ORIGINAL ARTICLE

Rising trend in primary caesarean section among low risk Nulliparous women

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Abstract:
Caesarean section rates have increased dramatically all over the world, in our hospital there is a sharp rise in caesarean delivery at first birth, which ultimately leads increased repeat caesarean section. We want to do this study to evaluate our practice performance and see why it is raising it may be help us to achieve the target.
Objective: The objective of this study was to identify the rate and major causes of primary caesarean section among low risk (term, vertex and singleton) nulliparous women.
Material and Methods: A prospective observational study carried out on 300 women with singleton foetus at Hospital, Karachi from January 2015 to December 2018. The study was evaluate all primary caesarean section in nulliparous women with vertex presentation in full term pregnancy.
Result: We included 300 pregnant women of reproductive age group (18-40 years), we found the most common indication of caesarean section was compromised foetal heart rate 101(33.6%), non-progress of labour (primary dysfunction 53(17.7%) and secondary arrest 43(14.3%).
Conclusion: We concluded that intra-partum caesarean sections rate can be reduced by the implementation of evidenced-based protocols and training workshops on labour management, this could help in reducing the high Caesarean section rate.

Received
Date: 13th December, 2019
Accepted
Date: 12th November, 2020

Keywords: Caesarean section, foetal distress, primary dysfunctional labour, secondary arrest.

Introduction:
Caesarean section (CS) was introduced in clinical practice as a life-saving procedure both for the mother and the baby.[1] Several studies have shown an inverse association between caesarean section rates and maternal and infant mortality at population level in low income countries where large sectors of the population lack access to basic obstetric care.[2-4] On the other hand, caesarean section rates above a certain limit have not shown additional benefit for the mother or the baby, and some studies have even shown that high caesarean section rates could be linked to negative consequences in maternal and child heath.[2,3,5-7] Caesarean section is usually performed when there is a risk to the life and/or health of the mother or the baby if delivered through normal vaginal pathway although in recent times they are being performed on request of the patient (elective cesarean section) leading to rising rate of deliveries via caesarean section .[8-10] The rates of caesarean delivery in many developed and developing countries have risen higher than necessary for optimal maternal and neonatal health outcomes.[11-13] The caesarean section rate has reached an astonishing 32.8% of all live births in the US in 2011,[14] while in Pakistan it is 37%,[15] in China it is estimated that about 50% of all births are caesarean.[15-17] Caesarean rates may be affected by clinicians' and women's attitudes towards caesarean delivery, which may differ depending on how maternity services are delivered.[18] The caesarean section is intended to save the lives of mothers and newborns, as in cases of

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dystocia, breech presentation, multiple births, anticipated low/high birth weight, and fetal distress.[19,20] But caesarean deliveries conducted without any medical indication place mothers and infants at risk for unfavourable outcomes, as it increases the risk of subsequent uterine rupture, placenta accreta, hemorrhage, hysterectomy, and maternal death as compared to normal vaginal delivery.[21]

The primary caesarean rate is defined as the percentage of caesarean deliveries out of all births to women who have not had a previous cesarean delivery, has also increased. In U.S. primary caesarean rate was increased from 14.5% in 1996 to 23.4% in 2007, an increase of more than 60%.[22] The primary cesarean rate has become a major driver in the total caesarean rate. Barber et al found that 50% of the increase in caesarean deliveries at their institution was due to an increase in primary caesarean deliveries.[23] Understanding the factors leading to primary caesarean deliveries is essential to reducing the total caesarean rate. The primary caesarean section rate is calculated as the number of women having their first caesarean section delivery divided by the number of live births to women who have never had a caesarean delivery, multiplied by 100. The denominator for this rate excludes those with method of delivery classified as repeat caesarean, vaginal birth after previous caesarean, or method not stated.[24] Although most studies report, Malpresentation e.g. breech presentation etc as one of the common denominators for an Elective or Emergency caesarean section, in babies born with vertex presentation and yet delivered through caesarean section, needs evaluation. Some studies have reported other factors, such as fetal distress, failure to progress during labour causing fetal complications and abdominal delivery of growth-retarded infant as one of the leading causes to undertake a caesarean section in primipara with vertex presentation. Other reasons encountered are pre-eclampsia, placental abruption, cord prolapsed, referral nature of some of the hospitals, unbooked status of most of the patients and a host of other factors endangering the morbidity of either the mother or the fetus, and thus demanding the need for the caesarean section.[25-26] However a dearth of information regarding this particular aspect of maternal and fetal well-being is encountered in the local data. Studies reporting exhaustive data regarding maternal or fetal factors in primipara with vertex presentation and undergoing Cesarean-section are much needed. This study attempts to fill this gap in literature by reporting the variables controlling the delivery modes in nulliparous women with fetus in vertex presentation.

The rationale of this study is to identify the rate and causes/ reasons for the rising incidence primary caesarean section that would allow us to isolate the cause of increasing number of Cesarean-section, since it's a better measurement and rules out patient preferences and other factors affecting the rate. The data would be used to further address the causes of increased number of cesarean-section in low risk nulliparous women and improve the outcomes. The bench mark in our hospital is 25% whereas in our statistic in some quarter, it is rising. We want to do this study to evaluate our practice performance and see why it is raising it may be help us to achieve the target.

The objective of this study is to identify the rate and major causes of primary caesarean section among low risk (term, vertex and singleton) nulliparous women.

Material and Methods:
A prospective observational study carried out after the approval by ERC. This study was carried out in a tertiary care hospital. The study was evaluate all primary caesarean section in nulliparous women with vertex presentation in full term pregnancy.

Duration of study was from January 2015 to December 2018. This study includes all nulliparous women with vertex presentation at full term gestation. This study excludes all multigravida women, nulliparous women with mal-presentation at full term, women with previous caesar-

ean section, multigravida women undergoing primary caesarean section, multigravida women with mal-presentation or vertex presentation undergoing caesarean section.

Our sample size was 300 nulliparous patients with vertex presentation who were going for primary caesarean section due to some indication. Sample size is calculated by sample size formula: n=Z2P(1-P)/d2 rate of primary caesarean section in Pakistan is 37%.

Data collection and analysis: The medical records of nulliparous pregnant patient with vertex presentation who had primary caesarean section between January 2015- December 2018 were reviewed and filled in the proforma. Variables include demographic features (age, height, weight) parity, gestational age, admitting reason like (labor pain, leaking, elective admission), risk factors (medical disorders, obstetric cause), type of labour (induction of labour, augmentation of labor, spontaneous labour), stage of labour (prolonged first stage of labour, prolonged second stage of labour), indication of LSCS (fetal distress, non progress of labour, patient wish, antepartum Hemorrhage). Fetal outcome (Condition of baby, Apgar score, NICU admission, foetal weight). Maternal outcome was in the form of post-partum complications and hospital stay. Proforma was filled by researcher. statistical program for Social Science (SPSS) version 20 was employed for data entry, formulation and analysis. Chi square test was administered whenever conditions apply.

Results:
300 women with singleton foetus were included in this study, 237(79%) were primigravida while 63(21%) were virtual primi with one miscarriage.

Most of the women 153(51%) were between 21-25 years, 88(29%) were 26-30 years, 43(14.3%) were 15-20 years, 14(4.7%) were between 31-35 years and 2(0.7%) were >35 years.

211(70.3%) were between 37-38 weeks, 31(10.3%) were < 37 weeks, 40(13%) between 39-40 weeks and 18(6%) > 40 weeks.

Out of 300 women 50(16.7%) developed anaemia, 42(14%) had pregnancy induced hypertension (PIH), 31(10.3%) had gestational diabetes mellitus (GDM), 18 (6%) developed obstetric cholestasis, 5(1.7%) had both PIH and GDM and 2(0.7%) had both GDM and Obstetric cholestasis.

75(25%) women developed oligo-hydramnios, 32(10.7%) were presented with SGA, 14(4.7%) with LGA, 8(2.7%) showed IUGR, 5(1.7%) developed both SGA and oligo-hydramnios, while 10(3.3%) women were post-dates. 150(50%) women had no obstetrical complications.

118(39%) were admitted with labour pains, 45(15%) with leaking, 24(8%) with decreased foetal movements while 113(37%) were elective admissions.

88(29.3%) were induced, 50(16.7%) had augmentation of their labour, while 71(23.7%) were admitted for elective caesarean section.

Induction of labour was done with prostaglandin E_2 in 39(13%) women, 35(11.6%) were induced with intra-cervical Foley's followed by prostaglandin E_2 and 14(4.75) with intra-cervical Foley's only.

The CTG was reactive in 167(55.7%) women, 85(28.3%) had suspicious while 47(15.7%) had pathological trace and 1(0.3%) with absent foetal heart sound (still birth).

Prolonged first stage of labour was found in 53(17.7%) and prolonged second stage (>2hrs) reported in 54(18%). Table 1

The most common indication of caesarean section was compromised foetal heart rate 101(33.6%), while non progress of labour (primary dysfunction 53(17.7%) and secondary arrest 43(14.3%).

Table 1: *Demographic characteristics*

Demographic characteristics	
AGE	
15-20	43(14.3%)
21-25	153(51%)
26-30	88(29.3%)
31-35	14(4.7%)
>35	2(0.7%)
PARITY	
Primi-gravida	237(79%)
virtual primi	63(21%)
GESTATIONAL AGE(WKS.)	
<37	31(10.3%)
37-38	211(11.7%)
39-40	40(13%)
>40	18(6%)
DURATION OF LABOUR	
Prolonged First stage of labour	53(17.7%)
Prolonged Second stage of labour >2 hours	54(18%)
CTG	
Reactive	167(55.7%)
Suspicious	85(28.3%)
Pathological	47(15%)
Absent foetal heart sounds	1(0.3%)
MEDICAL/OBSTETRICAL COMPLICATIONS	
Anaemia	50(16%)
PIH	42(14%)
GDM	31(10%)
Obstetric Cholestasis	18(6%)
PIH+GDM	5(2%)
Hypothyroidism	3(1%)
SGA	32(10%)
LGA	14(5%)
IUGR	8(3%)
SGA+Oligohydramnios	5(2%)
Post dates	10(2%)
Oligohydramnios	75(25%)
POST-PARTUM COMPLICATION	
Prolonged hospital admission	32(10.6%)
PPH	18(6%)
Wound infection	8(2.6%)
Anaesthesia complications	56(18.6%

The other indications are failed induction of labour 21(7%), Small for gestational age (SGA) 16(5.3%), Severe pre-eclampsia 12(4%), Obstructed labour 11(3.7%), CPD 10(3.3%), patient wish 11(3.7%), Absent liquor 8(2.7%), Un controlled sugar 6(2%), Placenta Previa 3(1%), Precious pregnancy 4(1.3%) and 1(0.3%) woman had CS because of VP shunt as shown in table 2.

32 (10.6%) women had prolonged hospital admission >3 days, 18(6%) had PPH and required blood transfusion and 8(2.6%) women developed wound infection while 56(18.6%) women had anaesthesia complications (54(18%) spinal headache, 2(0.6%) spinal shock) as shown in table 1.

Out of 300 babies 297(99%) were live births, 2(0.7%) were still born and 1(0.3%) was early neonatal death (their mothers were referred from Dai or other primary care hospital after trial of labour and had signs of obstructed labour on admission).

44(14.75) babies were low birth weight < 2.5 kg, 208 (69.8%) were between 2.5-3.5 kg, 41(13.7%) between 3.6-4 kg and 7(2.35) were > 4 kg.

227(75.7%) babies had good Apgar score in 1 min and 260(86.7%) in 5 min, while 71(23.7%) babies had poor Apgar score in 1 min and 38(12.7%) in 5 min. these babies were kept under observation in nursery while 30(10%) babies were admitted in neonatal intensive care unit and 18(6%) required ventilator support as shown in table 3.

Discussion:

Caesarean section rates have increased dramatically all over the world, in our hospital there is a sharp rise in caesarean delivery at first birth, which ultimately leads increased repeat caesarean section. The overall rate of caesarean section was 39.8% in our study population and primary caesarean section rate was 18.9% (ranges from 10% in 2016 rising to 28.6% in 2018, this rising trend of primary caesarean section provoked us to analyse the cause of this high rate.

Rami Al Rifai[27] from Japan reported similar rate

Table 2: *Indications of caesarean section*

Indications of caesarean section	**Percentage**
Intra-partum CS	
Compromised foetal heart rate	101(33.6%)
Non progress of labour/primary dysfunctional labour	53(17.7%)
Non progress of labour/secondary arrest	43(14.3%)
Failed induction	21(7%)
Obstructed labour	11(3.7%)
Pre-labour CS	
SGA	16(5.3%)
Severe pre-eclampsia	12(4%)
CPD	10(3.3%)
Patient wish	11(3.7%)
Absent liquor	8(2.7%)
Uncontrolled sugars	6(2%)
Placenta Previa	3(1%)
Precious pregnancy	4(1.3%)
VP Shunt	1(0.3%)

Table 3: *Foetal outcome*

Foetal outcome	
Live births	297(99%)
Still births	2(0.7%)
NND	1(0.3%)
Foetal weight	
<2.5kg	44(14.7%)
2.5-3.5kg	208(69.8%)
3.6-4kg	41(13.7%)
>4kg	7(2.3%)
Apgar score	1 min
Good	227(75.7%)
Poor	71(23.7%)
Apgar score	5min
Good	260(86.7%)
Poor	38(12.7%)

of caesarean section 30.8%, while Boyle et al,[28] and Ado Geidam et al,[29] reported the rate up to 11.8% and 21.8% respectively. This wide variation in the incidence of caesarean section from region to region, from one country to other country could be due to variation in clinical practice.

In our study the majority of women belongs to 21-25 years age group 88(29%), with healthy BMI 216(72%) and between 37-38 weeks of gestation 211(70%), while Boyle et al reported that most of the women >35 years of age, overweight and between 39-41 weeks.[28]

In our study the most common indication of primary caesarean section is compromised foetal heart rate 101(33%), CTG interpretation is highly subjective and in most of the cases the CTG was interpreted by junior doctors. Similar findings were reported from Sydney and Nigeria.[29,30]

The second most common indication for primary Caesarean delivery in our study was dysfunctional labour, most of them had delayed progress of labour at 4-6 cm of cervical dilatation (primary dysfunctional labour 17.7%). Most of the women were assessed by junior doctors and partographs were not maintained or missing. Boyle et al,[28] and Zhang et al,[31] concluded labour dystocia the most common cause and the labour were arrested before 6 cm cervical dilatation.

We found Secondary arrest of labour in 14.3% of patients, and failure to descent of foetal head was the main reason. 11 women had prolonged second stage of labour > 2 hours and developed signs of obstruction, half of these women were referred from Dai or primary care hospitals. To avoid these cases early referral policies, careful assessment by senior doctors and encouraging operative vaginal delivery, when appropriate is essential.

Recognising that 21(7%) of women in our study had a primary caesarean section after induction of labour, most women were induced between 37-38 weeks of gestation, it is tempting to assert that avoiding labour induction at early gestational age with poor bishop scores could reduce the rate of primary caesarean delivery.

Turning to less common indication for caesarean delivery, elective caesarean are an obvious target for reducing the primary caesarean rate. Patient wish, SGA, CPD, precious pregnancy, pre-eclampsia and un controlled sugar need careful assessment and counselling by senior doctors.

Caesarean section is considered a safe delivery option both by women and obstetrician, WHO had suggested that there were no additional health benefits associated with a caesarean section rate above 10-15%.[27,32] Studies reported safe lowering of caesarean section rate with no increase in maternal and perinatal morbidity and mortality.[32,33]

In our hospital we have panel and private patients and also teaching faculty and visiting consultants. We received patients from different primary care centres with trial of labour, this could be the one reason of high caesarean section rate. We also noticed changes in private and panel patient's care and also wide variation in clinical practice among obstetricians. The large increase in caesarean deliveries in public patients as well as private patients suggest that the trend reflects more general changes in attitude to obstetric risk factors and delivery management. Women and obstetricians may have become more averse to the perceived risks associated with vaginal delivery. Other possible contributor is fear of litigation (esp: fear of media coverage) and physician's convenience.

Probably it seems that reducing first-birth prelabour caesarean section should possibly reduce overall caesarean section rate but in reality it is more complex, because waiting for spontaneous labour till expected date of birth may create anxiety for both women, family and obstetrician and also it does not necessarily result in vaginal birth. Secondly, caesarean section on patient wish for a prim gravida with singleton cephalic foetus represent a minority (11, 3.7%) of all caesarean births.

The maximum efforts should be made to reduce intra-partum caesarean sections, like continuous one to one support during labour, effective pain management, early augmentation with oxytocin, training workshops in labour management and instrumental deliveries, implementation of evidenced-based protocols for managing dysfunctional labour and careful evaluation of foetal heart tracemay contribute significantly to reduce this rising caesarean section rate.

Conclusion:

We concluded that intra-partum caesarean sections rate can be reduced by the implementation of evidenced-based protocols and training workshops on labour management. This could help in reducing the high caesarean section rate in nulliparous women.

Conflict of interest: None

Funding source: None

Role and contribution of authors:

Dr. Tehmina Parveen, collected the data, references and did the initial write up.

Dr. Seema Ghani, collected the data, references and helped in introduction writing.

Dr. Ramna Devi, collected the references and helped in discussion writing and tabulation of the results.

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