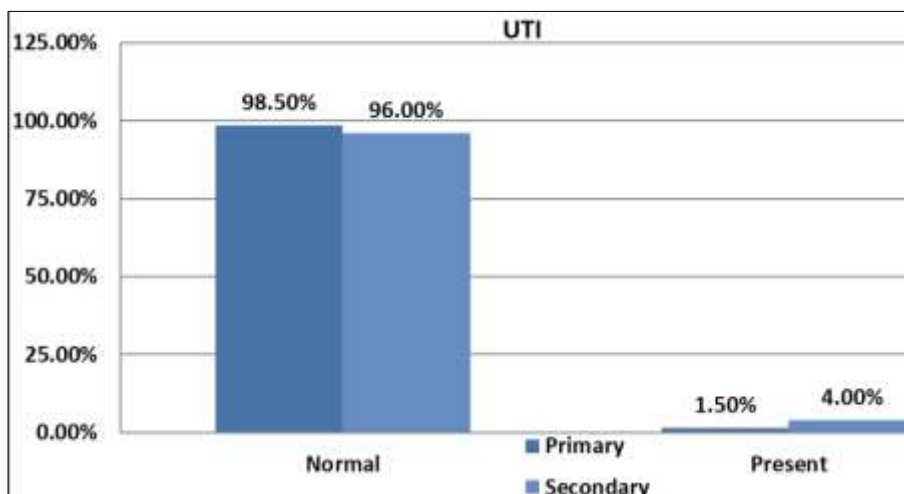


Fig 8: Graph wise Comparison of Study subjects based on UTI among both the groups

Table 6: Comparison of Study subjects based on Wound gaping among both the groups

		Group			
		Primary		Secondary	
		Frequency	%	Frequency	%
Wound Gaping	Normal	185	92.5%	182	91.0%
	Present	15	7.5%	18	9.0%

Chi Square =0.297 p= 0.586

Extension of the angle 25(12.5%) in primary c section and 24(12%) in secondary c section with a statistically significant p value of 0.879. In our study postpartum hemorrhage (PPH) in primary c section is 47 (23%) and 41(20.5%) in secondary c section, with statistically insignificant p value of 0.479. Intra operative blood transfusions 4 (2%) in each group due to atonic PPH, with statistically insignificant p value of 1.00.

In secondary caesarean section the paralytic ileus was found to be 4(2%) and of 2(1%) in primary caesarean section, with statistically insignificant p value of 0.411.

In primary c section the blood transfusion was found to be 20(10%) and of 17(8.5%) in secondary caesarean section with statistically insignificant p value of 0.605. In secondary caesarean section the adhesions was found to be 17(8.5%) and of 2(1%) in primary c section with a statistically significant p value of 0.0001. In secondary caesarean section the UTI was found to be 8(4%) and of 3(1.5%) in primary c section with a statistically significant p value of 0.126. In secondary caesarean section the wound gaping was found to be 18(9%) and of 15(7.5%) in primary c section with a statistically insignificant p value of 0.586

Discussion

One of the most often performed procedures is Caesarean section, done routinely in obstetric practice across India.

There is increase in the rate of Caesarean section rate thought the world due to various reasons and medical, social, ethical and medico legal factors also has an important role.

Relative indication of Caesarean section has changed due to various reasons. Pre-Pregnancy status is one of the independent risk factors for morbidity.

In our study, the primary C-section group, out of 200 cases, 48% of subjects were in 18-25yr age group, 36% of subjects were in 26-30yr age group, 15% of subjects were in 31-35yr age group, 0.4% of subjects were above 35yr age group.

In secondary C-section group, out of 200 cases, 43% of the subjects were in 18-25yr age group, 39% of subjects were in 26-30yr age group, 13.5% of subjects were in 31-35yr age group, 4.5% of subjects were above 35yr age group.

In Our study out of the 400 subjects - the largest proportion of women, 182 (45.5%), were in the 20–25 year age range, followed by 150 (37.5%) between 26-30 years. 20-30 years is most fertile period with mean Age of 27 years. The similar age group observed in Nigar A *et al.* and other studies [6-8]. Which is statistically significant.

In present study caesarean sections more in younger age group (18-24). This is comparable with study conducted by P.renuka, V. Suguna S [9]. May be Due to anxious and pampered by family members.

In present study common indications of primary caesarean section were fetal distress 84 (42%). which is correlates with study by Rupal Samal *et al.* [10] (44.1%). As non-reassuring NST as the most common indication which is associated

with commodities as pre-eclampsia, Postdatism, PROM, IUGR, GDM.

Other common causes were CPD in labor 44 (22%) and failed induction 20 (10%), which is comparable with Gayathri D *et al.* who reported CPD 38(15.8%), Failed induction 10(4.2%) [11]. deep transverse arrest 13 (6.5%) This is comparable with a study done by Bade P *et al* who reported arrest of labor (17.6%), as common Indications of Primary Caesarean section [12].

6.5% of subjects in the present study had malpresentations as an indication for cesarean section. In the study by Erika Desai *et al.* [13] (17.44%) of subjects had malpresentation as an indication, while in a study by P. Himabindu *et al.* [14] (19.3%) had malpresentation. Most common malpresentation in present study was breech.

In our study in primary caesarean sections, the most common intra operative complications were postpartum hemorrhage 47 (23.5%) which is comparable with Nigar A *et al.* study due to second stage section which leads to atonicity of uterus and associated with secondary to pre pregnancy anemia with history of treated with blood or iron supplements. And patients with pre-eclampsia, GHTN. Managed with medical management.

Extension of the angle 25(12.5%) and difficulty in extraction 19(9.5%) which is 5% in Kalpana P *et al.* study [15]. due to big baby, CPD in labor, polyhydramnios (mobile head) and oligohydramnios (baby is stucked).

In our study Adhesions were 5(2.5%) which is less common complication in primary section, may be due to previous history of other surgeries (i.e. h/o appendicitis, small bowel obstruction etc.). Intra operative blood transfusions 4 (2%) which is comparable with silver *et al.* (4.5%) Due to atonic PPH.

And out of 200 secondary caesarean section the most of intra operative complication were adhesions 96(48%) which is comparable with Morales *et al.* 46% and Lyell D J *et al.* 46%, adhesions between bladder and uterus were the most common and next most frequent is dense adhesions between anterior surface of the uterus and parietal peritoneum [17] This was managed by adhesiolysis and a higher up incision in some cases. The majority of these individuals had severe bleeding as a result of prolonged operations and increased raw surface area after adhesiolysis.

The caesarean section is commonly linked to factors including tissue handling roughness, tight suturing, extensive use thermal cautery that are known to produce adhesions.

Adhesions are graded as 5 adhesion sites. Score "0" no adhesion, "1" flimsy membrane adhesion (Requires only finger incision) and "2" tight dense adhesion (Requires sharp incision with scissors or diathermy for adhesiolysis) minimum score "0" and maximum score "10".

In our study postpartum hemorrhage (PPH) 41(20.5%). in study Gupta M *et al.* shows 13% [18]. In our study observed that primary cause of PPH in secondary c section due to adhesion which leads prolonged incision to extraction which

cause atonicity and may be associated comorbidities as pre-eclampsia, GHTN.

Other complications were angle extension 24 (12%), difficulty in extraction 12 (6%), which is comparative in Kalpana P *et al.* 5%. due to dense adhesions.

Intra operative blood transfusion 4(2%). which is comparable with Vishwakarma K *et al.* 2.56%. due to atonicity [18].

Intra operative complications were more in previous C-section compared to primary C-section. The findings are observed to be statistically significant with a p value of 0.05. In our study the most common post-operative complication post-operative anemia/blood transfusion 20(10%) in primary c-section. Which is comparable with Gayathry D *et al.* with post-operative anemia 10.7%. And wound infection 15 (7.5%) in primary c section and in secondary c section 18 (9%), which is comparable with T. Parrot *et al.* wound infection 4.6% and secondary c section is 11.3% [19]. The incidence of abdominal wound infections following c section, according to William's obstetrics ranged from 3-15% with an average of 6%. In our study pre pregnancy anemia, obesity, GDM, hypothyroidism patients are the risk factors for wound infection. And comparatively wound infection incidence is more in secondary c section.

The prevalence of urinary tract infections in primary c-section in our study, was 3(1.5%) and in secondary c section it was 8(4%) which is comparable with Jhajhria R *et al.* 2% [20]. Abdominal distension 2(1%) in primary c section and 17(8.5%) in secondary c section. In primary c section paralytic ileus 2(1%), and in secondary c section paralytic ileus is 4(2%). which is comparable with Vishwakarma K *et al.* 3.19% [12]. It is caused by gastrointestinal hypomotility without mechanical intestinal obstruction.

Conclusion

The most common surgical procedure in obstetrics is Caesarean section. Effort should be made to reduce emergency caesarean section rate with adequate training of medical professions in instrumental deliveries and vaginal deliveries should be anticipated in favourable cases will reduce the rate. Proper antibiotic prescription pattern has to be followed in order to prevent infection. Adequate adhesive preventive techniques such as securing effective hemostasis encourage in case of second stage sections and obese patient. Previous caesarean section patients should be well prepared (blood to be arranged, prophylactic antibiotic) and better to be done under supervision of senior obstetrician.

Conflict of Interest

Not available

Financial Support

Not available

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