DETERMINANTS OF PRIMARY CAESAREAN DELIVERY AND ITS OUTCOME IN SOUTH KERALA

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ABSTRACT

BACKGROUND

Caesarean Delivery is one of the most common surgical intervention in modern obstetrics. It is certainly one of the oldest operations in surgery, with its origin lost in antiquity and ancient mythology. Caesarean birth has been the most common hospital-based operative procedure in many parts of the world. An operation mainly intended to save a maternal life during difficult childbirth has now increasingly become the procedure of choice in high risk situations to prevent perinatal mortality and morbidity. The incidence of Caesarean section has doubled or tripled all over the world over the past 2 decades. Justification for this trend is the lowering of maternal mortality to the point of nil and increasing survival as compared to difficult vaginal deliveries. WHO[1] endorsed that a caesarean delivery rate more than 10 to 15% is not justified in any region of the world. One of the ways that we could adopt to reduce the caesarean delivery rates would be to cut down the primary caesarean rates. So, in this study, we have analysed the determinants of primary caesarean delivery and their outcomes (maternofoetal) in a tertiary care teaching hospital in South Kerala.

Objectives of the study are- 1) To find out the determinants of Primary Caesarean (Sociodemographic, Obstetric, Medical, Foetal and Physician factors). 2) To evaluate the maternal and foetal outcomes of Primary Caesarean Delivery.

MATERIALS AND METHODS

Study Design- Case Control Study.

This study was conducted in 900 subjects (450 cases & 450 controls) in the Department of Obstetrics and Gynaecology, Sri Avittom Tirunal Hospital, Thiruvananthapuram over a period of six months.

Study Variables- Age, Sociodemographic Data, Source of Referral, Antenatal Risk Factors, Maternal Anthropometry, Indication of Caesarean Delivery, Birth Weight of Baby, Maternal Postoperative Morbidities, NICU Admissions and Neonatal Details were noted.

RESULTS

The mean age of the case group was 25.3 and 24.21 in the control group. Primipara are 1.96-fold more likely to undergo caesareans. Women having medical disorders had 3.587-fold chance of operative intervention. Bad Obstetric History mothers had 1.68 times more chance of abdominal delivery. Coming to maternal anthropometry, women more than 70 kgs had 4.2 times more risk of first time caesarean. In labour referrals and women with infertility, treatment had higher chance of operative delivery. Maternal indications like Failed induction (21%), Dystocia (16%) Maternal medical disorders (15%), followed by foetal indications (14%) and IUGR (13%) made up majority of primary caesareans. Commonest morbidity was maternal fever. Babies of Primary caesarean mothers had 2.9 times more chances of NICU admissions. Preterm admissions were 16 times more common than term admissions. Apgar at 1 minute and 5 minutes was significantly lower in the babies of the case group than that of the control group.

CONCLUSION

Definite protocols to control unjustified and unnecessary induction of labour and availing second opinion in decisions during dystocias in labour can definitely reduce Primary Caesarean delivery rates. Thus, by bringing down the Primary caesarean delivery rates, we can indirectly reduce the burden of Repeat Caesarean Deliveries and its morbidities and thereby improve women's health.

KEYWORDS

Primary, Caesarean Delivery, Maternal, Neonatal, Morbidity.

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BACKGROUND

Caesarean Delivery is one of the most common surgical intervention in modern obstetrics it is certainly one of the oldest operations in surgery, with its origin lost in antiquity and ancient mythology. Caesarean birth has been the most common hospital-based operative procedure in many Parts of the world. An operation mainly intended to save a maternal life during difficult childbirth has now been increasingly become the procedure of choice in high risk

situations to prevent perinatal mortality and morbidity. The use of Caesarean as a clinical indicator for health care quality has been a subject of ongoing debate. Obstetricians and Epidemiologists all over the world are committed to the task of decreasing the caesarean section rates. The incidence of Caesarean section has doubled over the past 2 decades.

Justification for this trend is the lowering of maternal mortality to the point of nil and increasing survival as compared to difficult vaginal deliveries. From a public health perspective, WHO[1] endorsed the principle that there is no region in this world where the population-based CS rate exceeded 15% of all livebirths. One of the ways that we could adopt to reduce the caesarean section rates would be to cut down the primary caesarean rates. Primary Caesarean is defined as the first caesarean delivery in women of any parity. Several studies have shown an inverse association between Caesarean delivery rates and maternal and infant mortality rates in low income countries.[2] Knowledge of Caesarean delivery determinants is the first step to reduce unnecessary Caesarean Deliveries. So, we analysed the determinants of Primary caesarean delivery and their outcomes (maternofoetal) in a tertiary care teaching hospital in South Kerala.

Aims and Objectives

1. To find out the determinants of Primary Caesarean (Sociodemographic, Obstetric, Medical, Foetal and Physician factors).
2. To evaluate the maternal and foetal outcomes of Primary Caesarean Delivery
3. To compare the determinants of Primary Caesarean in Primigravida and Multigravida.

MATERIALS AND METHODS

Study Design- Case Control Study.

This study was conducted in 900 subjects (450 cases & 450 controls) in the Department of Obstetrics and Gynaecology Sri Avittom Tirunal Hospital, Thiruvananthapuram over a period of six months. A case is defined as one who has undergone primary caesarean section in women of any parity. A control is defined as one who has undergone a normal vaginal delivery. SATH has a 24-hr. blood bank facility, excellent triaging and Emergency Obstetric Care services. Our hospital has a state of art facilities with survival rate of 100% for babies with Gestational Age >34 weeks. The sampling frame was the maternal register maintained in the labour room, which contains all the deliveries conducted in this hospital. Details entered were the name, age, sociodemographic details, education, skill, antenatal risk factors, previous pregnancy details, indication of primary caesarean, referral status, physician factor, Maternal Anthropometry, Indication of caesarean delivery, Birth weight of baby, Maternal postoperative morbidities, NICU admissions and neonatal details were noted.

Data Management

The data was collected and computed. A descriptive analysis of the variables was carried Bivariate analysis was done after categorizing the variables, with 95% confidence intervals. Odds Ratio was calculated and a p value of 0.05 was considered significant. Multiple Logistic Regression Analysis was also done. Data analysis was carried using SPSS software.

RESULTS

The results of our study are given below-

Characteristics	Variable	Cases	%	Controls	%	P Value	Chi Square
Maternal Age	<20	25	5.5	46	10.2	0.0002	-
	20-29	346	77	351	78		
	>30	79	17.6	53	11.6		
Parity	0	363	80.66	296	65.8	0.00001	51.25
	1	56	12.4	123	12.3		
	>2	31	6.9	8	1.8		
Income	<1600	340	75.7	395	87.9	0.00001	20.47
	>1600	110	24.3	55	12.1		
Education	School	288	64	365	72	0.00001	39.05
	college	162	36	85	18		
Occupation	Skilled	153	34	114	25.25	0.386	7.3
	Unskilled	297	66	321	74.75		

Table 1. Socio-demographic Variables and Primary Caesarean Delivery

Maternal Height (cms)	Cases (%)	Controls (%)	Maternal Weight (kg)	Cases (%)	Controls (%)
>146	8 (1.7%)	14(3.11%)	>70	76(16.8%)	23(5.1%)
<146	442 (98.3%)	436(96.89%)	<70	374(84.2%)	427(94.9%)
Chi Square-58.75	P value-0.26		Odds Ratio	4.2	P value-0.00001
Maternal height (cms)	**Cases (%)**	**Controls (%)**	**Maternal Weight (kg)**	**Cases (%)**	**Controls (%)**
>146	8 (1.7%)	14(3.11%)	>70	76(16.8%)	23(5.1%)
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Chi Square-58.75	P value-0.26		Odds Ratio	4.2	P value-0.00001

Table 2. Maternal anthropometry and Primary Caesarean

Infertility Treatment	Cases	%	Controls	%	P Value	Chi Square	Odds Ratio
Yes	36	8	5	1.1	0.00001	24	
No	414	92	445	98.9			
Spontaneous Abortions							
Yes	59	13.1	37	8.2	0.011	5.09	1.68
No	391	86.9	413	91.8			
Previous Pregnancy Outcome							
Primis	267	59.33	328	72.8	0.00001	74.079	
Previous BABY alive	152	33.77	50	11.11			
Previous BOH	31	6.8	72	16			

Table 3. Reproductive Career and Primary Caesarean

Admission Status	Cases	Controls	Odds ratio
Booked SATH	332(73.8)	397(88.2%)	2.977
Booked outside	118(26.2%)	48(10.7%)	
Unbooked	-	5(1.11%)	
Referral Status			**Chi Square**
In labour	45(10%)	31(6.8%)	44
Not in labour	73(16.2%)	17 (3.9%)	
Others	332(73.8%)	397(88.2)	

Table 4. Referral Status and Booking Status

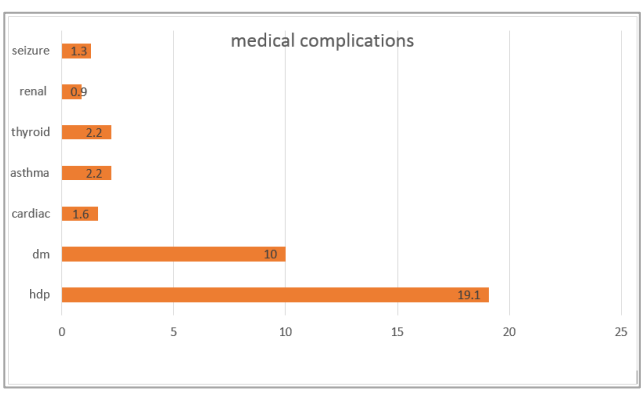

Figure 1. Medical Complications and Primary Caesarean

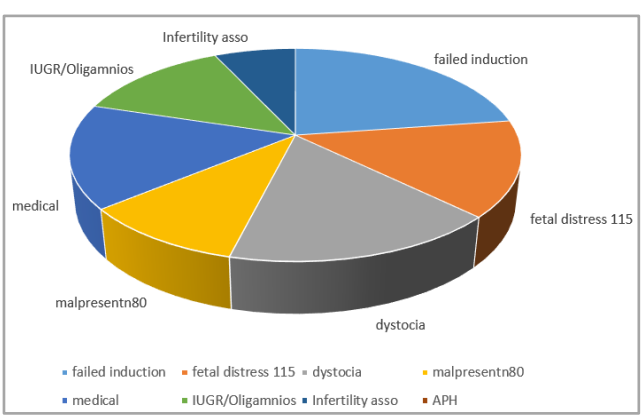

Figure 2. Indications of Primary Caesarean

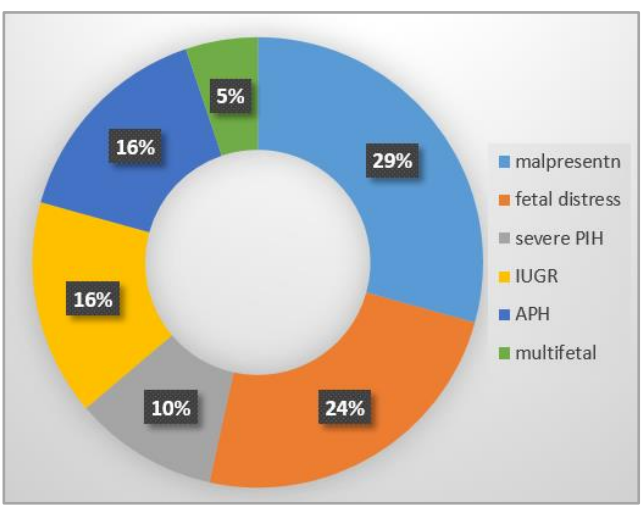

Figure 3. Indications of Primary Caesarean in Multigravida

Condition	Cases (%)
Maternal Fever	52 (11.55%)
PPH	34 (7.5%)
Blood Transfusion	21 (4.6%)
Urinary Tract Infections	15(3.33%)
Respiratory Tract Infections	13 (2.88)
Extension of Incision	5(1.11%)
Anaesthesia complications	5(1.11%)
Wound Infection	2 (0.44%)
Paralytic ileus	1(0.22%)

Table 5. Condition Associated with Primary Caesarean Delivery

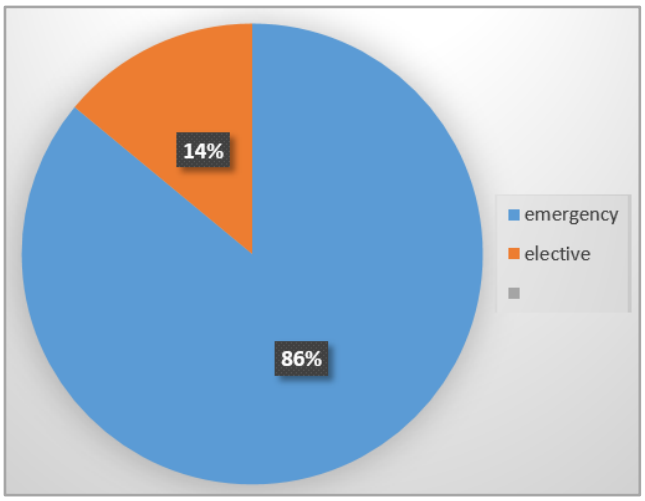

Figure 4. Nature of Caesarean Delivery

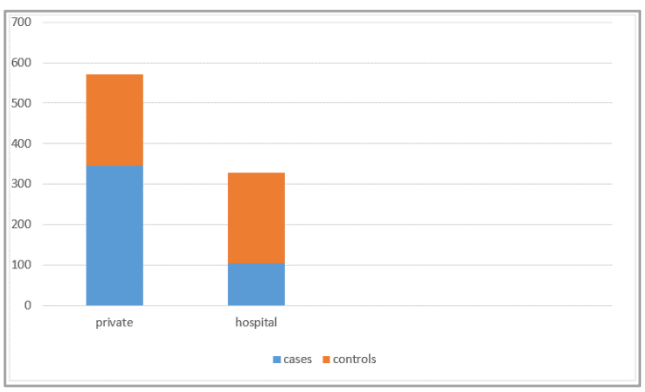

Figure 5. Physician Factor and Primary Caesarean

NICU Admission	Cases (%) n=465	Controls n=450	Chi Square- 25.759
Preterm	28 (6.02%)	2(0.44%)	P Value 0.0001
Term	52(11.18%)	28(6.22%)	Odds Ratio- 16.29
Others	385(82.79%)	420(93.33%)	
Status of Baby at Discharge	**Cases (%)**	**Control %)**	Chi Square- 9.742
Alive	457	450	p value- 0.002
Dead	10	-	Odds Ratio- 10.879
Total	467	450	

Table 6. Neonatal Characteristics and Primary Caesarean

Neonatal Birthweight	Cases (%)	Controls (%)	P value
<2.5 kg	100 (22.9%)	80(17.77%)	0.0001
2.5-4 kg	328(75.4%)	369(82%)	
>4 kg	7(1.6%)	1 (0.22%)	
5 Minute Apgar			
<7	11(2.4%)	1(0.2%)	0.004
>7	454(97.6%)	449(99.8%)	
NICU Admission			
Yes	80(17.2%)	30(6.7%)	0.0000
No	385(82.8%)	420(93.3%)	

Table 7. Gestational Age at Birth and Primary Caesarean

Variables	Odds Ratio	95% C.I.	P-Value
Family Type			
Nuclear	1.00		
Extended Nuclear	0.473	0.27 – 0.83	0.010
Others	0.992	0.58 – 1.68	0.976
DM			
Yes	2.570	1.16 – 5.70	0.02
No	1.0		
Reference Case			
Yes	3.435	2.15 – 5.5	0.000
No	1.0		
Type of Patient			
Private	3.545	2.35 – 5.34	0.000
Public	1.0		
Income			
< 1599	0.489	0.27 – 0.88	0.016
≥ 1600	1.0		
Schooling (Wife)			
≤ 10	1.0		
≥ 11	1.847	1.18 – 2.88	0.007
Parity			
0	1.0		
1	0.339	0.21 – 0.55	0.000
2	0.288	0.10 – 0.80	0.016
Weight (kg)			
< 70	1.0		
≥ 70	2.505	0.14 – 0.86	0.022

Table 8. Multiple Logistic Regression Analysis

The women who were from extended nuclear family had significantly 53% lower risk as compared to nuclear families (p< 0.01). The women who were Diabetics had 2.5 times more likely to have CS as compared to normal women (p=.02). The women who were Referred case, were 3.4 times more likely to have CS as compared to others (p <.001) and the private patients were 3.5 times more likely to have CS as compared to public patients (p<.001). The patients whose income was <1600 Rs. per month were nearly 50% less likely to have CS as compared to women with more than 1600 Rs. income (p=.016). The women patients whose education was more than 10th standard had

1.8 times more likely to have CS as compared to less educated women (p=.007). The women who had higher parity had significantly lower risk as compared to null parity women and there was a significant dose response relationship found (higher parity and lower risk) (p<.01). The women whose weight was over 70kg had 2.5 times higher risk for CS as compared to others (p=.02).

DISCUSSION

In this research study, the mean age in the case group was 25.3 years and in the control group was 24.21 years. Women with age more than 30 yrs. were 1.6 times more likely to undergo Caesarean. Joseph[3] et al found that advanced maternal age to be an important determinant of primary caesarean. According to Parazzini[4] et al, maternal age more than 40 years had three times more chance of caesarean. Coming to Parity, 88.4 % of cases had primary caesarean for first time mothers while 11.6% were for women with one or more live children. Similar finding was noted in Parazzini[4] et al where nullipara were 20% delivered by Primary Caesarean.

Serap Akmal[5] states that parity was a strong predictor for caesarean delivery with a nearly seven-fold difference between multipara and primiparous women. Eugene[6] et al in her study on maternal characteristics determined that primary caesareans among nulliparous women was consistently 2.5 times higher than among multiparous women. Women with college education had 2.42 fold chance of operative delivery which is in accordance with Parazzini[4] et al which quotes maternal education is directly associated with caesarean rates. Wives of educated husbands had 1.58 times more chance of primary operative interventions. Regarding the place of living, 88% lived in rural area and 12% in urban area. This is in agreement with Scotland[7] audit findings that there are no major differences in caesarean section rates among Scottish women of different levels of economic deprivation.

Paying (1600 Rupees and more) patients when compared with the remaining group non-paying (<1600 Rupees had 2.3-fold risk of operative delivery as in Latin American[8] studies, where caesarean rates as high as 40% and had significant positive correlation with Gross national Profit.

Maternal Anthropometric variables as maternal height were analysed and it was not statistically significant. Serap Akmal[5] had maternal height as a significant predictor and height more than 160 cms had 0.93 times chance of undergoing a primary caesarean.

Maternal Obesity is on rise and in our study observed that weight of the mother was a significant predictor and weight >70 kg had 4.2 times chance of primary caesarean section. Maternal medical factors which topped the list was hypertensive diseases odds ratio (2.99), followed by Gestational diabetes Odds ratio (2.52) and Bronchial Asthma Odds (3.39). Sambarey et al[9] showed that medical disorders comprised 4.2% of emergency caesarean sections. Naqvi MM[9] showed a higher incidence of antenatal medical. Complications in elderly women. Previous pregnancy losses multiplied the chance of primary Caesareans by 1.68 fold, in accordance with Parazzini[4] et al who found that the ratio of primary caesarean is double in women with miscarriage or stillbirth. Infertility treatment doubled the rates of operative interferences. Maternity units managing high risk pregnancies have higher rate of caesareans than low risk population.

In Kerala, unlike other neighbouring states, 99% women receive antenatal care. Booked cases constituted 73.68% while 26.2% were referred from private hospitals (booked outside). Odds ratio was 2.977 and this was as high risk cases were referred here for better obstetric care. Referral in labour were 16.8% and it was significant and had undergone significantly greater number of caesareans. Goswami et all[10] opined that full implementation of national referral guidelines would result in 30% of all pregnant women being referred either antenatally or in labour.

Physician factor/women under special care in antenatal period by a specific obstetrician had 3.2-fold chance of primary caesarean. Goyert et al,[11] in his study found that the physician factor was an important determinant and it was due to individual practice styles affecting the rates of caesarean delivery among obstetricians. Nature of caesareans were 86% emergency and 14% were elective procedures as is with Amirikia[12] et al. Spinal Anaesthesia was given for 95% cases as is with Amirikia[12] et al. Failed Induction accounted for 21% of Primary caesareans for Preterm Rupture of Membranes, Pastdate, Hypertensive disorder of pregnancy as with Karim et al.[13] Dystocia (16%) in our study in contrast to 30% in Serap Akmal et al. Hernandez[14] et al had foetal distress (12.8%) in her clinico-epidemiological study which is similar to 14% in our analysis. Multifetal gestation and breech accounted for 7% and 10% respectively. Maternal fever (11.5%) was the most common morbidity associated with caesarean followed by Postpartum haemorrhage necessitating blood transfusions.

Babies of mothers who underwent caesareans had nearly thrice the chance of NICU Admissions and preterm babies accounted for most of them.

Survival rate was 97.9% in babies of case group and non-survivors were due to compromised Babies (IUGR/Triplets/Severe preterm) and placental causes.

CONCLUSION

Definite protocols to control unjustified and unnecessary induction of labour and availing second opinion in decisions during dystocias in labour can definitely reduce Primary Caesarean delivery rates. Thus, by bringing down the Primary caesarean delivery rates, we can indirectly reduce the burden of Repeat Caesarean Deliveries and its morbidities and thereby improve women's health.

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