

Current trend of caesarean sections and vaginal births

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ABSTRACT

Caesarean section rates are inexorably rising which has led to the possibility of negative impact on maternal and neonatal health. Present study was aimed to compare the factors associated with caesarean and vaginal births among pregnant women. A retrospective study was conducted in Obstetrics and Gynaecology Department, Punjab Institute of Medical Sciences, Jalandhar (Punjab, India) during the period of April, 2012 to June, 2012. Details of age group, parity, socioeconomic status, antenatal booking, mode of delivery, obstetric complications, gestational age at delivery, maternal and neonatal outcomes were explored. The prevalence of Caesarean Sections (65%) was higher over vaginal births (35%). It had higher number of Emergency (52.31%) over Elective (47.70%) caesarean sections. Multiparity (55.38%; $p < 0.05$), high socioeconomic status (18.46%), 21 to 30 yrs of age group (78.46%) and booked status (44.62%) were associated with Caesarean Sections while primiparity (65.71%) and low socioeconomic status (22.86%) with vaginal births. The commonest reasons for Caesarean Sections were Fetal Distress (30.77%) and Repeat Caesarean Sections (29.23%). Caesarean sections rate is high. High number of referred patients who underwent Emergency sections was the main reason. Trial of vaginal birth after Caesarean Section in approximate cases and confirmation of suspected fetal distress through fetal blood acid base study are recommended.

Key words: Caesarean Section, Emergency sections, Fetal Distress, Vaginal births.

INTRODUCTION

The increase in the rate of Caesarean section is a global phenomenon that has got the professionals, the public and those who care for women's health, worried because its rise has not contributed to an improved pregnancy outcome [1]. This increase has grown concern among many countries, although, a necessary or a desirable procedure but still Caesarean births may also be medically unnecessary [2]. The survey conducted by World Health Organization [3] between 2004 and 2008 in which 24 countries from the region of Latin America, Africa and Asia participated has reported in 2010, that, in 23 countries rate of Caesarean deliveries without medical indication ranged between 0.01% and 2.10%, whereas, in China it shoots up to 11.6%. On the other hand, this rise has shown an increased hospital based deliveries and access to hospital care which has been saving lives for a long period of time. It has been argued that decreasing Caesarean deliveries would have a detrimental effect on mothers and infants' health and patient's choice should be considered [4].

The WHO published guidelines regarding Caesarean Section rates in 1985 which was revised in 1994. The guidelines published in 1997 by UNICEF, WHO and UNFPA states that proportion of Caesarean births should range between 5 to 15%. The rate of Caesarean Sections below 5% seems to be associated with gaps in obstetric care

leading to poor health outcomes for mothers and child, whereas rates over 15% don't seem to improve either maternal or infant health [5]. In US, rate was 22.7% in 1990 which increased to 27.5% in 2003 and it was 32.8% in 2010 which shows about one mother in three now gives birth by Caesarean Section [6]. These high levels are also reported in Latin America; it ranged from 16.8% to as high as 40% in the countries of this region [7]. The estimate for Caesarean Section rates in East Asia also shows that it is well above 15% [8].

India is not excluded from the list. Though, estimates of Caesarean Sections rates in India is 7.1% in the year 1998 but 16.7% change in rates is observed annually in India which is one of highest among the countries of South East Asia region [8]. Various studies have shown that constraint of data has masked actual rates. The five year audit from a large teaching hospital in Kolkata showed a Caesarean Section rate of 49.9% [9] and another study in Madras showed a 50% Caesarean Section rate [10]. When controlled for demographic variables, the odds for Caesarean Section were about 1.7 times more likely to occur in private health institutions in Kerala [11].

Advances in anesthesia and surgical procedures have decreased complications and mortality risks for mothers and babies [12]. However, Swedish survey conducted in 1999 concluded that an increase in Caesarean delivery rate didn't reduce Perinatal Mortality Rate or lower rate of asphyxia [13]. Morbidity and death in neonatal period are mostly due to respiratory and cerebral disorders, particularly in preterm births. Significant respiratory morbidity after Elective Caesarean deliveries is well known, even in term neonate upto 40 weeks of gestation [14,15,16,17]. Some studies favour Elective Caesarean deliveries because of fear of childbirth [18], urinary and fecal incontinence after vaginal delivery [19], breech presentation at term [20], and neonatal outcome as an unexplained fetal death and complications of labour [18,20,21]. Other surveys benefit vaginal deliveries because Caesarean deliveries implied a higher risk of maternal death [22], a longer recovery time and operative complications [23], a higher risk of unexplained stillbirths in subsequent pregnancies [2] and respiratory problems of newborn infants [14,15,16,17]. The current study was designed to compare demographic characteristics, parity status, antenatal care, obstetric complications and perinatal outcome of all pregnancies in women who underwent Caesarean Sections with women who had a normal vaginal delivery with the aim to study the factors responsible for particular mode of delivery.

MATERIALS AND METHODS

A retrospective study was conducted in the Department of Obstetrics and Gynaecology at Punjab Institute of Medical Sciences (PIMS), Jalandhar (Punjab, India) during the period of April, 2012 to June, 2012. PIMS is a tertiary care centre having a large number of referral cases (unbooked patients) from city as well as from periphery and provides antenatal care and delivery services to low and high risk booked pregnant women. All patients (booked & unbooked) were managed according to the protocol of the department. A questionnaire consisting of demographic variables, obstetric history, maternal outcome and neonatal outcome was designed to meet the requirement of the study. Informed verbal consent was obtained from women admitted during the study period. All mothers who delivered during the study period and freely consented to participate were interviewed personally either on the day or day after delivery regarding their antepartum, intrapartum and postpartum experiences. The study was approved by PIMS Ethical Committee.

Technically, booked mothers were defined as those who had at least three antenatal visits at our center while unbooked mothers included those who had no or less than three prenatal care visits during their whole pregnancy at our center and those who were referred in emergencies from other medical centers and hospitals. Demographic variables included age, socioeconomic status and booking status. Obstetric history included parity status, maternal health before & during pregnancy, significant clinical events in previous pregnancy and detailed information regarding complication occurring intrapartum or postpartum. Maternal outcome was recorded which included mode of delivery, occurrence of anemia, postpartum hemorrhage and maternal death. Neonatal outcome such as gestational age, birth weight, perinatal mortality etc. were also documented. Investigations were also done in all the study subjects that included complete blood count, urinalysis, random blood sugar, blood grouping, HIV, Hepatitis C and Hepatitis B antigens, bleeding & clotting time and baseline ultrasonography. Specific investigations were done relevant to medical disorders if present in any patient.

The subjects were further divided into two groups on the basis of mode of delivery. The various factors predisposing to particular mode of delivery were compared in these two groups.

Statistical Analysis: The results were analyzed by Chi Square test. P value <0.05 was considered as statistically significant.

RESULTS

All patients (N=100) were divided into two groups on the basis of the mode of delivery. 65% of women were delivered by caesarean section while 35% of mothers gave birth by vaginal route. **Table 1** shows comparison of demographic variables of all the mothers delivered via both routes (caesarean and vaginal). 06.15%, 43.08%, 35.38% and 15.38% of mothers who had caesarean deliveries were in <20yrs, 21-25 yrs, 26-30 yrs and >30 yrs of age group, while mothers who delivered vaginally had 17.14%, 42.86%, 25.71% and 14.28% for the same age groups respectively. This shows majority of mothers who were having Caesarean sections falls in 21-30 yrs of age group (78.46%).

Mothers belonging to low socioeconomic status had higher number in vaginal births (22.86%) when compared to Caesarean births (12.30%). While, higher rate of Caesarean Sections was observed among mothers of high socioeconomic status (18.46% vs. 14.29%). Regarding comparison for antenatal checkups, 44.62% of booked mothers had Caesarean deliveries when compared to the number of vaginal deliveries (40.00%) among booked mothers. Further, the result shows a statistically significant ($p < 0.05$) increase in incidence of Caesarean Sections with an increase in parity (44.62% in primiparous and 56.38% in multiparous).

TABLE 1: Demographic variables compared between two groups

Category	MODE OF DELIVERY				p value
	Normal Vaginal Delivery(35)		Caesarean Section(65)		
	Percentage (%)	Number of subjects	Percentage (%)	Number of subjects	
AGE (yrs)					
<20	17.14	06	06.15	04	NS
21-25	42.86	15	43.08	28	
26-30	25.71	09	35.38	23	
>30	14.28	05	15.38	10	
SOCIO ECONOMIC STATUS					
Low	22.86	08	12.30	08	NS
Middle	62.86	22	69.23	45	
High	14.29	05	18.46	12	
ANTENATAL CARE					
Booked	40.00	14	44.62	29	NS
Unbooked	60.00	21	55.38	36	
PARITY					
Primi	65.71	23	44.62	29	<0.05
Multi	34.29	12	56.38	36	

(NS: Non Significant)

Table 2 reflects event outcomes of pregnancies with gestational age at delivery and neonatal birth weight. The gestational age at which bulk of deliveries happened via both route was TERM (complete 37 weeks) with 88.57% vaginally and 80.00% abdominally. However, the rate of preterm babies was higher in Caesarean Sections (20.00%) when compared to vaginal births (11.43%). Majority of Low Birth Weight (LBW- <2.5kg) babies and babies with appropriate weight (>2.5 kg) are delivered by vaginal (45.72%) and Caesarean deliveries (63.08%) respectively.

TABLE 2: Event outcome compared between two groups

Category	MODE OF DELIVERY				p value
	Normal Vaginal Delivery(35)		Caesarean Section(65)		
	Percentage (%)	Number of subjects	Percentage (%)	Number of subjects	
Gestational Age					
Preterm	11.43	04	20.00	13	NS
Term	88.57	31	80.00	52	
Birth Weight					
<2.5 kg	45.72	16	36.92	24	NS
>2.5 kg	54.29	19	63.08	41	

(NS: Non Significant)

The types of Caesarean Sections are described in **Table 3** which shows higher incidence of Emergency Caesarean Sections (52.31%) over Elective Caesarean Sections (47.70%).

TABLE 3: Emergency vs. Elective Caesarean sections

TYPE OF CAESAREAN SECTIONS		
Category	Percentage (%)	Number of subjects
Elective	47.70	31
Emergency	52.31	34

Table 4 lists the various indications for Caesarean Sections in decreasing frequency with Fetal Distress (30.77%), Repeat Caesarean Sections (29.23%), Intra Uterine Growth Retardation (18.46%), Oligohydraminos (18.46%), Malpresentation (13.85%), Pregnancy Induced Hypertension (12.30%), Placenta Previa (10.77%), Preterm Premature Rupture of Infection (06.15%), Failed Labour (06.15%), Preterm labour with scar tenderness (04.62%), Maternal Request (04.62%), Gestational Diabetes with Macrosomia (03.08%), Multiple Gestation (03.08%) and Cord Prolapse (01.54%).

TABLE 4 : Indications for Caesarean section

INDICATIONS	PERCENTAGE (%)	NUMBER OF SUBJECTS
Fetal Distress	30.77	20
Repeat Caesarean section	29.23	19
Oligohydraminos	18.46	12
Intrauterine Growth Retardation	18.46	12
Malpresentation	13.85	09
Pregnancy Induced Hypertension	12.30	08
Placenta Previa	10.77	07
Preterm Premature Rupture of Membrane	06.15	04
Failed Labour	06.15	04
Preterm Labour with Scar Tenderness	04.62	03
Maternal Request	04.62	03
Gestational diabetes with macrosomia	03.08	02
Multiple Gestation	03.08	02
Cord Prolapse	01.54	01

DISCUSSION

Caesarean section rates are high and this inexorably rising rates of Caesarean Sections have potential to divert human and financial resources from others, arguably higher priority interventions [25]. It also raises the possibility of negative impact on maternal and neonatal health [26] which has received support from a number of studies [27,28,29]. On the other hand, it has been argued that decreasing Caesarean Section rates would have a detrimental effect on mother and infants health [4].

The analysis of demographic factors (**Table 1**) in relation to booking status (44.62%) showed mothers who approached for antenatal care had higher number of Caesarean deliveries (44.02%) than vaginal deliveries (40.00%). Unnikrishnan *et al.* [30] and D'Orsi *et al.* [31] have also quoted the similar statements. This showed the women who had gone for full antenatal checkups have more chance of Caesarean Sections than women with some or no antenatal checkups. This may be because women who had complications in previous or current pregnancy had gone for antenatal care and these complications had resulted in Caesarean Sections. However, this has been in contrast to the study conducted by Adekanle *et al.* [32] at a teaching hospital in Osogbo which concluded unbooked mothers and their babies are at higher risk for Caesarean deliveries than booked mothers.

The present study has reported that majority of mothers having Caesarean Sections falls in 21- 30 yrs of age group (78.46%) and found it supported by other researchers [33]. However, the studies conducted by Abu-Heija *et al.*[34] and Lin *et al.*[35] has noticed the contrast finding of advanced maternal age with Caesarean Sections. Multiparous mothers (56.38%) had significantly higher number of Caesarean deliveries in our study which has found association by Abu-Heija A *et al.*[34] who has shown a relation of an increased parity with Caesarean Sections. However, a study done in Brazil by D'Orsi *et al.* [31] reports an association between primiparity and Caesarean Section. Another recent study done by Roberts *et al.*[36] in Australia has concluded that rising first-birth Caesarean rate had drove the overall increase in Caesarean Sections. Regarding socioeconomic character, the current study found

mothers belonging to high socioeconomic status (18.46%) had high incidence of Caesarean Section which has been proved by other researchers [37]. This explains women of higher socioeconomic status were able to afford a relatively expensive method of delivery and conveys the message that financing Caesarean Section is a major issue. But this has been in contrast to the study conducted in Canada by Leeb *et al.* [38] which shows women in Canada's highest income urban neighbourhoods are significantly less likely to have Caesarean Sections than those in lowest income areas. On the other hand, majority of mothers belonging to low socioeconomic status (22.86%) had high number in vaginal births. This has been reported by another cross-sectional study done by Kudisha *et al.* [39] that only a minority of women from low socioeconomic background would go for Caesarean Section.

Our study (**Table 2**) has shown that higher number of preterm babies (20.00%) was associated with Caesarean Sections. Though the occurrence of birth asphyxia, trauma and meconium aspiration is reduced by Caesarean deliveries but the risk of respiratory distress, surfactant deficiency and pulmonary hypertension is increased. There occurs a physiological event in last few weeks of pregnancy coupled with onset of spontaneous labour which is accompanied by changes in hormonal milieu of fetus & its mother resulting in preparation of fetus for neonatal transition [40]. It also leads to increase in workload and costs in neonatal unit because a significantly higher transfer rate to Neonatal Intensive Care Unit (NICU) is observed among this group [41]. However, another study conducted in United States by Kazandijan *et al.* [42] showed that average total charges for vaginal delivery may be higher than average total charges for Caesarean deliveries that include maternal plus neonatal charges for admission to NICU. Thus, it shows obstetrician should make decision after taking into consideration all the factors which can reduce both maternal & neonatal mortality & morbidity.

This study (**Table 3**) has reported higher prevalence of Caesarean Sections (65%) over Vaginal births (35%). It had higher number of Emergency (52.31%) over Elective Caesarean Sections (47.70%) and noticed the same result by other authors [43]. Kim YM *et al.* [44] has recommended that timely referral within and to Emergency Obstetric and Newborn Care (EmONC) facilities would decrease the proportion of CS deliveries that develop to emergency status. A high Caesarean Section rate in this study is attributed to unbooked and referred mothers (55.38%) who came in a critical condition with a history of trial of labour or complicated medical disorders and end up with Emergency Caesarean Section (52.31%) in order to safeguard the life of mother and fetus. Grivell *et al.* [45] has observed in their work that induction of labour for non recognized indication was associated with significantly an increased risk of range of outcomes including Caesarean Section. Fear of litigation, health insurance system, Caesarean Section by maternal choice, increased proportion of breech deliveries by Caesarean deliveries, lowering of threshold regarding making decision for Caesarean deliveries, use of electronic fetal monitoring, injudicious use of oxytocics, performing Caesarean Section for astrological reasons especially in India, abdominal delivery of growth retarded infants, improved safety of Caesarean Section in developed countries, use of repeat Caesarean Section for patients with previous Caesarean Section, unbooked status of most of the patients, specialist and referral nature of some of the hospitals, overdiagnosis of cephalopelvic disproportion by junior doctors, country's health system financial status, use of Caesarean Sections for multiple gestations etc can be the various factors behind the high Caesarean Sections rate worldwide.

The most common indication (**Table 4**) in our study was Fetal Distress (30.77%). Krychowska *et al.* [46] has also shown the consistent outcome. Fetal Distress was diagnosed by Fetal Heart Rate and presence of meconium stained amniotic liquor. However, accurate method for establishment of Fetal Distress is to perform fetal scalp blood pH estimation which is considered a gold standard for assessment of fetal well being but is not done at our set up. Cardiotocography monitoring is known to overestimate Fetal Distress [47]. This shows the method of screening used for making the diagnosis of Fetal Distress have its own limitations [48].

The second most frequent indication was Repeat Caesarean Section in mothers with Previous Caesarean (29.23%). Cook *et al.* [49] has observed that Multiple Repeat Caesarean Section (MRCS) is associated with greater maternal and neonatal morbidity than fewer Caesarean Section. They further described the associated maternal morbidity is largely secondary to placenta previa and accreta. However, trial of scar in singleton pregnancies can be given to reduce the rate of Repeat Caesarean Section as the risk of uterine rupture is as low as 0.3% [50]. However, there is no consensus about Vaginal Birth After Caesarean (VBAC) safety. McMahon *et al.* [51] has noted that higher rate of maternal and fetal morbidity exist with VBAC as compared to Elective Caesarean Section which has been also recently supported by Crowther *et al.* [52]. On the other hand, study by Gonen R *et al.* [53] has interpret that VBAC with a well defined protocol was found safe for mother and infant as a Planned Caesarean Delivery and can be encouraged. The study done in Addis Ababa teaching hospital by Birara and Gebrehiwot [54] has noticed

independent factors determining successful VBAC were, history of successful VBAC in the past, rupture of membrane at admission, and cervical dilatation of more than 3cm at admission. However, presence of meconium, malposition and history of stillbirth were associated with failed VBAC. High incidence of Repeat Caesarean has shown there is a vicious cycle that needs to be put to stop which is possible only if Caesarean section is undertaken after careful consideration and when obstetric risks outweigh those of the procedure itself [30].

Breech malpresentation (13.85%) accounted for significant number of Caesarean section in our study. External Cephalic Version (ECV) may be used as an intervention to reduce high caesarean section rate at 37 weeks of gestation. However, ECV has its drawbacks and requires skills and might not be successful. The study conducted by Zaman SB *et al.* [55] has results of high neonatal morbidity in vaginal breech delivery than Caesarean Section for primigravida with breech presentation at term. However, Danielian PJ *et al.* [56] has contrast view that the policy of selective and planned vaginal delivery for breech presentation has no association of an increase in infant morbidity. Early diagnosis of adequate progress of labour through use of partogram, proper assessment of pelvic size, timely amniotomy and judicious use of oxytocin can reduce events of failed or obstructed labour leading to Caesarean Sections. Trial of Vaginal birth after Caesarean Section in approximate cases and confirmation of suspected fetal distress through fetal blood acid base study are recommended [57]. Good antenatal care can detect problems like Pregnancy Induced Hypertension, Intrauterine Growth Retardation, Oligohydraminos etc earlier and early management can prevent these complication. It has been suggested the study should be done in a prospective way which may reveal some of the other reasons for increasing Caesarean Sections rate and measures to control the current trend.

CONCLUSION

Caesarean sections rate is high. High number of referred patients who underwent Emergency sections was the main reason. Trial of vaginal birth after caesarean section in approximate cases and confirmation of suspected fetal distress through fetal blood acid base study are recommended.

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