

# Trend in cesarean section rate

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## ABSTRACT

**الأهداف:** التحقق من العوامل والأسباب التي تؤثر على زيادة نسبة العمليات القيصرية، بالإضافة إلى اقتراح التوجيهات اللازمة للتحكم بهذه النسبة.

**الطريقة:** أُجريت هذه الدراسة الاسترجاعية في قسم النساء والولادة بمستشفى الملك فهد للقوات المسلحة، جدة، المملكة العربية السعودية وذلك خلال الفترة من يناير 2007م إلى ديسمبر 2008م، حيث قمنا بمراجعة سجلات الولادة أثناء تلك الفترة وعمل مقارنة فيما بينها. لقد كان عدد العمليات القيصرية في عام 2007م 1105 عملية، فيما وصلت هذه العمليات إلى 1226 عملية في عام 2008م، وهكذا فقد كان حجم العينة التي تضمنتها الدراسة 2331 عملية قيصرية. وتمت إجازة البحث من قبل اللجنة المتخصصة بأخلاقيات البحث والدراسة.

**النتائج:** أشارت نتائج الدراسة إلى أن نسبة العمليات القيصرية قد تجاوزت الحد المسموح به من قبل منظمة الصحة العالمية وهو 15% وذلك في مستشفى الملك فهد للقوات المسلحة بجدة وعلى الأرجح في العديد من مستشفيات المملكة. ولقد كانت أكثر الأسباب التي دعت إلى إجراء العمليات القيصرية كالتالي: تعب الجنين، وعملية قيصرية واحدة وسابقة، وعمليات قيصرية عديدة وسابقة، والولادات المقعدة.

**خاتمة:** أظهرت هذه الدراسة أن نسبة العمليات القيصرية في تزايد مستمر وخصوصاً مع ميل المجتمع السعودي لتكوين الأسر الكبيرة، وميزة العمليات القيصرية في تكرار إجرائها، ولهذا فنحن بحاجة إلى بذل المزيد من الجهد وتطبيق الإجراءات اللازمة للحد من هذه المشكلة في جميع المستشفيات وفي المجتمع السعودي ككل.

**Objective:** To investigate factors influencing the increase in cesarean section (CS) rates, and to implement control measures.

**Methods:** This retrospective analysis reviewed the birth registry of the Department of Obstetrics and Gynecology, King Fahd Armed Forces Hospital, Jeddah, Saudi Arabia. We compared the frequency of different indications for CS between January 2007 and December 2008. The numbers of CS studied were 1105 in 2007, while they were 1226

in the year 2008. Thus, the sample size studied was 2331 cesarean deliveries. Approval of the ethical committee for publication was obtained.

**Results:** The CS rate exceeded the acceptable 15% rate suggested by the World Health Organization (WHO) at our institution, and probably in many other hospitals in Saudi Arabia. Fetal distress, previous single CS, previous multiple CS, and breech presentation were the most common indications for CS.

**Conclusion:** This high rate of CS will continue to increase due to the tendency to have large families, and the self-perpetuating character of each CS. Efforts should be made at each hospital level, and nationwide, to control this tendency.

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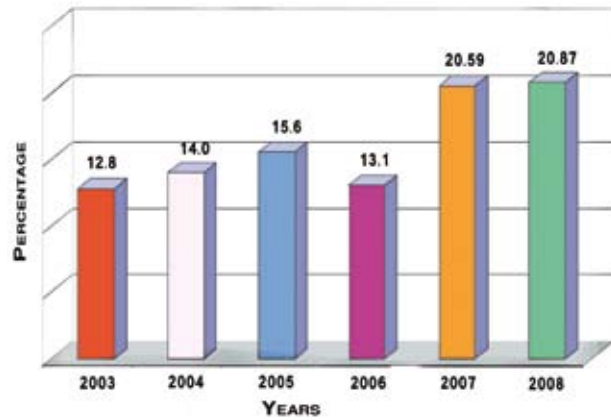
In 1985, the World Health Organization (WHO) issued a consensus statement suggesting that there were no additional health benefits associated with a cesarean section rate (CSR) above 10-15%. This was based on an examination of estimates of national CSR and maternal and perinatal mortality rate from various countries.<sup>1</sup> At our institution, the King Fahd Armed Forces Hospital (KFAFH), Saudi Arabia, the CSR was always below 15%. However, in 2007 the CSR exceeded 20%. This raises a real concern, as there was no change in the population served or the type of practice. The operative vaginal delivery rate in the same year was 1.8%. We felt that this rate is lower than that reported in many places in the world. Our first assumption was that cesarean deliveries had replaced operative vaginal deliveries in many cases. Reviewing the hospital statistics

showed that between the years 2003 and the year 2008, there was an approximate 0.5% reduction in the rate of operative vaginal deliveries, but an increase in the CSR rate of approximately 8%. Thus, we can say that the increase in the CSR was due to other reasons, and not due to a reduction in the operative vaginal deliveries rate. Therefore, the objective of the study was to investigate the most common indications for cesarean sections (CS) in this institution, and introduce controls measures to reduce the CSR.

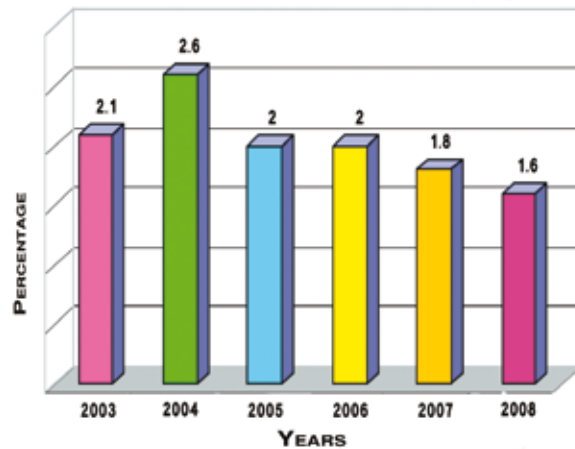
**Methods.** We carried out a retrospective analysis of the indications for all CS conducted between January 2007 and December 2008 at the King Fahd Armed Forces Hospital, Jeddah, Saudi Arabia by reviewing the Obstetric Department's birth registry. We collected the data from the hospital birth registry, and then held 3 brainstorming sessions to discuss the relevance of the data, and the production of the tables and figures. We reviewed the hospital statistics starting from 2003 with regard to operative deliveries generally, namely, vaginal and abdominal. We contacted many hospitals in the area to compare similar trends in the CSR, and the impression was that many other hospitals had the same trend, but due to lack of official statistics produced; no record of the actual CSR from these hospitals were provided.

Data were computed using Microsoft Excel Office.

**Results.** Figure 1 clearly shows the increasing CSR each year starting from the year 2003. Figure 2 shows the percentage of operative vaginal deliveries rates during the same years. Both figures indicate that the mild reduction in the operative vaginal deliveries rates cannot explain the increase in the CSR. Table 1 shows the total number of births in each year, and the total number of CS, and the percentages of all the operative deliveries in both years. Table 2 shows the major indications for CS, with the most common indicators being fetal distress, previous multiple CS, previous single CS, and breech presentation. Table 3 shows that for women with a history of one CS, the likelihood of having a second CS was 68% in 2007, and 73% in 2008. Seventy-nine cases with one previous CS in 2007 were offered vaginal birth after cesarean (VBAC), but refused and opted for elective repeat CS, namely, 23.6% of the total number of cases with previous single CS were candidates for VBAC, but declined. Table 4 shows that primary CS comprised 60.2% of the CSR in 2007, but dropped to 56.7% in the year 2008. This tendency to have a higher proportion in the CSR from previous CS will continue due to the self-perpetuating character of CS, and the strong wish to have big families in Saudi Arabia. Both tables 3 and 4 indicate the importance of controlling



**Figure 1** - Rate of cesarean sections from 2003-2008 in King Fahd Armed Forces Hospital, Jeddah.



**Figure 2** - Rate of instrumental deliveries from 2003-2008 in King Fahd Armed Forces Hospital, Jeddah.

**Table 1** - Mode of deliveries.

Mode of deliveries	Year 2007	Year 2008
Total number of birth (n)	5366	5874
Number of cesarean section (n)	1105	1226
Percentage of cesarean section (%)	20.6	20.9
Operative vaginal deliveries (%)	1.8	1.6

**Table 2** - Major indications of cesarean section (CS).

Major indications	Year 2007	Year 2008
Fetal distress	21.2	21.0
Previous single CS	20.8	22.3
Previous multiple CS	19.0	21.0
Breech presentation	13.8	14.4
Failed progress in labor	9.0	8.7

Values are express as percentage

**Table 3** - Previous single cesarean section.

Variables	Year 2007	Year 2008
Total	335	377
Elective cesarean section	141	153
Emergency cesarean section	88	114
Successful V-BAC	106	110
Likelihood of having a second cesarean section (%)	68	73
V-BAC - vaginal birth after cesarean		

**Table 4** - Primary and secondary cesarean section (CS).

Variables	Year 2007	Year 2008
Primary CS	60.2	56.7
Previous CS	39.8	43.3

the primary CSR as being the most important factor behind the total increase in the CSR.

**Discussion.** Due to the retrospective nature of the study, there were limitations mainly related to the use of the word fetal distress as this could have meant a pathological cardiotocography (CTG) trace primarily or pathological trace secondary to no progress in labor. This was also used for cases of intrauterine growth restriction (IUGR) with abnormal Doppler and sectioned without being in labor. In addition to the fetal distress, which is still the leading indication for CS locally and abroad, three changes in our obstetric practice were identified as possible reasons for increased CSR, namely: The policy of CS for all breech at term, electively or during labor, and a policy of no labor induction for cases with history of single CS, namely, whenever there is an indication to deliver these women before labor starts, CS is the only option available. The third reason was the policy of obtaining written consent for VBAC, which was introduced in 2002, prior to this, verbal consent was enough. This led to an increase in the number of patients declining VBAC, as it led to an increase in the patients' anxiety regarding the safety of the VBAC. In the year 2007, 23.6% of the patients with one previous CS declined VBAC, and this percentage is increasing. This is attributed to the influence of private practice. The impression of many Obstetricians is that very few cases accepted to undergo VBAC by their private doctors, and this decision is not based on purely medical grounds.

**Fetal distress.** Fetal distress was a major indicator of cesarean delivery. It was the indicator in 34% of emergency cesarean deliveries, and 21% of all cesarean deliveries in the year 2007, while it was the second most common indicator, second to CS related to one previous CS section in the year 2008. Fetal distress was

mostly based on pathological and non-reassuring CTG. Continuous electronic fetal monitoring (CEFM) is used for most of the laboring women in our hospital. The American College of Obstetricians and Gynecologists (ACOG) concluded after reviewing many studies that the use of CEFM compared with intermittent auscultation increased the overall CSR, and the CSR for suspected fetal distress. The use of CEFM did not reduce the overall perinatal mortality and the incidence of cerebral palsy. The current available data do not clearly support CEFM over intermittent auscultation, and either option is acceptable in patients without complications.<sup>2</sup> Many options have been tried to replace the CEFM or to improve its predictability for fetal distress, such as fetal blood sampling, fetal pulse oximetry, and analysis of the fetal electrocardiogram. However, all are still being used in clinical trials and further studies are needed. Currently, apart from intermittent auscultation of the fetal heart during labor, all the other alternatives that were tried still require further evaluation.

**Induction of cases with prior CS.** Induction of cases with one previous CS for medical reasons was an acceptable hospital practice. This option was offered to patients if the attending clinician felt that vaginal delivery was possible with no increased risk. Induction with prostaglandin gel or pessary was an acceptable option, and the audit on this practice was in favor of continuation. However, early in the year 2000, this practice for the first time in 20 years was complicated by uterine rupture, intra uterine fetal death, and peripartum hysterectomy. This led to a medico-legal process, which resulted in action against the deciding team. As a consequence, this practice was stopped in our department, and this has contributed to the increase in the CSR. One large series<sup>3</sup> studied the risk of uterine rupture during labor among women with a prior CS and recorded an increased risk (2.45%) of uterine rupture, mostly in the group where prostaglandins were used for the induction. The same study showed that other groups recorded a lower incidence of uterine rupture, for example, those with repeat CS without labor recorded an incidence of 0.16%, the incidence of uterine rupture in spontaneous labor started was 0.52%, and the incidence in those induced without prostaglandins had rupture in 0.77% of cases.<sup>3</sup> The clinical guidelines of the RCOG on induction of labor<sup>4</sup> state that if delivery is indicated, women who have had a previous CS may be offered induction of labor with vaginal prostaglandins (PGE<sub>2</sub>), CS, or expectant management should be on an individual basis taking into account the woman's circumstances and wishes. Women should be informed of the increased risks with induction of labor, increased risk in the need for emergency CS, and the increased risk of uterine rupture.

**Breech presentation.** Breech presentation was the third most common indication for CS delivery, comprising 14% of emergency CS, and 13% of elective CS in 2007. The incidence of breech presentation in the same year (2007) was 3.04%. A total of 163 cases were breech presentation. Only 11/163 (6.7%) of them were delivered vaginally. There was one case of 30 weeks preterm reporting to the labor ward fully dilated, 5 other cases were term and reported fully dilated, and the other 5 cases had vaginal delivery as a maternal option based on their previous experience. In total, 93.7% of breech presentations were delivered by CS. Since the year 2001, CS has been offered to all cases of breech presentation at term. This was based on many international guidelines, for example, the Green Top Guidelines of the Royal College of Obstetricians and Gynecologist (England, 2001).<sup>5</sup> These guidelines advised that woman should be informed that planned cesarean delivery (PCD) for breech carries a reduced perinatal mortality and early neonatal morbidity for babies with breech presentations at term compared with planned vaginal delivery (PVD). This was rated as level A evidence. Most of these guidelines were based on the term breech trial (TBT).<sup>5</sup> However, as time passed, on re-analysis of the TBT, many criticisms were raised. These included for those women for whom cesarean deliveries were performed during active labor, there was only a borderline difference in perinatal outcome in favor of PCD.<sup>6</sup> The authors of the TBT<sup>7</sup> explained in a subsequent paper that many of the participating centers had no routine access to ultrasound scan evaluation, namely, 30% of women in both arms of the study did not have an ultrasound scan prenatally. The result was fetuses with hyper-extended head were not excluded from PVD, and in addition, 5 cases of perinatal death were not excluded as they did not fulfill the inclusion criteria of the study being stillborn, twins, and anencephalic fetus. Results from such centers are not applicable to centers where standards of modern obstetrics are followed. Also, more babies in the PVD group had a birth weight that exceeded 4000 gm than in the PCD group. Most clinicians would be very reluctant to deliver large breech babies vaginally. There was a wide variation in the standard of care between the participating centers, especially regarding the time frame allowed for the emergency CS to be started after decision, this again put the PVD arm at a definite disadvantage. If one looks at infants who were born with significant morbidity, it is revealed that 31.9% of them were attended by obstetrician in training or without enough expertise in delivering breech. Careful and critical analysis of the perinatal mortality cases concluded that most cases of perinatal death were not related to the mode of delivery, a fact that is also no longer being

disputed by the authors of the TBT. Analysis of outcome after 2-years has shown the risk of death or of neuro developmental delay was no different for PCD than for PVD.<sup>7</sup> At least 2 studies,<sup>8,9</sup> showed that safe vaginal breech delivery can be achieved at term whenever strict selection criteria were applied. These criteria include adherence to careful intrapartum protocols with an experienced Obstetrician in attendance, estimated fetal weight of 2500 to 3800 gms, no hyper-extension of the fetal head, CEFM in labor, and the active phase in the second stage was limited to one hour in primigravida and 30 minutes in the multigravida. Induction or augmentation was totally avoided in one of the studies,<sup>8</sup> and was a matter of concern in the other study.<sup>9</sup> At the Riyadh Armed Forces Hospital, where a selection policy is practiced for vaginal breech delivery, in 2007, 149 cases of breech were delivered vaginally out of 406 cases of total breech, namely, 37% of breech presentations were delivered vaginally.<sup>10</sup>

In conclusion, efforts to keep the CSR around a certain level are needed, as CS is associated with high maternal morbidity rates and increased health care costs. Identifying the local CSR beyond which there is no benefit to the maternal or fetal health is important. Such an effort cannot be left to each hospital alone, or even to a group of obstetricians. In fact, a nation-wide committee that involves policy makers, social leaders, and obstetricians, is required. In other countries such an effort is being organized, clear goals are identified, and an audit is continuing. For example in the USA, the ACOG task force on CSR in collaboration with the US Department of Health and Human Services in the year 2000 recommended 2 benchmarks for the United States for the year 2010.<sup>11</sup> First, a CS rate of 15.5% for nulliparous women at 37 weeks or more with a singleton cephalic presentation. Second, a VBAC rate of 37% in women at 37 weeks gestation or more with a singleton cephalic presentation who had prior low transverse CS. In our department, 31.6% of the total number of the women with a history of one prior lower segment transverse CS achieved vaginal delivery. We suggest that a local benchmark needs to be identified. This may need local guidelines followed up by continuous audit. Guidelines may include protocols for using either CEFM or intermittent auscultation. Guidelines on midwifery services and qualifications are also needed that can help overcome the language and cultural barriers between the attending midwife and the laboring women to achieve effective one to one observation during labor for those who fulfill the criteria to have intermittent auscultations. Guidelines for the centers who are fit to practice vaginal breech delivery with regular reviews of their practice and exchange of expertise with other centers who may be able to adopt such a policy. Continuous audit on

the acceptance of external cephalic version, success, and complication rates. Nationwide statistics on mode of deliveries that are based on hospital statistics need to be produced and published. The practice of VBAC in each hospital should be monitored and presented in a communicable way to the patients during counseling for VBAC. Public health education of the advantages and drawbacks of CS should be arranged. Auditing on the CSR and practice in the private sectors is needed. Also, guidelines on tubal ligation for those who had multiple CS, and so forth. Such efforts are very much needed, and they are also cost-effective. In addition, it will guide the regional leadership for the countries around us, as we have a unique opportunity in the availability of facilities that are comparable to the developed countries, and an obstetric population that is comparable to third world countries.

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