Original Article

Identify Modifiable Risk Factors and their Individual Contribution to Caesarean Delivery

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Abstract

Objective: To identify modifiable risk factors and their individual contribution to caesarean delivery.
Methdology: This prospective descriptive case series study was conducted at Obstetrics and Gynecology Department, Unit II, Foundation University Medical College, Fauji Foundation Hospital Rawalpindi from 15-7-2019 to 30-7-2022. An Informed written consent was taken from subjects and they were provided a number, and the data kept confidential. Subjects with previous one LSCS were selected by consecutive non-probability sampling technique. A thorough clinical assessment performed after fulfilling inclusion criteria. Subject with non-recurrent cause of their previous LSCS who underwent repeat caesarean section either elective or emergency were included in the study. Their demographics, risk factors and indications for repeat caesarean section recorded on a predesigned preform. Analysis of the data done using SPSS 21.
Results: Total patients with previous one scar were 491, out of which 388(79.02) had repeat caesarean delivery. In El. LSCS group (n=243), (62.6%) deliveries were due to modifiable risk factors. Statistically significant contribution of modifiable risks were found for El LSCS group as compared to Em LSCS (p value<0.001).
Conclusion: Our results concluded significant contribution of modifiable risk factors in increased repeat LSCS rate. As unnecessary cesarean delivery is the major cause of maternal and neonatal morbidity and mortality, and unfortunately cesarean section rate is increasing in our society. So, timely and accurate screening for these risk factors as an indication for LSCS and arrangement of awareness and intervention program about risk and benefit of LSCS and VBAC respectively should be done to reduce the rate of unnecessary LSCS.
Keywords: LSCS, Modifiable Risk factors, VBAC, CDMR.

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Introduction

LSCS is an operative technique to deliver a live fetus, placenta, and membranes. In this procedure, an incision in abdomen (laparotomy) and uterus (hysterotomy) is made.[1] Cesarean section is one of the most common surgeries around the world.[2] It is estimated that about 20 million cesarean section deliveries occur each year with rapidly growing continuously in low-, middle-and high income contries.[3]

Over the past decade, increase in cesarean section rate has been observed globally. During the year 2013 the average rate which is documented from both developed and developing countries is 27%. According to WHO statement no additional health benefits observed if cesarean section rate increased above 5%–15%.[4]

Unnecessary cesarean section may have an adverse impact upon maternal, neonatal, and infant morbidity and mortality.[5] LSCS increases the chance of having

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preterm or early term babies. Its association to morbid adherent placenta, transfusion, hysterectomy, bowel or bladder injury increases with increasing number of LSCS. An increase in number of admissions to an intensive care unit, ventilator therapy, longer hospitalization, and even newborn deaths and maternal mortality is also observed, it can be as high as 2-4 times greater for LSCS than normal vaginal deliveries.[6]

The indications for which LSCS are performed are multiple and they are divided into absolute and relative indications. Absolute indications are only contributing for less than 10% of LSCS. Relative indications are responsible for rest of the LSCS rate.[7]The most frequently observed relative indication (modifiable risk factor) for LSCS is maternal request which is called CDMR.[7] Next most commonly cited contributor is BMI, which has both direct effect on labor progress and also indirectly consider as a risk factor of developing DM, GDM and macrosomia. Fetal macrosomia is considered as a relative indication, so it also contributes to the increase in cesarean section rate.[7-8]

The risk of fetal congenital malformations, hypertension, or even diabetes mellitus increase, as maternal age rises over 35 years. These risk factors may lead to an indication for cesarean delivery.[8] This is the reason that pregnancy in the age of 35 years or above are called high-risk pregnancy.

Over the past decade, there are great achievements in the mother and child health including delivery by LSCS. Unfortunately, LSCS delivery rate is increasing worldwide beyond the WHO set criteria. There is no additional benefit of this high rate, as most of them are done due to non-medical indications. Two desiderates of modern obstetric care worldwide are successful trial of labor after cesarean (TOLAC), followed by vaginal birth after cesarean (VBAC).[9]

Because of conflicting literature and insufficient information in Pakistan regarding modifiable determinants of CS, the rationale of current study is to identify these contributors in order to reduce rate of unnecessary CS.

So our aim of this study is to identify modifiable risk factors for repeat cesarean section. If our study finds significant contribution of modifiable risk factors in increasing rate of LSCS then by timely and accurate screening of women during obstetric care and, decision to perform cesarean section should be based on clear, compelling and well-supported justification and arrange intervention programs for raising awareness about the bad effect of CS delivery especially among women with risk factors which can be modify to reduce rate of CS and its complications.

Methodology

It was a prospective descriptive case series carried out in the Obstetrics and Gynecology Department Unit II Fauji Foundation Hospital Rawalpindi. Informed written consent was taken from subjects and they provided a number rather than using their names, and the data kept confidential. Subjects with previous one LSCS, who visited to antenatal clinic selected by consecutive non-probability sampling technique. A thorough clinical assessment performed after fulfilling inclusion criteria. Subject with non-recurrent cause of their previous LSCS who underwent repeat caesarean section either elective or emergency were included in the study. Patients with absolute indications for repeat cesarean section were excluded from the study. Their continuous variables were expressed as mean and SD and categorical variables were expressed as frequencies and percentages. Analysis of the data was done through online calculator by using t-test on two by two tables of modifiable risk factor contributing to Em LSCS and El LSCS.

Results

Mean age of women who underwent elective LSCS was 32.7 $\pm$ 5.37 and mean gestational age was 38.65 $\pm$ 2 weeks. Mean parity was 1.97 $\pm$ 1.37. (Table I)

Among elective LSCS group 112 (46.1%) were booked, 70(28.8%) late booked and 61(25.1%) unbooked patients. (Table I)

Table I: Demographic Features.

Demographics	El. LSCS (243)	Em. LSCS (145)
Mean Age	32.7 years ± 5.37	32.98 ± 5.29
Mean Gestation	38.65 ± 1.2 weeks	37.06 ± 2.0 weeks
Parity	1.97 ± 1.37	2.51 ± 1.93
Booked	112 (87%)	29 (20%)
Late booked	70 (29%)	13 (9%)
Un-booked*	61(25%)	103 (71%)

Total patients included in study were 491, out of them 103(20%) delivered through VBAC, 388(79.2%) had caesarean delivery. Among caesarean deliveries 243(62.6%) had undergone elective LSCS and 145(37.3%) emergency LSCS. (Table II)

Table II: Outcomes of previous scars. (n=481)		
	Number	Percentage
VBAC	103	21.4%
Repeat LSCS	388	80.6%
- Elective	243	62.6%
- Emergency	145	37.3%

There is significant contribution of modifiable risk factors in increased repeat LSCS rate (49.4%). The frequency of modifiable risk factors in El. LSCS group (n=243) was 155 (63.7%) and medical indications contributed only 88(36.2%). Statistically significant contribution of these modifiable risks were found for El. LSCS group as compared to emergency LSCS (p value<0.001). The most common modifiable risk factor found was refusal of TOLAC 94(38.6%) followed by, in descending order of their contribution, short inter-pregnancy interval 24(9.8%), private setup scars 20(8.2%), post-date 17(6.9%). (Table III)

Table III: Modifiable factors for repeat LSCS.		
Indication	**Elective (n=243)**	**Emergency (n=145)**
Modifiable factors	155 (63.7%)*	37 (25.5%)
Refusal of TOLAC	94 (38.6%)	15 (10%)
Short inter pregnancy interval*	24 (9.8%)	4 (2.7%)
Private scar	20 (8.2%)	6 (4.1%)
Postdates	17 (6.9%)	0
Poor bishops	0	12 (8.2%)
Non-modifiable factors	88 (36.2%)	108 (74.4%)

Statistically significant contribution of modifiable risks were found for elective LSCS group as compared to emergency LSCS (p value<0.01)

Discussion

Over the past decade there are great achievements in the mother and child health. One of them is the delivery by LSCS, provided it is done only on medical basis. The indication for cesarean delivery should be very clear.[9] Unfortunately cesarean delivery rate is increasing worldwide due to unnecessary and non-medical indications. It is beyond the limits defined by WHO with no additional benefits, instead having adverse effect on mother and child health.[4,6,10] Birth by cesarean section is rapidly increasing in both developed and developing countries. [8, 11,12] There is an association between increasing rate of cesarean section and its future complication like repeat LSCS and morbid adherent placenta. Morbid adherent placenta itself has increasing rate of major hemorrhage, blood transfusion, DIC, hysterectomy, bowel or bladder injury, admission to an intensive care unit, ventilator therapy, longer hospitalization and even mortalities. [6, 13.14] Delivery by cesarean is not an equivocal to vaginal birth it increases the chance of having preterm or early term babies, and it should be cautiously viewed [7.] There is huge list of indications for cesarean section, but previous cesarean delivery remained the main cause of repeat cesarean section, so counseling of patient in first pregnancy regarding normal vaginal birth is important.[8]

Globally, it has been estimated that about 50% of cesarean deliveries are done unnecessary without an obstetric indication.[15] Increase rate of cesarean section is associated with increase in catastrophic health expenditure for families and additional pressure upon health systems due to its high cost, especially in low- and middle-income countries.[4,5,18,19]

Compare to repeat cesarean delivery, vaginal birth after cesarean (VBAC) is an important alternative of delivery.[16,17,20] It is associated with lower rates of hemorrhage, thromboembolism, and infection, and a shorter recovery period compared with women who have an elective repeat cesarean delivery (ERCD).[9] This is the reason that now a days the two desiderates of modern obstetric care worldwide are successful trial of labor after cesarean (TOLAC), followed by vaginal birth after cesarean (VBAC), and developed countries are investing more in strategies that ensure safety of patients in a controlled hospital environment, with reduced costs in order to reduce rate of unnecessary cesarean .[9,15]

Although most of studies showed different results and rate of cesarean delivery, but data available for low and middle income countries is sparse.[4] In our study the repeat cesarean section rate is very high (80%) mainly contributed by elective repeat LSCS but almost half of the cesarean delivery are due to risk factors that can be modified and remaining cesarean deliveries are due to clinical indications of surgical delivery.[7] In consistent with other studies, our study showed that among modifiable risk factor refusal of TOLAC is the major contribution to repeat LSCS.[11] It is followed by short inter pregnancy interval, caesarean in private setups, post-dates and poor bishops.[7]

So, main effort must be put in to educate the women, regarding complications of repeat LSCS and chance of successful vaginal delivery after one cesarean.

The result of our study showed that antenatal visits have an association with cesarean delivery.[1] We observed that early booking with regular antenatal visits reduced the rate of emergency cesarean section. In our

study the late booked and un-booked patient have an increased rate of emergency cesarean section and thus its complication as compare to elective cesarean section.

Among demographic variables our study showed similar result to other studies that increasing maternal age and parity is associated to increasing rate of repeat LSCS.[7] In our study mean age was 32 and in other study mean age was 31.[8] In Germany, the percentage of women giving birth over the age of 35 is now 24%.[8] In our study percentage of women with age more than 35 are 39%. As maternal age rises, so does the risk of fetal congenital malformations, hypertension, or even diabetes mellitus. Age is not in itself an indication for cesarean section; rather, it is the occurrence of specific risks in this age group that may lead to an indication for cesarean delivery.[8] that is why this pregnancy has been considered a high-risk pregnancy.

Our study has large number of patients who delivered via repeat cesarean section as compared to VBAC. This magnitude of cesarean section may be attributed to high number of referred cases and the late age pregnancies with multiple risk factors as the hospital provides care to retired army families. This increase rate of cesarean section than VBAC is in contrast to other study which is having a greater number of VBAC.[9] It may be due to the fact that our study is observational study to find out modifiable risk factor to implement its result in order to decrease the rate of repeat cesarean section and its complication, that aforementioned study is a randomized controlled study.[5, 9]

Different studies found different risk factors and their contribution to cesarean section and some risk factors are even not studied like poor bishop and post-dates.[3] We studied these risk factors in detail and found that these factors have significant contribution to repeat cesarean section. This is due to the Unit protocol for not doing induction of labour in patient with previous cesarean scars. These can be modified in form of pharmacological induction of labor (IOL) if one to one care is provided.

A best effort in reducing the rate of repeat cesarean section can made specially in patients with modifiable risk factors. As unnecessary cesarean section is the major cause of maternal and neonatal morbidity and mortality, and unfortunately cesarean section rate is increasing in our society.[3-5]

The limitations of study are small number of samples due to referral centre of high risk patients, furthermore it was observational study that is why we have less number of VBAC as compare to repeat LSCS. [9]

Conclusion

Our study concluded significant contribution of modifiable risk factor to increase in rate of cesarean delivery. As unnecessary cesarean delivery is the major cause of maternal and neonatal morbidity and mortality, and unfortunately cesarean section rate is increasing in our society.

Therefore, during obstetric care of women it is important for obstetrician to do timely and accurate screening. Indication for cesarean section should be very clear, compelling and well-supported. For raising awareness, arrangement of intervention programs about the bad effect of delivery by cesarean section and comparatively safe delivery by vaginal birth after cesarean (VBAC) should be done especially among women with modifiable risk factors in order to reduce its rate and associated complications.

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