Increasing Cesarean Births, Cause for Concern

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Abstract: *Introduction:* Relationship between increasing Caesarean section rates (CSRs), maternal-perinatal outcome continues to be controversial but CSRs, have risen high, regardless of age, babies number etc, higher than necessary for optimal maternal neonatal outcome with geographic variations. WHO advocates that CSRs should remain 5 - 10% and with rates higher than 15%, risks increase. Studies reveal higher perinatal mortality with increasing CSRs. There are many harmful effects on mother too.

Objective: To look into status of CSRs, causes of high CSRs, possibilities of reduction in CSRs.

Material & methods: Literature search with available search engines was done adding personal experiences and discussions.

Results: It was revealed that CSRs are increasing globally. Leading factors quoted are genuine needs, more women asking for CS, liability pressure, continuous electronic fetal monitoring, private care, health problems, race/ethnicity and other characteristics but none accounts for high CSRs. Upward trends in Caesarean births (CBs) are neither explained by maternal characteristics nor pregnancy complications**.** Babies are more likely to have breathing problems, diabetes, allergies, asthma, exhibit differences in composition of intestinal flora, long-term obesity, immune, endocrine dysfunction independent of intestinal microbiota, prematurity, respiratory distress syndrome, neonatal intensive care unit admission. All these lead to high perinatal mortality. CSs done without medical indication represent drain on resources, negative health equity. Possible interventions to lower CSRs may be partography, vacuum / forceps births, evidence-based protocols for evaluating fetal status, dysfunctional labour, second opinion for CS decision, auditing indications.

Conclusions: CSRs are increasing with their sequelae. Health authorities, professional associations, institutions, public, media should work together to reduce maternal sufferings, social, financial burden due to over roofing CSRs.

Keywords: Caesarean Section Rates, Causes, Ill effects, Mothers, Babies.

INTRODUCTION

Caesarean section (CS) is one of the commonest major surgical procedures performed globally. There are wide geographic variations in CS rates (CSRs), but almost all show a rise, quadrupled in less than two decades [1-6] a cause for alarm and a matter of concern. WHO [6] reports that the best outcome for the mother and baby is with CSR of 5 to 10%, and CSRs higher than 15% are associated with greater risk with higher maternal, perinatal morbidity and mortality compared to vaginal birth [7-9].

OBJECTIVE

Present article is review of trends, causes and effects of CS and possibilities of reduction in CSRs.

MATERIAL AND METHODS

Various search engines like Pubmed, Readers guide, Retrospective, Springer's link, Maternal health task force websites etc. were used to get the information as per the objective.

RESULTS

For both medical and non medical reasons, the CSRs have been increasing the world over. In many countries across the globe, the CSRs are reported to be much higher than recommended by the WHO**.** World Health Statistics reveal a global CSR of 16%, exceeds the recommended upper limit of 15% [10, 11].

In the year 2007 alone, the CSR in the US was 31.8% and approximately 45% in Brazil, which could be in part due to defensive medicine, patient's choice. The change is global, from 10.5% in 1990 to 17.8% in 2008 in Belgium, from 16.1% in 1999 to 18.8% in 2003 in France, 7.4%in 1990 to 13.5% in 2002 in Netherlands, 11.3% in 1989-1990 to 23% in 2004 in Britain, 17.5% in 1995 to 23.4% in 2002 in Canada, and 19.8% in 1999 to 20.9% in 2000 in Germany [12]. Although CS is not indicated in cases of increased maternal age, increased body mass index (BMI) during pregnancy, in-vitro fertilization and multiple pregnancies, but these factors have also been associated with increased CSRs [13]. Perception that, CS is of little or no risk leads to primary CS, with future repeat CS. Maternal request may be, for convenience or fear of pains or fear that vaginal birth will cause pelvic organ prolapse, urinary/ rectal incontinence or sexual dysfunction. Myths among Indians and Chinese about birth on an

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auspicious day, doctors opting for CS earn more, and women wishing to maintain their young vaginal tone to benefit their sexual partner are also responsible [14]. Conducting CS for non medical reasons is of special concern because CS is associated with a four-fold increase in mortality [15]. In US, CSR was 4.5% in 1965, when first measured [16] and recent rate is 32% [17], Canada 22.5% [18] and United Kingdom 23.8% [19]. Menacker [20] reports that caesarean births (CBs) increased from 20.7% in 1996 to 32% in 2007 in US, levelled off at 32.8% in 2010 and 2011 [21]. Even in a low-income country like Bangladesh, CSRs have increased from 3% to 12% between 2001 and 2010 [22]. Some middle income countries, (Latin American and Asian countries) report rates between 30 to 46%. The CSRs for upper-middle-income countries have surpassed that of high-income countries (31% and 28% respectively) [23]. A study by the Indian Council of Medical Research (ICMR) in 33 medical institutions revealed a CSR of 21.8% in 1993–1994 and 25.4% between 1998–1999 [24]. Women in the wealthiest households have rates above 20%, whereas among the poorest households in many countries, CSRs are less than one percent [25]. The CS in many developed and developing countries have risen higher than necessary for optimal maternal and neonatal outcomes [26-28].However, with a CSR of 10%, maternal and neonatal mortality decreased, when CSR increased. As CSR increased above 10% and upto 30% no effect on mortality rates was observed in a study by WHO [29]. Studies reveal that, large groups of healthy, low-risk American women who received care that enhanced their body's innate capacity for giving birth have achieved CSRs 4% - 6% with good overall birth outcomes [30, 31].

RISK FACTORS AND REPORTED CAUSES

Upward trends in CB are neither explained by changes in maternal characteristics or pregnancy complications [32-35]. Litorp *et al* [36] report a sharp increase in the CSR for all cases except transverse lie. Fear of malpractice liability is frequently cited as a major driver of the extensive use of CS. However many studies have revealed that the role of liability pressure is modest at best and can account for just a fraction of the steep recent rise. This seems to be overpowered by the variations in professional practice style and refusal to offer the informed choice about vaginal birth, casual attitude about surgery, limited awareness of harms with CS and incentives to practice in a manner that is efficient for providers [37]. Baicker *et al* [38] opine that it could also be, that the flat "global fee" method of paying for childbirth does not provide any extra pay for providers who patiently support a longer labour for vaginal birth.

The Robson classification system [39] based on four obstetric concepts: category of pregnancy, previous obstetric history, course of pregnancy, and gestational age, provides a framework for monitoring and auditing CSRs. On this basis Litorp *et al*[36] categorised women into ten groups, parity (nullipara/multipara), previous CS (CS/no CS), plurality (single/multiple) presentation (cephalic/breech/ transverse), labour (spontaneous/induced/no labour), birth weight (< 2.5 kg or ≥ 2.5 kg), and mode of delivery (CS/no CS). The analysis revealed that the contribution of CS amongst low-risk groups was high in total CSs suggesting that many CSs were performed on questionable indications, CSRs rising from 19% to 49%, involving nine out of ten groups. Multipara without previous CS, single baby, cephalic presentation with spontaneous labour had a CSR of 33% between 2009 and 2011, in part because of increased rates of CB on maternal request with a rise in maternal mortality ratio of 463 (maternal deaths/lac live births) between 2000 to 2002 to 650 between 2009 to 2011.However in a meta-analysis, the mother's preference for cs was found only in 15.6% cases, thereby contributing only to a small proportion to the rising CSR [40].

Purandare [41] suggests that an increase in elderly pregnant women with or without medical disorders and doubling of obese pregnant women with large babies might have also increased CBs. Joseph [42] report CSR of 38% for nulliparous women over 35 years and 50% in those over 40 years. In nulliparous women, the relationship between maternal age and delivery by emergency CS is linear, which suggests a biological effect of advancing maternal age on labour performance, rather than simply obstetrician or maternal preferences [43]. Researchers are reporting high CSRs for all birthing women, regardless of age, the number of babies they are having, the extent of health problems, their race/ethnicity [44, 45].

Kambo [22] reports that rise in the CSR has also been attributed to the improvement of skill with safety of the operation, broadened but not well defined indications, legal, financial and convenience incentives, demographic, anthropological and social changes during recent decades. Widespread perception that, the CS is of little or no risk to healthy women has also resulted into increased elective primary CS, with proportionate increase in repeat CS as well.

In a study of 11,309 CS, 755(6.6%) CS were for nonprogress of labour (NPOL). It was revealed that small size, anaemic women were likely to have CS for NPOL. Perinatal mortality rate (PMR) was 70.72 and around 68% of perinatal deaths seemed to be directly related to NPOL. Attempts must continue to prevent such CS by trying to know which women are likely to have NPOL, so that right action is taken at right time to prevent NPOL, unwanted CS and reduce perinatal deaths especially with CS. A recent US study (2003–2007), where over 60% of primary CB were for labour arrest disorders or non-reassuring fetal heart rate tracing, with relative increase of 21% and 62%, respectively, for caesarean delivery in these situations [46].

Roberts *et al* [47] report that factors responsible for CB on maternal request are convenience, fear of labor pains or 'women too posh to push,' intrauterine fetal death, brain injuries, fear that the consequences of labor and delivery may compromise the quality of life of mother, because of pelvic organ prolapse, urinary and rectal incontinence and sexual dysfunction resulting from vaginal delivery.

Roberts *et al* [47] further report that CSR worldwide are higher for women receiving private care. Mossialos *et al*. [48] also report that obstetricians are motivated to perform CS for financial and convenience incentives. So women with limited access to midwives, as primary care givers, or those experiencing a previous CS are more likely to have CB. Declercq *et al*. [49] report that the *Listening to Mothers* survey participants who had CB reported that they had experienced pressure from health professionals to have CS. Researchers also found that many women with a previous CS (PCS) would have liked the option of a vaginal birth after CS (VBAC), but did not have it because health professionals and/or hospitals were unwilling. There is refusal to offer the informed choice of vaginal birth. Just 1% of *Listening to Mothers* survey participants with a PCS reported that they had planned CS knowing there was no medical reason for it. More than nine out of ten women with a PCS are having repeat CS in the US. Similarly, few women with breech presentation have vaginal birth, and twins have increasingly CB [50]. All births carry an element of risk, however small. The important issue is that women are aware of the evidence around breech birth, including the risks and the benefits of either a vaginal birth or CB, so that they can make a decision about how they want to give birth.

Common labor interventions make a CS more likely. Labor induction among first-time mothers and/or when the cervix is not ripe appears to increase the likelihood of CB.However a recent trial of induction of labour at term for women at risk for emergency CS, were found to have more vaginal births and reduced NICU admissions with better perinatal outcome in the treatment group . Walker *et al* [51] also report that there is a growing body of evidence that induction of labour at term does not increase emergency CSR and does not increase intrapartum deaths.

Continuous electronic fetal monitoring has been associated with greater likelihood of CS. Having an epidural early in labor or without a high-dose boost of synthetic oxytocins also seems to increase the likelihood of a CS for fetal distress.

Casual attitude towards surgery reflected in the comfort level that many health professionals, hospital administrators and women themselves have with CB and insurance plans, also contribute to increase in CSRs [52]. A planned CS is an especially efficient way for professionals to organize their hospital work, office work and personal life, a difference in styles across hospitals [50].

EFFECTS ON MOTHER AND BABY

It has been reported that in spite of the increase in fetal indications for CS, perinatal mortality has remained high, with increased incidence of preterm births, respiratory distress syndromes and NICU admissions [21]. Morris [53] reports that from 2001 to 2009, increasing CSR have not been accompanied by any significant change in perinatal mortality, but have been accompanied by a small (3%–3.2%), but significant, increase in severe neonatal morbidity [54]. A study of indications of CS had revealed CSR of 15% in 1983 and 38% in 2007, around 4% CS were fruitless (no take home baby) with PMR of 92 in 1983 and 52 in 2007. In the rural communities in the same region there has been disproportionate increase in CSR parallel to institute's CSR [55].

Harmful effects to the mother include haemmorhage, emergency hysterectomy, surgical cuts, risk of infection, going back to the hospital, a challenging recovery, deep vein thrombosis (DVT) and death. Perhaps the surgical side effects of scarring and adhesion formation lead to chronic pelvic pain, infertility and ectopic pregnancy. Placenta previa, placenta accreta, placental abruption, emergency hysterectomy,

and uterine rupture in future are well known [35, 56, 57]. In a study of 34975 births, 7309 were CBs, no mortality with CBs but 8.25% women had intra-operative complications and 42.21% had postoperative morbidity. Morbid complications such as pelvic infection, sepsis, DVT, fever, urinary infection, and anaesthetic complications have been reported in 35.7% CS cases [58].

CB has been identified as risk factor for childhood asthma and allergic rhinitis, [59, 60]. Babies of CB are more likely to have breathing problems, childhood diabetes. They exhibit differences in the composition and timing of acquisition of intestinal flora [61, 62]. These alterations in intestinal microbial composition in the first year of life may last throughout childhood, and may contribute to the development of obesity [63-65]. Huh *et al* [66] did a prospective cohort study and reported that children delivered by CS had double the odds of obesity, along with higher BMI. Double skinfolds at age 3 of CB baby compared with children delivered vaginally may be because of differences in the composition of intestinal flora acquired at birth among CB and vaginally delivered. Also given the routine perioperative antibiotic prophylaxis accompanying CS, CB may be a proxy for intrapartum antibiotic use, which could influence the composition of neonatal intestinal flora, in turn influencing the development of obesity. Perhaps physical passage of the infant through the birth canal is more important than the presence or duration of rupture of membranes in determining infant flora composition [67]. Mothers who choose CB on request should be aware of potential health risks for themselves and their babies [68-71].

DISCUSSION

It is obvious that there is tremendous increase in CSR precise relationship between increasing CSRs and maternal-perinatal outcome remaining controversial. Even combining all the studies does not necessarily give the right answers on an individual level. When the available planned C-section is compared to planned vaginal delivery, there is a significant difference between the two routes of delivery when investigating maternal morbidity. The impact of dramatic rise in CSR on neonatal morbidity and mortality or maternal health is still challenged [39]. It is appropriate to view the widely increasing rates of CS as a potential obstetric hazard. Although indicated and timely CS is of tremendous benefit to the mother and baby, the repercussions, sequelae and health economics demand a better understanding. CS not only predisposes the woman to subsequent compromise of fertility but also results in a heavy social and financial burden on the society. The issue of increase in CBs deserves international attention not only because of health consequences, for the mother and baby, resource administration and policies, but also because high CSRs are not associated with low PMR. Therefore the International Federation of Gynaecologists and Obstetricians recommend that hard evidence does not exist for CS for non medical reasons and is not ethically justified [38].It is now well understood that optimum maternal and perinatal outcome depends on good obstetric practice rather than CS. Robson [39] reports low PMR in best of centres in the world with overall CSR near 20%. Since CS entails higher costs than vaginal delivery [71], CS done without medical indication represents a drain on resources and have negative implications for health equity [72].

Potential interventions to lower the CSR and improve outcomes include use of partograms, promoting active management of labour, increasing the use of vacuum extraction, introduction of a mandatory second opinion for CS decision and auditing CS indications with outcome [73]. The high rate of repeat CS among women with previous CS calls for improvement in the organization, such as a more structured surveillance during labour and shortening of the time interval between CS decision and operation, in order to allow women with previous CS to have a trial. A prediction model proposes that VBAC is not associated with increase in neonatal morbidity in comparison to elective repeat CS, even if the chances of successful VBAC were at minimum of 70%[74]. In addition, high CSR is associated with increase obstetric care costs and has an unfortunate negative impact on maternal health. Sonographic scrutiny of the uterine scar might be considered to gauge the risks of uterine rupture when planning on a vaginal delivery after a CS [75]. China has one of the highest rates of caesarean delivery in the world. Thus, understanding the reasons underlying the practice preference in China may provide insight into factors influencing caesarean rates into other countries [14].

Evidence-based protocols for evaluating fetal status and managing dysfunctional labour need to be developed and promoted. In one study, application of a strict protocol dramatically reduced no-medical-indication elective births before 39 weeks, although the impact on CSR was not an outcome [66]. Changing practice requires that interventions are adapted to local

circumstances [76]. If rising CSRs are to be arrested or reversed, mothers and maternity service providers will need supporting evidence demonstrating that in most of the circumstances, vaginal delivery at term is as safe for the neonate as CS. It is reported that major brain development occurs in last 3 weeks [77]. Finally, making public the performance also results in changes in obstetric services which affect CSRs [78]. The decision to switch to CS is often made during labor when care givers could use watchful waiting, positioning and movement, comfort measures, oral nourishment and other approaches to facilitate comfort, rest, and labor progress.

Over a certain threshold, the increasing rates of CS might only have adverse consequences rather than favouring outcomes. However, since emergency CS in a planned vaginal delivery carries most risk, each case requires individualised decision [79]. Specific attention should be given to the action and attitude of physicians and health care systems in lowering the primary and subsequent CSR. Therefore, each hospital and institute must analyse the CSR and PMR and develop appropriate and clear guidelines specifying the circumstances under which a CS is medically necessary [80]. Also studies should focus on healthcare-related factors behind the rising CSR rate by interviewing caregivers. Health authorities, professional associations, institutions, the public and media should work together to reduce maternal sufferings and the financial burden on health system occurring due to the over roofing rates of CS.

CONCLUSIONS

Each hospital and institute must analyse the CSR and PMR and develop appropriate guidelines. Healthcare-related factors behind the rising CSR rate must be researched. Health authorities, professional associations, institutions, the public and media should work together to reduce maternal sufferings and the financial burden on health system occurring due to the over roofing rates of CS.

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