



The rising incidence and impact of non-medically indicated pre-labour cesarean section in Latin America

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ABSTRACT

In the poorest populations of the world the difficulties of performing a surgical procedure lead to extremely low cesarean section rates associated with very high perinatal mortality. Meanwhile the proportion of births by cesarean section has been increasing for several decades in many areas of the world, reaching alarmingly high rates especially in Latin America. This review aims to describe this secular trend. The causes of the increase in cesarean deliveries are analyzed with a multidimensional approach, trying to recognize the reasons behind the choice of the route of delivery. We are facing a shift in the guiding paradigm, leaving the classical biomedical one. Advantages and disadvantages of non-medically indicated cesarean section are being sought, comparing it with the results of vaginal delivery, with special emphasis on the short- and long-term morbidity of the newborn. Several variables involved in this controversial topic are considered, with the objective of stimulating critical thoughts about the medical, bioethical and social aspects of the increasing trend in the cesarean section rate.

1. Introduction

In evolutionary terms, we could speculate that, as bipedalism developed, natural selection favored the behavior of seeking assistance during childbirth [1]. Human beings have the largest and most complex brain among all mammals, and the relationship between the pelvic conformation and the head of the fetus is one of the factors that help to explain the acceptance of cesarean section (CS) as an alternative mode of birth [2].

Cesarean section is mentioned in different cultures from 2000 BCE [3]. However, the procedure was directed either to save the life of the fetus in the face of some severe complication during a term pregnancy, in which the mother did not survive, or to allow mother and child to be buried separately if they were both dead. According to reports, it was in Switzerland, at the beginning of the sixteenth century, that the first case in which the survival of the newborn and her mother was achieved.

With improvements in CS technique and patient care, there has been a progressive increase in the rate of cesarean births in most parts of the world. CS is a major surgery with inherent risks, but when performed following maternal or fetal indications, it improves perinatal outcomes, decreasing the morbidity and mortality associated with birth.

One of the current discussions concerns whether CS performed in situations of low risk is associated with advantages or disadvantages for both the mother and her child. However, the analysis of this subject is more complex than just balancing the medical outcomes and a multi-dimensional approach must be considered.

2. Secular trend on the rate of CS

The proportion of births by CS in the world has grown significantly in the last 35 years [4]. In the USA, the cesarean rate increased from 5% in the 1970s to 32.8% in 2012. From then on, in the USA, a slow but steady decrease in the cesarean rate has begun, reaching 31.9% in 2016 [5]. The increase in the cesarean rate represents an uneven global phenomenon. While in sub-Saharan African countries the change in rates of CS over the past 24 years was minimal (from 2.3% in 1990 to 3.5% in 2014), the Latin American and Caribbean region showed the largest increase in the same period (from 22.8% to 42.2%) [6]. A correlation between a country's per-capita gross domestic product and CS rates has been reported for 18 Latin American countries [6]. An ecological study concluded that 850,000 “unnecessary cesareans” per year were performed in Latin America [7]. Another study referred to this

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region showed differences between public and private hospitals, with cesarean rates in the latter, reaching, in some countries, up to 70% [8]. Some private hospitals in Brazil and Argentina have cesarean rates approaching 90%. The high CS rate in our countries may be at least in part responsible for the rise in premature births in the region.

The latest report of the Organization for Economic Cooperation and Development (currently with 35 member states) shows that in recent years some countries have had a small decrease in the rates of CS that had been rising previously [9]. The countries with the lowest rates continue to be the Nordics, along with Israel and the Netherlands (between 15% and 17%), while Turkey (53.1%), Mexico (46.8%) and Chile (46%) (the only two Latin American countries in the group) have the highest rates.

CS rates in Argentina have been continuously increasing, with an average of almost 30% in the public health facilities of the country in 2013, ranging from 23% in Chaco province to 49% in La Rioja province. More than half of the births in private institutions in Argentina are performed by CS.

In recent years there has been a greater increase in CS rates in primiparous women than in multiparous women [10]. If this trend is not reversed, and taking into account the rarity of vaginal delivery after a CS, in the coming years we will witness an even greater escalation in the CS rate.

Several factors have contributed to the increase in the CS rate. **Box 1** shows a classification of these variables [11–14].

3. How to be born. Impact of elective CS on the mother and the neonate

One of the central problems of this controversy is related to defining what is safe and what is risky for the mother, the fetus, and the neonate. We are facing a complex debate that involves neither more nor less than the way we are born. At one extreme, there are those who argue that there is equipoise to carry out a randomized controlled trial comparing planned cesarean delivery versus vaginal delivery in single low-risk term pregnancies in cephalic presentation [15]. On the other, there are those who refer to the increase in CS as an “iatrogenic epidemic” [16].

The 2006 National Institutes of Health (NIH) Conference on CS on maternal request concluded that there is no evidence of significant differences in maternal results in the short term between both birth paths, except for a longer hospitalization time in the cesarean group [17]. In this analysis, planned CS was associated with a lower risk of bleeding or need for transfusion than planned vaginal and unplanned cesarean delivery, and a lower risk of organ injury or trauma when damage to the perineum and intraperitoneal organs were considered together.

Cohort studies suggest that vaginal delivery, particularly instrumental delivery, is associated with an increased risk of long-term adverse maternal outcomes, such as pelvic organ prolapse and urinary incontinence. The OR adjusted for urinary incontinence at 10 years was 2.75 (95% confidence interval (CI): 2.02–3.75) when women with vaginal delivery were compared with those with CS [18].

The method of delivery is usually a decision of the obstetrician, sometimes agreed with the pregnant woman, rarely with her family and exceptionally with the neonatologist. Regarding the point of view of the neonate's health, cesarean delivery is associated with an increased risk of neonatal respiratory complications. When this occurs, admission to an intensive care unit, oxygen therapy, or respiratory assistance may be necessary. The differences between the routes of delivery, in terms of respiratory outcomes, narrow as the gestational age increases. It is important to note that the risks of CS are not only related to the current pregnancy but may be projected to future pregnancies and deliveries. The results of an observational study funded by the NIH indicate that the risk of placenta accreta and puerperal hysterectomy increase along with maternal hemorrhage and surgical complications as the number of CSs increases, mainly between the third and fourth CSs [19].

Conversely, CS may protect against infrequent complications, such as trauma resulting in nerve damage or broken bones, or other complications, such as uterine rupture, cord prolapse, and placental abruption, associated with serious complications, such as hypoxic–ischemic encephalopathy. Finally, the evidence also suggests that the termination of pregnancy around 39 weeks could prevent fetal deaths.

Let us examine some of these aspects in more detail.

Labor in mammals involves the secretion of hypothalamic hormones (oxytocin and vasopressin), which have effects on the maternal and fetal limbic systems, inducing aspects of maternal care [20]. There is also an elevation of various hormones that favor the adaptation to the extrauterine environment (catecholamines, prostaglandins). In addition, changes in the sodium channels in the alveolar epithelium cause a decrease in lung fluid, which begins days before the start of labor [21]. Much of this physiological preparation is lost in a birth by elective CS.

Therefore, after a CS without labor, the newborn must perform the transition phase much more quickly than under physiological conditions. Thus, there is an increased risk that the pulmonary gas exchange will not be satisfactorily achieved during extrauterine adaptation and, as a consequence, to develop signs of respiratory distress.

Whereas usually under these circumstances the newborn will develop transient tachypnea (which, although usually mild, implies a separation from her mother and a delay in the beginning of lactation), in some cases the neonate develops persistent pulmonary hypertension which can be severe and have serious complications, including death [22].

Numerous studies have found a higher incidence of respiratory morbidity in neonates after a CS compared to vaginal birth. The analyses of the results of these studies must be careful, since there may be confounding variables that lead to erroneous conclusions (e.g. CS due to acute fetal distress). Studies that attempt to compare neonatal outcomes must clearly define the inclusion criteria, as well as the type of analysis performed to control for those variables.

A retrospective cohort study of 34,458 term infants in Denmark found that, after adjusting for smoking, alcohol consumption, parity, body mass index, marital status, maternal age and maternal education, the elective CS odds ratio (OR) for respiratory morbidity (taking as a reference the intention of vaginal delivery) was 4.1 (95% CI 2.4–7) at 37 weeks, 3.3 (2.2–4.8) at 38 weeks, and 2.1 (1.3–3.4) at 39 weeks [23].

A prospective cohort study conducted by us, which included 2021 low-risk term pregnancies (≥ 37 weeks), showed that cesarean birth was associated with an increased risk of respiratory morbidity and neonatal hospitalization, mainly respiratory distress syndrome and transient tachypnea of the newborn [24]. CS without labor performed at 37 and 38 weeks showed a significant increase in neonatal respiratory morbidity. The percentage of neonates who were breastfed exclusively at the time of discharge was significantly lower in those born by CS (relative risk: 0.94; 95% CI: 0.92–0.96). This finding should not be overlooked, given the transcendent short and long-term benefits of breastfeeding. A systematic review and meta-analysis on this topic shows a negative impact of cesarean birth on successful breastfeeding, with an odds ratio (OR) of 0.57 (95% CI: 0.50–0.64) [25].

As mentioned above, the negative impact of CS in infants is more evident at lower gestational ages. It is important to consider that although respiratory morbidity is the most evident immediately after birth, late preterm and early term infants (37–38 weeks gestation) have higher risks of many other worst outcomes compared to those born at 39 or 40 weeks. Some of them occur in the neonatal period such as hypoglycemia, jaundice, poor feeding, dehydration, hypothermia, infections, etc., but other poor results develop after discharge and in the long term, including adverse neurological development, low academic achievement at school, respiratory syncytial virus infections, asthma, and sudden infant death syndrome [26–28]. The decision to perform a non-medically indicated CS is frequently due to the desire of obstetricians to prevent the initiation of labor at inconvenient times such

BOX 1

Factors involved in the increasing CS rate

Maternal factors:

- Increase in the proportion of women > 35 years
- Increase in elderly nulliparous women
- Increase of cesarean by maternal request
- Assisted fertilization treatments
- Professionalization of women

Cultural factors:

- Culture of immediacy (little tolerance for waiting)
- Intolerance to uncertainty
- Diversity of values (i.e. a more sexual than maternal view of women)
- Autonomy principle
- Smaller families

Obstetric factors:

- Increase in the rate of primary cesarean:
 - Increased labor induction and its failure
 - Decrease in instrumental births*
 - Increase in fetal macrosomia
 - Decrease in vaginal delivery in pelvic presentation
 - Increased suspicion of risk of fetal health (more techniques for fetal well-being evaluation)
 - Increase in multiple pregnancies
 - Beneficial effects of the Term Breech Trial¹²
 - Emerging infectious diseases (HIV, herpes, condylomatosis)
- Increase in the rate of iterative CSs:
 - Decreased use of trial of labor after previous cesarean**

Factors related to the organization of health care:

- Malpractice lawsuits (defensive medicine) ***
- Time constrictions****
- Resource availability
- Personalized medicine (solo practice instead of team obstetrical care)
- Costs (economic factor)
- Less training in instrumental births

*The decrease in use of the instrumental procedures to facilitate vaginal deliveries when indicated, affects the experience gathered by younger obstetricians during training and consequently in their confidence for its use in real practice.

**The trial of labor after CS was a practice encouraged in the 1980s and then rejected due to reports of uterine rupture and increased prosecutions against obstetricians. Cragin's adage from 1916, "Once a cesarean, always a cesarean" seemed to come true. However, in recent years, reviews of the subject have again questioned that maxim, now replaced by Flamm's one, "Once a cesarean, always a controversy"^{13,14}.

***Whereas obstetricians face demands for neonatal complications after vaginal deliveries, it is extremely rare in Argentina to see an obstetrician incriminated for an unjustified cesarean section.

****It is common for the obstetrician not to have enough time to partner a prolonged labor. Group practice in obstetrics is usually not understood and accepted by medium and high socioeconomic class pregnant women in several South American countries, and it is obvious that an obstetrician cannot be available 24 h a day, 365 days a year to comply with the expectations of a determinate patient. The issue is solved by programmed deliveries without medical indications. These attitudes frequently lead to deliveries before 39 weeks of gestation and birth of late preterm or early term infants.

as nights or weekends, when personalized medicine is a family demand. To spread information among obstetricians and the general public on these potentially avoidable complications of infants born before 39 weeks is an obligation of academic institutions and professional associations.

Tita et al. oriented their research towards neonatal outcomes after a second CS and evaluated the impact of the timing of birth on neonatal morbidity [29]. Of 13,258 CSs, 36% were performed before week 39. Again, the findings showed that, in these neonates, the morbidity

(overall and respiratory) was significantly higher in relation to those born in week 39. The conclusion is clear: elective births, scheduled in low-risk pregnancies prior to 39 weeks of gestational age, can lead to neonatal complications that could and should be avoided. Interestingly, In Latin American hospitals, increasing CS rates from 10% to 20% were associated with greater preterm delivery [8].

The negative impact of CS on neonatal morbidity is not limited to the newborn of the involved pregnancy but could have implications on the outcomes of future children. A multivariate analysis performed in a

cohort of 18,673 births evaluating the effect of previous CSs on neonatal outcome found that for a higher number of previous CSs, there was an increased risk of premature delivery (OR: 1.23; 95% CI: 1.09–1.39), respiratory distress syndrome (OR: 3.54, 2.02–5.91), and neonatal intensive care unit admission (OR: 1.41; 1.25–1.60) [30].

It is also interesting to evaluate whether the decision to perform a cesarean in the first pregnancy has consequences on the reproductive life of the woman. Miller et al. performed a decision analysis study, designed to compare adverse outcomes after an elective CS versus an attempted vaginal delivery in a first pregnancy [31]. The model included single term pregnancies without contraindications to try a vaginal delivery. Considering a combined result of maternal morbidity, in the case of initial elective CS, the probability of presenting problems increases from 0.8% in the first pregnancy to 5.8% in a hypothetical fourth pregnancy. In the case of a labor attempt, that probability is 0.5% in the first pregnancy and 1.6% in the fourth. This analysis shows that the route of birth in the first pregnancy has consequences throughout the reproductive life. In general, there is no great difference for a first pregnancy, but as the number of CSs increases, the morbidity due to the surgery itself increases, as well as the risk of placenta previa/accreta/ectopic pregnancy. These problems increase the risk of premature birth.

Other studies evaluated a possible relationship between the route of delivery and respiratory morbidity in childhood. A multivariate analysis in a cohort study of 37,171 children that looked for an association between cesarean birth and childhood asthma yielded an RR of 1.17 (95% CI: 1.03–1.32) [32]. It is speculated that this increased risk could be explained by an alteration in the development of the immune system secondary to the delay of intestinal colonization in children born by CS. This hypothesis, called the hygiene hypothesis, has motivated an active investigation. In a 2011 review, Neu and Rushing evaluated the association between the “birth by cesarean” factor and various pathologies, finding increased risk of allergic rhinitis (OR: 1.37; 1.14–1.63), asthma (OR: 1.24; 1.01–1.53), celiac disease (OR: 1.8; 1.13–2.88), and diabetes mellitus type 1 (OR: 1.19; 1.04–1.36) [33]. A recent systematic review and meta-analysis also found an increased risk of obesity in children who were born by CS (OR: 1.29; 1.16–1.44) [34].

The findings of these epidemiological studies are important, as the incidence of these diseases in the Latin American pediatric population is increasing. This impact in neonatal and pediatric morbidity must be considered when evaluating the supposed benefits of a cesarean in the first pregnancy.

Some researchers went even further and evaluated the impact of cesarean births in low-risk situations (or with non-medical indications) on neonatal and infant mortality. McDorman et al. took national data from the USA based on birth and death certificates: 5,762,037 live births and 11,897 deaths, considering only women with single pregnancies, full term (37–41 weeks), in cephalic presentation (vertex), without medical risks or complications at birth, and without a previous CS [35]. They carried out a logistic regression analysis to evaluate the adjusted risks of neonatal mortality according to birth by cesarean or vaginal delivery. The OR for mortality, adjusted for maternal age, ethnicity, parity, education, smoking habit, gestational age and birth weight, was 2.02 (1.6–2.55), having excluded congenital anomalies and births with Apgar scores < 4. A subsequent study of the same group, on the analysis of 8,026,415 live births and 17,412 deaths, found an adjusted OR of 1.69 (1.35–2.11) [36].

Similar results were found by Villar et al. in the World Health Organization (WHO) global perinatal health survey, where 97,095 births were evaluated from eight countries, 24 regions and 120 Latin American institutions [8]. The authors performed analyses of fetal, neonatal and maternal morbidity and mortality. When evaluating the relationship between elective CS and neonatal mortality in single pregnancies with cephalic presentation without signs of acute fetal distress, the adjusted OR was 1.76 (1.33–2.32) in relation to vaginal delivery.

On the other hand, in the study by Villar et al. a significant beneficial effect was observed: elective cesarean birth decreased the risk of fetal death, with an adjusted OR of 0.65 (0.43–0.98) [8].

Mandujano et al. performed a study trying to evaluate the optimal time of birth, that is, the one with the lowest risk of fetal and neonatal death. They evaluated low- and high-risk cohorts and found that the crossing point in which fetal deaths exceed neonatal deaths in high-risk pregnancies is close to 35–36 weeks, whereas in low-risk situations, that point is closer to week 38 [37].

4. Brief analysis of the increase in CSs and the open debate on how to be born

We are probably facing a paradigm shift, which means a change in the way society organizes and interprets reality. Traditionally, the dominant paradigm has been the biomedical one. In this sense, CS is considered a surgical intervention to prevent situations or perinatal complications that threaten health or life, and, according to this conception, an appropriate rate should be that associated with the lowest possible morbidity and mortality [38]. However, the increase in the CS rate in recent years has not necessarily decreased maternal and perinatal morbidity and mortality. In other words, the increase in CS rate has not been motivated exclusively by the idea of reducing the risks associated with birth.

One study of cesarean rates worldwide showed that Latin America and the Caribbean have the highest rate (29.2%), and Africa the lowest (3.5%) [39]. In developed countries, the proportion of cesarean births is 21.1%, whereas in least-developed countries only 2% of deliveries are by CS. The analysis suggests a strong inverse association between CS rates and maternal, infant, and neonatal mortality in countries with high mortality levels. However, this correlation between cesarean rate and mortality is lost with values of CS rate greater than 10–15%, a finding consistent with another ecological study published by Althabe et al. [40].

5. Sociocultural factors and Latin America

In the Healthy People 2010 and 2020 initiatives, the WHO proposed (without a clear rationale) a desirable cesarean rate of 15% and a target CS rate of 24% respectively. At the time of both proposals, the CS rate was already 10% above that level in the USA.

In 23 of the 25 least developed countries there are cesarean rates < 10%, compared to only 11 of the 57 countries with more advanced or emerging economies. In the former, most centers that assist deliveries do not have the means to perform CS because they lack operating rooms, surgical instruments, surgeons, anesthetists and supplies, among other things. This scenario is repeated in some regions of many Latin American countries, even though most births are institutional and attended by professionals. As we have mentioned, in scenarios with adverse socio-economic conditions there is a strong inverse relationship between the cesarean rate and maternal, infant, and neonatal mortality [39,40]. This has been confirmed by a recent ecological study analyzing data from 172 WHO member countries [41]. This study found that CS rates of ~19% were associated with optimal levels of maternal and neonatal mortality.

Countries with middle and high socio-economic status differ in CS rates. It is reasonable to speculate that the difference in cesarean rates between these countries is in part based on the different approaches towards labor and delivery. Countries with less interventional approaches have lower rates, compared with countries (e.g. in Latin America) that have more of a “medical” approach [42].

6. Women, doctors and the decision-making process

In different surveys, doctors' preferences for CS as a form of delivery for themselves or their relatives vary as much as 1.4% in the

Netherlands, 9% in Israel, 18% in USA and 30% in Great Britain. Regarding the opinion of women, a recent systematic review shows that, on average, around 15% would choose CS, a percentage that increases in women who have had a previous CS to 30% [43]. Interestingly, the percentage is higher in middle-income countries (including Latin America) in relation to countries with higher incomes.

The Hippocratic tradition maintained for centuries sustains a model of paternalistic physician–patient relationship. According to this model, the doctor can make decisions based on what s/he considered best for her patients (beneficence), regardless of their wishes. The asymmetry in the decision-making authority between doctor and patients was justified based on three elements: knowledge; the supposed lack of rationality and objectivity of the patient; and the idea of the doctor as a selfless, altruistic person. Paternalism presupposes a highly questionable notion of beneficence since it implies the moral abdication of the patient [44]. Furthermore, it does not recognize that society is governed by a set of ethical rules broader than those of the principle of beneficence. Linda and Ezequiel Emanuel postulate that the goal of the physician–patient relationship is to help the patient determine and choose the optimal values attainable in the health field that are compromised by their state [45]. It is interesting that autonomy is understood here as a moral self-development, requiring people to evaluate their own values and preferences, analyze and determine which are desirable, and be able to update them. This model shows a richer and more complex notion of autonomy. Also, feminism leads us to re-examine the concept of autonomy. Instead of understanding it as a natural property of all normal adults, it proposes to recognize that it is a potential that is only viable in the context of a community, redefining it as relational autonomy [46].

Since the 1950s, informed consent has been progressively imposed as a form of expression of voluntariness and the exercise of autonomy. The principle of autonomy requires respect for people's decision-making capacity and the right to have their will respected in matters that refer to themselves. For the patient to make the best decision, it is essential to be adequately informed about the risks and benefits of performing an elective CS and to complete an informed consent form.

In contrast to the paternalistic model, currently, the incorporation of the values and priorities of patients in informed decision-making is recognized as essential. Although this approach is not (or should not be) controversial, it usually shows difficulties when it comes to its implementation. This happens for several reasons: physicians may provide information about risks and benefits in an insufficiently objective way, biased by their own feelings or desires; on the other hand, patients differ in several ways in their values, preferences and priorities about a given medical situation. Specifically, patients can vary considerably in how they weigh risks and benefits. In addition, non-medical considerations often have a major role of importance for patients, which is

especially true in obstetrics [11].

The extreme of the unlimited exercise of autonomy in obstetrics is that of elective cesarean by maternal request, defined as that performed in a single term pregnancy, in the absence of medical or obstetric indication that justifies it. However, it is questionable to ask for the right to obtain any treatment on demand. It must be recognized that patient requests are not always appropriate and that there are safety considerations, in addition to the responsibility of health professionals.

Therefore, it is crucial to underline the importance of the role of the physician as the patient's assistant in the task of clarifying and integrating her priorities, preferences and values in the decision-making process, while providing information on the medical aspects of any therapy and on the short- and long-term actual and potential effects. Obstetricians and neonatologists should be clear about their own personal opinions, and they should avoid trying to impose them on their patients (see [Box 2](#)).

7. Controlling the increasing rate of CS

The CS rate has increased significantly in recent years and it does not seem that globally that trend is going to change significantly. However, in the USA and a few other countries, the percentage of CS has been stabilized. There are initiatives tending to decrease the number of primary CSs through different strategies [47–51], which are shown in [Box 3](#).

8. Summary and conclusions

A central aspect of obstetric practice is the approach to the method of delivery. However, there is little evidence to guide that decision outside the biomedical view. Within this framework, respect for autonomy should be considered, with informed knowledge and without coercion of any kind. Of course, the decision-making process must have complete information, making an adequate assessment of risks and benefits, always respecting a higher-level principle: do no harm.

The rapidly increasing frequency of CS in Latin America is an important public health topic that must be considered by both medical professionals and public policy makers, as cesarean birth constitutes a significant risk factor for metabolic diseases and chronic immune disorders that are also becoming more prevalent in the region [52].

One aspect that is often overlooked, and one that we believe is central to this controversy, is that in all areas of medicine doctors have a strict obligation to offer patients reasonable alternatives to manage their condition and that patients have the right to choose. However, most guidelines and recommendations do not mention whether the planned CS should be discussed proactively as a form of delivery or in what terms, nor how preferences should model decisions about the birth path.

Box 2

Main reasons for high cesarean section (CS) rates in Latin America.

- The preferential use of continuous electronic fetal heart rate monitoring (instead of intermittent auscultation) for low-risk deliveries, especially in private rather than in public hospitals, which leads to the decision to perform a CS based on false-positive results.
- The high rate of elective inductions prior to 39 weeks of gestation, with a high rate of “induction failure”, a concept with controversial definitions [51].
- A general misconception that cesarean birth is better for mothers and babies.
- Better remuneration for cesarean birth compared to vaginal delivery in some countries.
- An increasing fear of litigation.
- Request by parents for individual, personalized medical care rejecting a group-practice approach. As a response, obstetricians looking for convenience to organize their time tend to “program” delivery, avoiding interruption of office time. Furthermore, the time spent in the delivery area by obstetricians performing a programmed cesarean section is much shorter than the one needed for a vaginal delivery.
- Women demanding more independence, autonomy and choices in their reproductive decisions.
- Other common reasons include: infertility and assisted reproductive treatments, advanced maternal age, presence of cord around the fetal neck during sonography, prematurity, breech position and concerns of maternal pelvic floor damage with vaginal delivery.

Box 3

Proposed strategies to avoid a high cesarean section (CS) rate.

- Improve the circumstances of labor induction indications.
- Allow adequate time for normal progression of the latent and active phases of labor.
- Improve difficult vaginal birth training through simulations.
- Plan obstetric and neonatal care with the adequate number of trained and well-paid personnel, and with the availability of time and resources to allow for an appropriate humane, respectful care of childbirth. Promote a team approach rather than solo practice for obstetrical care.
- Consider an authoritative second opinion for controversial situations.
- Develop better methods of monitoring intrapartum fetal health, since current fetal monitoring has a very high false-positive rate. It would be useful to have tools that allow doctors to predict in which cases a difficult birth is expected and in which it is not.
- Use of the Robson Classification (also known as the 10-group classification) as a global standard for assessing, monitoring and comparing CS rates.

More than a specific CS rate for all, the relevant issue is to sustain a system that delivers optimal maternal and neonatal care. As stated by WHO, “every effort should be made to provide cesarean sections to women in need, rather than striving to achieve a specific rate” [53].

8.1. Research directions

- Identify the disparity between public and private hospitals regarding the use of CS, as an important step towards decreasing inequities in the health system.
- Define whether there are appropriate CS rates for different contexts, focusing on those that achieve best maternal and neonatal outcomes.
- Assessment of the effect of different interventions using the Robson Classification on CS rates.
- Analyze cultural and social influences on maternal decision on the method of delivery.

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