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Original Research Article

A STUDY OF PRIMARY EMERGENCY CESAREAN DELIVERY BETWEEN BOOKED AND UNBOOKED CASES AT TERTIARY CARE CENTRE

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ABSTRACT

Background: A study of primary emergency caesarean delivery between booked and unbooked cases at Tertiary Center.

Materials and Methods: Prospective observational study in subjects admitted in the given study done for a period of 18 months. Booked and unbooked antenatal cases admitted and who underwent emergency caesarean delivery, Term gestation (early and late term) and singleton pregnancy are enrolled in study.

Results: Total 2336 patients with booked cases in 1408 and unbooked 928 cases are studied. Emergency caesarean sections were more frequent among booked mothers as most of the cases are of high risk category landing in Caesarean section. most of the patients belonging to Socio-economic status of II and III . Severity of the SE Status is associated with the booking status of mothers. Teenage pregnancy is more in unbooked group. Hypotension and PPH were the most common intraoperative complications among both booked and unbooked mothers. The proportion of cases indicates, albeit relatively small, required NICU admission, with a higher percentage observed in the unbooked group compared to the booked group. Maternal outcomes between booked and unbooked cases, with booked cases with much lower incidence of maternal mortality.

Conclusion: Booked antenatal patients have better maternal outcome and perinatal outcome in terms of mortality when compared to Unbooked patients.

Keywords: National Rural Health Mission(NRHM), Haemolysis , Elevated Liver Enzymes, Low Platelets (HELLP), unbooked cases.

INTRODUCTION

Caesarean delivery is one of the most commonly performed operations today. Obstetric practice has witnessed an increasing frequency in Caesarean deliveries, in India the incidence of Caesarean section has increased from 17.2% in 2015 to 21.5% in 2021.[1,2] The procedure has evolved from it being done in desperate situations as a postmortem surgery to save the unborn child to present times where one of the commonest indications for Caesarean delivery is previous Caesarean birth. According to estimates of WHO 2020, world health statistics, the maternal mortality ratio is 560 (1990), 370 (2000), 190 (2013), 130 (2016), 103 (2020) per 100,000 live births.[3,4]

Inspite of all attempts to deliver the fetus by elective Caesarean section, many times emergency Caesarean section may have to be resorted for fetal or maternal salvage. The incidence of severe maternal morbidity is significantly higher among women undergoing emergency Caesarean section than women undergoing elective one. In emergency cases, there is lack of all the facilities, availability of trained staff, all the criteria may not be fulfilled, and both maternal and fetal complications are more common.[5,6]

Late referrals in case of obstructed labor, abnormal presentations, toxemia and inadequate transport facilities to apex hospital-this leads to increased risk of Maternal and Perinatal complications.[7,8]

Prenatal care aims to identify high risk pregnancy and to prevent and manage problems and factors that adversely affect the health of the mother and infant. Improper antenatal and intra-natal care at peripheral level is responsible for poor maternal and perinatal outcome. The two delay's which can affect a woman's chance of surviving an obstetric emergency are Delay in problem recognition and decision making and Delay in reaching a health facility. Periodic health surveys to be done like NFHS, DLHS, AHS to decrease the mortality and morbidity.[9]

The literature indicates that the most likely known targets for prenatal interventions to prevent low birth weight rates are Psychosocial (aimed at chronic Toddy intake), Nutritional (aimed at low pre pregnancy weight and inadequate weight gain), Medical (aimed at general morbidity like chronic anemia). However data on the effectiveness of these services are lacking. Caesarean delivery, commonly known as C-section, is a critical surgical intervention performed to deliver a baby when complications arise during labour. It can be either planned in advance (elective Caesarean) or necessitated as an emergency measure due to unforeseen circumstances during pregnancy. Emergency Caesarean delivery refers to the urgent need for a Caesarean section without prior planning or indication during the gestational period. The categorization of caesarean deliveries into booked and unbooked cases is pivotal in understanding the intricacies of primary emergency caesarean deliveries within the realm of maternal healthcare. Booked cases involve pregnancies where the mother has received regular prenatal care and has been under the continuous supervision of healthcare professionals throughout the duration of pregnancy. In contrast, unbooked cases involve pregnancies where the mother did not receive adequate prenatal care or lacked access to healthcare services until the onset of labour.

Present study was undertaken at a Tertiary care center which has a patient population mainly from low socio-economic status and rural areas. Patients were referred from private hospitals, cases handled by untrained dais and untrained medical personnel then being referred to us as unbooked cases in an emergency state for management. These high risk rural referral cases (Unbooked) are managed by emergency Caesarean delivery which are compared to booked emergency Caesarean deliveries , therefore it is essential to compare the outcome of Caesarean deliveries in both situations, hence the need for study.

MATERIALS AND METHODS

Prospective observational study in subjects admitted in the given study period from July 2022 to December 2023. All booked and unbooked antenatal cases of term gestation (early and late term) in the Department of Gyneacology and obstetrics.

Inclusion Criteria

Booked and unbooked antenatal cases admitted in who who underwent emergency caesarean delivery, Term gestation (early and late term) and singleton pregnancy.

Exclusion Criteria

preterm cases, multiple gestation, booked and unbooked cases admitted for elective caesarean delivery. -booked and unbooked cases undergoing vaginal deliveries.

The study population would be categorized into 2 groups:

1. Booked cases.
2. Unbooked cases.

Booked cases are those who had regular antenatal checkup. Unbooked cases are those who did not have minimum of 4 antenatal checkups.

A detailed information regarding the maternal age, duration of pregnancy, socioeconomic, literacy status, antenatal registration, number of antenatal visits will be gathered. A detailed general, systemic& obstetrical examination will be done. The indications and risk factors for emergency primary caesarean delivery are assessed. The maternal and fetal intraoperative and postoperative complications will be noted. All cases will be followed up postoperatively till the patient is discharged. all newborns will be evaluated at birth and the need for nicu admission will be noted and followed up till the newborn is discharged.

Primary emergency Caesarean deliveries are typically performed under urgent circumstances, requiring swift decision-making and prompt surgical intervention to minimize risks and optimize outcomes for both the mother and the baby. While Caesarean delivery can be a life-saving procedure when medically indicated, it also carries risks and potential complications, highlighting the importance of skilled obstetric care and timely interventions in managing emergency situations during labor and childbirth.

The research investigates primary emergency Caesarean deliveries (PEC) at a tertiary care center, focusing on the differences between booked and unbooked cases. PEC refers to urgent Caesarean sections without prior planning, often necessitated by complications during labor or childbirth. Booked cases involve pregnant individuals who received regular prenatal care, while unbooked cases did not. By analyzing medical records and data, the study aims to compare the incidence, indications, and outcomes of PEC in these two groups. It seeks to identify factors influencing PEC rates and assess the effectiveness of prenatal care in reducing emergency Caesarean deliveries. The findings are expected to inform strategies for improving prenatal care access and quality, ultimately optimizing maternal and neonatal health outcomes in both booked and unbooked cases at tertiary care centers.

RESULTS

Table 1: Indications of emergency caesarean section in booked and unbooked groups.

Indication for C-section	Booked Cases	Unbooked Cases
Fetal distress-non reassuring nst	387(27.5%)	241(25%)
Severe pre-eclampsia- uncontrolled hypertension.	89(7.8%)	130(13%)
Antepartum eclampsia with end organ damage.	30(2%)	59(6%)
Doppler changes	36(2.55%)	28(3%)
CPD	126(9%)	22(2.5%)
Placenta Previa	92(7.25%)	52(6.2%)
Abruption	14(1%)	38(4%)
Malpresentation	70(4.9%)	9(1%)
Failure of Induction	146(8.9%)	72(8%)
Contracted Pelvis	74(5.25%)	30(3.5%)
Obstructed Labour	42(2.9%)	37(4%)
Shoulder Dystocia	8(0.56%)	28(3%)
Cord Prolapse	7(0.49%)	25(3%)
Deep Transverse Arrest	52(3%)	10(1%)
Severe Oligohydromnious	17(1.2%)	28(3%)
Prom	38(2.8%)	65(7%))
Failed instrumental delivery	15(1%)	9(1%)
Heart disease complicating pregnancy	97(6.9%)	49(5%)
Chronic Liver Disease	56(3.9%)	28(3%)
Total	1408	928
S.E Status		
II	233(10.03 %)	118 (11.9 %)
III	739 (31.66 %)	433 (30.03 %)
IV	644 (27.57 %)	466 (20.06 %)

This indicates that emergency caesarean sections were more frequent among booked mothers as most of the cases are of high risk category landing in Caesarean section.

Table 2: Distribution of study subjects according to SE status

S.E Status	Booked cases	Unbooked cases
II	233(10.03 %)	118 (11.9 %)
III	739 (31.66 %)	433 (30.03 %)
IV	644 (27.57 %)	466 (20.06 %)

Overall, the data indicates that there is a substantial difference in the distribution of S.E. Status among booked and unbooked mothers, with higher incidences observed among the booked mothers across all S.E. Status categories. This indicates that most of the patients belonging to Socio-economic status of II and III are utilizing the resources available to them at Tertiary care centre and are having Regular antenatal visits. since the p-value (0.0013).

Table 3: Age wise distribution of the study subject

Age group in years	Booked cases	Unbooked cases
<20	359	405
21-25	550	274
26-30	301	164
>30	198	85

p <0.05 significant, x2 = 34.888

As shown in the above table, the maximum no of cases were seen In <20 years in both booked and unbooked groups. Teenage pregnancy is more in unbooked group i.e 43.6% compared to 25.4% in the booked group.

Table 4: Distribution of study subjects according to intra- operative complications

Intra-operative Complications	Booked		Unbooked	
	n	%	n	%
Hypotension	384	27.27	191	20.58
PPH	168	12.86	141	15.19
Desaturation	121	8.51	26	2.80
Tachycardia	26	0.7	194	20.90
Intrapartum eclampsia	9	0.63	23	2.47
Hysterectomy	0	0	1	0.1
Broad ligament Hematoma	22	1.5	45	4.8

Hypotension and PPH were the most common intraoperative complications among both booked and unbooked mothers, although their incidence rates varied between the two groups.

Table 5: Distribution of study subjects according to postoperative complications

Postoperative Complications	Booked		Unbooked	
	n	%	n	%
DIC	8	0.54	23	2.54
2° PPH	27	2	59	6.39
MODS	3	0.2	13	1.43
Pulmonary edema	42	3	94	10.7
PPE	66	4.7	84	8.97
Sepsis	3	0.2	90	9
AKI	11	0.8	12	1.3
CSVT	28	2	70	3.00
PRES	22	1.6	83	4.00
Toddy withdrawal Seizures	134	9.5	168	16.00
Anemia	436	31.00	356	39.00
HELLP	163	11.6	204	22.00

The data presents a stark contrast in the distribution of postoperative complications between booked and unbooked patients.

Table 6: Distribution of study subjects according to nicu admission

NICU admission	Booked		Unbooked	
	n	%	n	%
Not required	1221	86.7	505	54.4
Required	187	8.00	327	35.2

The proportion of cases indicates, albeit relatively small, required NICU admission, with a higher percentage observed in the unbooked group compared to the booked group. This suggests the importance of monitoring and timely interventions to improve neonatal outcomes, especially in cases with higher risk factors and frequent antenatal visits of unbooked cases at Tertiary care centre. Corresponding p- value is approximately 0.12, which is more than the typical significance level suggests that there is a significant association between NICU admission status and the booked/unbooked groups.

Table 7: Distribution of study subjects according to baby outcome

Baby Outcome	Booked		Unbooked	
	n	%	n	%
Dead	51	3.6	81	8.7
Discharged	1355	96.2%	847	91.2%
Mother Outcome	**n**	**%**	**n**	**%**
Live	1401	59.97	928	39.38
Dead	7	0.30	22	2.34

In the booked group, 1355 babies were discharged, while 847 babies were discharged in the unbooked group. (Dead): In booked group 51 babies and in unbooked group 81 babies were recorded Dead (those died in NICU).

Corresponding p-value of approximately 0.00092 there is a statistically significant association between Baby Outcome and the booking status of the subjects. In other words, there is evidence to suggest that the distribution of Baby Outcome differs significantly between booked and unbooked subjects.

Table 8: Distribution of study subjects according to maternal outcome

Mother Outcome	Booked		Unbooked	
	n	%	n	%
Live	1401	59.97	928	39.38
Dead	7	0.30	22	2.34

Significant disparity in maternal outcomes between booked and unbooked cases, with booked cases generally exhibiting a much lower incidence of maternal mortality and a higher likelihood of a live outcome compared to unbooked cases a p-value of 0.0 suggests a highly significant association between maternal outcome and booking status. This indicates that there is a strong relationship between being booked for delivery and having a live maternal outcome, while being unbooked is strongly associated with maternal death. The difference in outcomes between booked and unbooked cases is statistically significant.

DISCUSSION

Emergency Caesarean delivery is a critical intervention often necessitated by complications that

arise during pregnancy or labor. The outcomes of such procedures can significantly differ based on whether the mother received regular antenatal care and also depends on maternal condition. In rural areas, due to lack of awareness and poor socioeconomic status and where access to healthcare services is often limited, unbooked cases (those who did not attend regular antenatal clinics) are more prevalent.[10] The findings highlight the significant impact of antenatal care on maternal health and the need of early referrals of high risk cases.The study compared the sociodemographic characteristics, obstetrical complications, and maternal and fetal outcomes between booked and unbooked cases.[11] Booked cases with complicated pregnancy who had regular visits at Tertiary care centre were benefited from early detection and management from impending potential complications and had less mortality and good perinatal outcome compared to unbooked cases but landed in Emergency Caesarean section. The data suggests that improving access to antenatal care in rural areas can substantially reduce maternal and perinatal morbidity and mortality, emphasizing the need for targeted interventions to bridge the healthcare gap between rural and urban populations.

Our study, conducted from August 2022 - January 2024(18 months), found that the incidence of emergency Caesarean sections was 60.27% in the booked group (n=1408) and 39.73% in the un-booked group (n=928). When compared to other studies, such as Vidyadhar et al,[12] with 27% in the booked and 73% in the un-booked group, and Gul-e-Irim et al,[13] with 43.9% in the booked and 56% in the unbooked group, our study findings conclude increased rate of emergency caesarean section in booked cases compared to unbooked indicating most of the high risk cases were delivered by caesarean section due to high risk causes. The variability in the incidence rates across different studies highlights the influence of local healthcare practices, patient demographics, and definitions of 'booked' and 'unbooked' groups. Notably, the lower percentage of emergency Caesarean sections in booked patients across various studies which was not in accordance with present study. Our study reinforces the critical importance of ensuring access to consistent prenatal care to reduce maternal mortality and perinatal morbidity & mortality.

The present study and the study by Masood Z et al,[11] underscore the critical impact of antenatal care on maternal and fetal outcomes in Caesarean sections. Masood Z et al,[11] found that booked mothers experienced fewer maternal deaths, shorter hospital stays, and better neonatal outcomes, with significant benefits observed for older, parous women. Their study also noted higher neonatal ICU admissions and deaths among unbooked mothers, particularly those with lower gestational ages and higher parity. These findings collectively emphasize the necessity of improving access to and utilization of antenatal care to reduce maternal and fetal complications, especially in rural areas. The study by Nair RV et al,[14] focused on 100 primigravida women undergoing primary Caesarean sections, with the most common age group being 20-25 years (45%). In their cohort, 80% of the cases were booked and 20% were unbooked. All deliveries were conducted via lower segment Caesarean sections (LSCS), with an average labor duration of 10 hours and 35 minutes. Notably, 18% of the Caesarean sections were elective, due to conditions like contracted pelvis, pre-eclamptic toxaemia, borderline disproportion, breech presentation, postdated pregnancy, oligohydramnios, and transverse lie with placenta previa. The remaining 82% were emergency sections caused by complications such as fetal distress, disproportion, premature rupture of membranes, breech presentation, dystocia, antepartum hemorrhage, decreased fetal movement, brow presentation, footling, and cord presentation. This study highlighted that antenatal care allows for better management of deliveries, resulting in more elective procedures and fewer emergency interventions.[15]

Our study at Tertiary centre examined 1408 booked women undergoing emergency Caesarean sections. The indications for these emergency procedures were diverse, including 27.5% for fetal distress,7.8% for severe-preeclampsia(uncontrolled hypertension),2% for Antepartum- eclampsia with end organ damage, 2.5% for doppler changes, 9% for CPD, 7.25% for placenta previa, 1% for abruption, 4.9% for malpresentation,8.9% for failure of induction, 5.2% for contracted pelvis, 2.9% for obstructed labour, 0.56% for shoulder dystocia,0.49% for cord prolapse,2% for Deep transverse arrest, 1.2% for severe oligohydromnious , 2.8% for PROM,1% for failed instrumental delivery, 6.9% for Heart disease complicating pregnancy, 3.9% for chronic liver disease,4.1% for Multiple Gestation .As the present study was conducted at a tertiary care centre most of the booked cases were delivered by emergency caesarean section due to various high risk indications. Our findings demonstrated that unbooked mothers face a significantly

higher risk of adverse outcomes due to the lack of regular antenatal monitoring and timely medical intervention. This comparison with Nair RV et al,[14] study understands the urgent need to improve access to and utilization of antenatal care services, particularly in rural areas, to reduce maternal mortality along with perinatal morbidity & mortality. The comparison between Bangera RT et al,[15] and our study reveals notable differences in the socioeconomic status distribution among women undergoing emergency Caesarean sections. While previous studies showed a higher representation of booked cases in the upper socioeconomic classes, our investigation found a contrasting scenario, with a majority of unbooked cases falling into lower socioeconomic class. This disparity suggests potential barriers to accessing antenatal care services among women from lower socioeconomic backgrounds, which could contribute to adverse

maternal and fetal outcomes. In our study 27.5% of Upper lower class were booked cases indicating most of them belonging to High risk category are being picked up by ASHA worker from CHC & PHC. Simultaneously in Unbooked cases, 20% of them were of Upper lower class, 30% of Lower Middle class,11.9% of Upper Middle class. Additionally, efforts to raise awareness about the importance of regular antenatal care and the availability of support services for pregnant women from various socioeconomic claases are essential in promoting maternal and fetal health.

The study conducted by Samal R et al,[16] sheds light on the significant improvements in maternal and neonatal outcomes over time, particularly in multiparous women. Their findings indicate the absence of maternal mortality, attributing this to advancements in obstetric care, including the availability of antibiotics, blood transfusion facilities, safe anesthesia methods, and skilled obstetricians. They emphasize the importance of proactive obstetric care, including antenatal and intrapartum monitoring, timely interventions, and access to obstetric intensive care units, in reducing maternal and perinatal morbidity and mortality in multiparous women. Additionally, the study highlights the evolving management practices, with a shift towards a lower threshold for opting for Caesarean sections to safeguard fetal health, reflecting the changing landscape of obstetric practice and the increasing acceptance of the necessity of Caesarean sections in certain situations. In comparison, our study provides contemporary data on maternal and neonatal outcomes, revealing a low incidence of maternal mortality among booked cases136. Our findings align with those of Samal R et al,[16] in emphasizing the importance of vigilant monitoring, timely interventions, and proactive obstetric care to mitigate risks and ensure optimal outcomes.

The study conducted by Bello OO et al,[17] highlighted significant maternal and fetal complications associated with emergency Caesarean delivery (CD), with obstructed labor being the primary indication138. They reported a high proportion (85.5%) of emergency CDs, predominantly among unbooked women. Complications such as hemorrhage, puerperal sepsis, wound infection, and anemia were more prevalent among those with emergency CDs, along with adverse fetal outcomes including low birth weight and stillbirths. Notably, women with postdated pregnancies had twice the likelihood of undergoing emergency CDs. This understands the importance of educating pregnant women and communities about pregnancy and labor complications to facilitate prompt intervention and reduce adverse outcomes. In our study there was increased rate of Perinatal mortality in Unbooked cases compared to Booked cases. Overall, both studies understand the importance of proactive obstetric care in reducing maternal and fetal complications, highlighting the significance of timely interventions and community education to enhance pregnancy outcomes.

The comparison between our study and the referenced study groups reveals varying rates of NICU admission among booked and unbooked mothers. In Arunda M et al the proportion of NICU admissions was notably higher among unbooked mothers (13.8%) compared to booked mothers (3.2%), indicating a potential association between lack of antenatal care and neonatal complications requiring intensive care. Mundhra R et al,[19] and Sahadev S et al,[20] reported similar trends, with higher rates of NICU admissions among unbooked mothers compared to booked mothers. These findings collectively understand the importance of antenatal care in preventing neonatal complications and the need for targeted interventions to improve access to prenatal services, particularly among marginalized populations. In our study, we observed significant differences in NICU admission rates between booked and unbooked mothers. While the majority of babies born to booked mothers did not require NICU admission (86.7%), a substantial proportion of unbooked mothers (35.2%) required NICU admission, highlighting the potential impact of inadequate antenatal care on neonatal health outcomes. These findings emphasize the need for comprehensive strategies to address barriers to antenatal care utilization, such as improving access to healthcare services, addressing socioeconomic disparities and increasing awareness about the importance of prenatal care. By identifying the disparities in NICU admission rates between booked and unbooked mothers, our study provides valuable insights for informing targeted interventions aimed at improving neonatal health outcomes and reducing the burden of neonatal complications associated with inadequate antenatal care.[21]

CONCLUSION

The following conclusions are rate of Emergency Caesarean Delivery were high in Booked cases as my study was done at a Tertiary care centre where there is higher proportion of High risk cases. Booked antenatal patients have better maternal outcome in terms of mortality when compared to Unbooked patients. Booked antenatal patients have better perinatal outcome when compared to Unbooked antenatal patient. There was Increased rate of Post-operative complications in Unbooked cases.

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