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## FACTORS CONTRIBUTING TO THE RISING FREQUENCY OF CESAREAN SECTION: A LITERATURE REVIEW

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### Abstract

**Relevance:** There is a rising trend for cesarean delivery worldwide. The data provided by WHO- is 15%. Cesarean section (C-section) has many disadvantages for the mother and the child. WHO has set a 10-15% percentage for cesarean delivery out of total births. A higher rate means C-sections are used excessively. The unnecessary use of C-sections should be reduced to the WHO-recommended rate.

**The study aimed to** find possible solutions to help decrease the cesarean delivery rate without medical indications for surgery.

**Methods:** The literature search covered original articles and reviews on the cesarean section (C-section) available in Google Scholar, PubMed, Sci-Hub, and Biomedical Corner.

**Results:** The literature review revealed a daily increase in the C-section rate. If before, C-section was considered a life-saving emergency procedure, today some consider it a method of choice and comfort, which leads to exceeding the WHO recommended rates. This review discusses the factors that possibly lead to an increased cesarean delivery on maternal requests. Decreasing the C-section rate requires educating people about the risk factors, morbidity, mortality, the WHO guidelines, and clinical opinions.

**Conclusion:** The overall C-section rate can be reduced by addressing the factors for the cesarean delivery on maternal request and providing psychological support to women asking for C-sections without medical indication.

**Keywords:** cesarean section (C-section), maternal request, raising C-section rate, labor pain, medical indications, cesarean delivery

**Introduction:** The phrase ‘cesarean section’ (C-section) comes from the Roman legal text ‘Lex Caesarea,’ which says that if a pregnant woman dies, she should not be buried until the child is extracted from her womb. The documented texts from ancient times say that the initial use of C-section was primarily for the post-mortem birth of a dead or alive child. This term was first used in Rousset’s book of 1581 in connection with abdominal birth. Caesarea derives from the Latin word «Caesar» (emperor). The option of choosing the birth of the emperor’s heirs, when the baby’s life was valued more than the mother’s, and saving the baby was the priority [1].

C-section, also known as cesarean delivery, is a surgical intervention performed for delivering a baby when a normal vaginal birth is complex or is a risk to the mother’s or child’s life. The abdominal wall, muscles, and the uterus are incised to deliver the child [2, 3]. Typically, pregnancy is terminated with a vaginal birth, but standard or traditional delivery becomes difficult due to some factors. Natural birth process failure occurs because of structural and physiologic reasons. A common structural abnormality is a cephalopelvic disproportion, and the baby’s head size is more significant, which cannot pass through the maternal birth canal. Severe eclampsia is the physiologic cause of C-section. Other reasons for C-section include breech presentation, dystocia, fetal distress, transverse labor, mother’s health problems such as high blood pressure or unstable heart, heart disease, severe preeclampsia/eclampsia, active mother genital herpes, reduced oxygen supply to the baby, stalled labor, multiple pregnancies, placenta problems such as placenta abruption or placenta previa, prolapsed cord malrotation, toxemia, and a maternal request for non-medical reasons [4-7]. As a result, two incisions are made; the first skin incision (Figure 1) is midline or low transverse in the mother’s abdomen to access the uterus, and the second is a small transverse incision in the lower segment of the uterus. The anesthesia offered to deliver mothers is general anesthesia, epidural anesthesia, or spinal anesthesia.

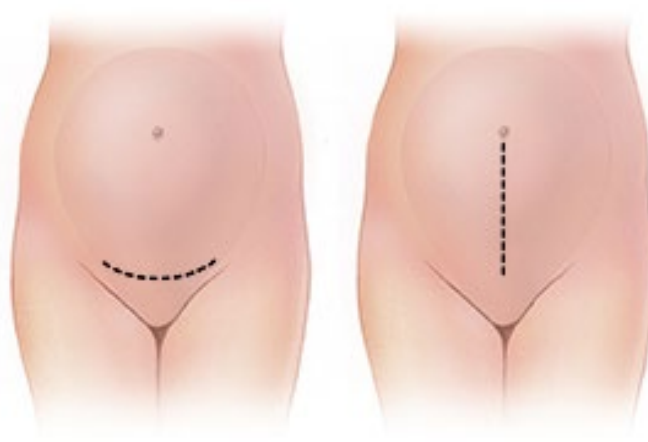


Figure 1 – Skin incisions for cesarean section surgery [8]

**The study aimed to** find possible solutions to help decrease the cesarean delivery rate without medical indications for surgery.

**Materials and methods:** The literature search covered original articles and reviews on the cesarean section (C-section) available in Google Scholar, PubMed, Sci-Hub, and Biomedical Corner by the keywords “cesarean section (C-section),” “maternal request,” “raising C-section rate,” “labor pain,” “medical indications,” and “cesarean delivery.” The selection criteria included the scientific novelty, the English language of publication, a focus on C-section on maternal request, and C-section without any medical indication. Articles focusing on normal vaginal deliveries and medically indicated C-sections were excluded from the analysis.

**Results:** Cesarean delivery on maternal request (CDMR) is a planned C-section performed at the pregnant woman’s request when there is no obstetric contraindication for vaginal delivery [9]. Research says that across the globe, many pregnant women request C-section as a mode of delivery while there is no medical indication. Request for medically unnecessary C-section beholds many reasons. The reasons include the fear of labor pain, fear of pelvic floor trauma, fear of the thought that vaginal delivery may fail, fear of birth canal lacerations, fear of the baby being harmed, the bad experience of previous vaginal delivery, previous bad experience with the health care providers, body image, socioeconomic influences, social issues, less knowledge and awareness, the bad experience of a friend or a family member with vaginal delivery, an obstetrician’s or clinician’s advice, and others [10]. At the same time, the patient is anesthetized, and many other possible reasons influence the mother to choose C-section as a mode of delivery.

The first C-section was performed successfully in the 16th century but was not so common until the twentieth century. The procedure was considered risky and served only in emergencies until the last century [11]. Advancements in surgical and anesthesia techniques, medications, availability of blood banks, and the attitude of medical professionals

and ordinary people made C-section more acceptable and increasingly common [11, 12]. Figure 2 shows the worldwide increase in the C-section rate. Thus, it amounted to 12.1% of all births in 2000, then increased to 21.1% by 2005, and added another 4% each year till 2018. WHO stated that 6.2 million non-medical C-sections were performed yearly, and 50% were from China and Brazil [13, 14]. According to WHO (2010), C-section rates in 2008 were: Brazil-45.9%, Chad-4%, and Iran-41.9%, while Iran had an even higher rate of 62% in 2012 [3]. In 2018, more than 50% of all deliveries were C-Sections in Egypt, Brazil, and Turkey. Every third pregnant woman has a C-section in the USA, Australia, and Germany. Similarly, a rising trend of C-section deliveries has been documented in South Asian countries, including Pakistan, which increased from 3.2% in 1990 to 20% in 2018 [6]. China reports 16 million births yearly, of which C-sections deliver more than 50%. In Brazil, this proportion is more than 80% of births, especially those attended in private medical centers [13]. A study conducted in 2011-2012 in 18 hospitals with maternity centers in Jordan showed a C-section rate of 29.1%. Planned C-sections amounted to 15.9%, and 13.2% were emergency C-sections. The mortality rates from planned C-sections (2.1%) and emergency C-sections (2.5%) were significantly higher than from vaginal delivery. In Pakistan, the frequency of births through C-sections has increased in the past five years, from 14% in 2012 to 22% in 2017-2018. The birth rate through C-sections was higher in private facilities (38%) compared to public facilities (25%). In urban areas, the C-section delivery rate (32%) was almost double that of rural areas (18%). The frequency of C-sections in Iran is 47%, of which 40% is CDMR. The increased C-section rate in Iran recently put it among the Top 4 countries with high C-section rates. According to the latest report from 150 countries, 18.6% of all births occur by C-section. Now, Latin America and the Caribbean have the highest C-section rates (40.5%), followed by North America (32.3%), Oceania (31.1%), Europe (25%), Asia (19.2%), and Africa (7.3%). All are higher than the WHO recommended rate of 10-15 percent.

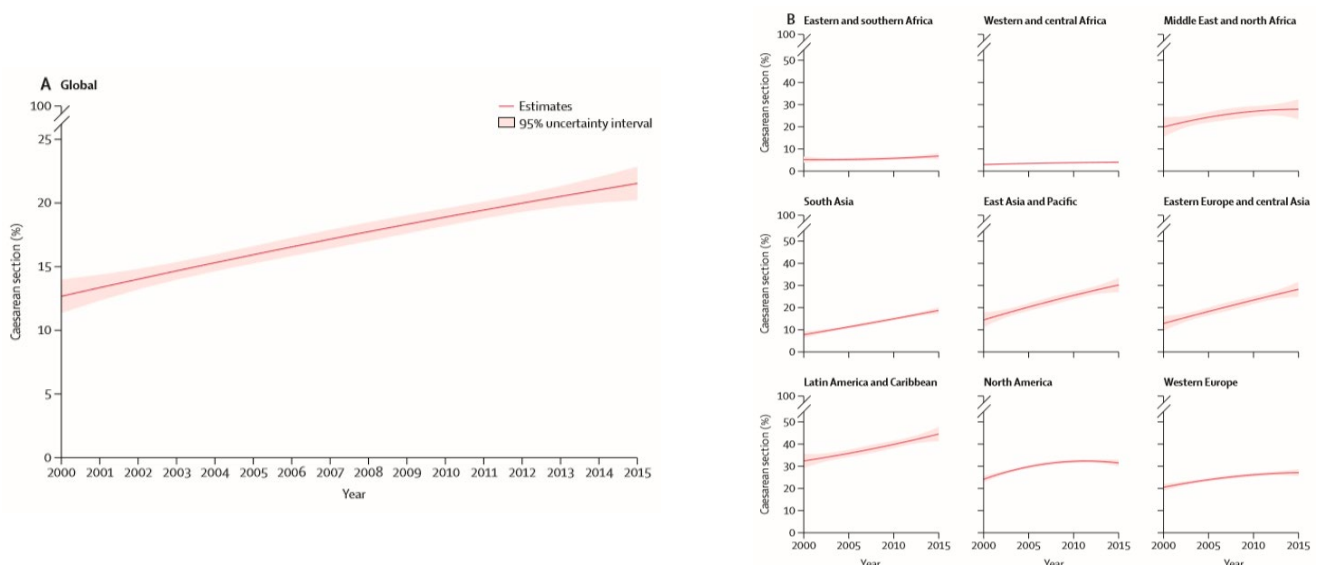


Figure 2 – Summary of estimated trend in using the cesarean section as a proportion of live births between 2000 and 2015: (A) global estimate, (B) regional estimate [13]

According to WHO, the C-section rate should not exceed 10% to 15% in any country across the globe [16]. The rate of C-sections among the total births in a definite period is considered a chief indicator of prenatal care. Access to pregnancy-related surgeries is deemed poor if the rate is lower than 5%. In comparison, higher than 15% rates indicate that C-section is being conducted for other reasons besides saving lives [3]. The international federation of obstetrics and gynecologists emphasizes that C-section for non-medical reasons is immoral [2]. The recent reports of increased adverse maternal and fetal outcomes associated with C-section have rejected the myth that C-section is “safe” [12]. As major laparotomy surgery, the C-section has risks and is reported to be associated with a three-fold increased risk of maternal death compared to natural vaginal birth. A child is deprived of the innate immunity acquired from the maternal birth canal. It is delivered through C-section and is prone to an increased risk of chronic diseases like asthma, obesity, diabetes, and autoimmune disorders [14]. Some studies reported that C-sections might adversely affect neuropsychiatric development [17].

#### *Factors that contribute to excessive cesarean section*

Understanding the factors that play a role in choosing C-sections is key to making and implementing strategies to reduce unnecessary C-sections. The reasons for choosing a C-section are the medical or psychological needs of the mother and the medical needs of the child or mother and child. However, when the use of C-section is more significant than required, the determinants fall into three wider, interrelated, and sometimes overlapping factors. These factors are related to a) pregnant women, friends, families, communities, and the broader society; b) health professionals; c) healthcare systems, financing, and organizational design and culture.

#### *1 Factors related to pregnant women, their families, communities, and the broader society*

##### *1.1 Fear of pain*

Fear was women’s most essential and most frequently reported influencing factor in choosing the mode of birth, and fear from pain was the most common cause of anxiety. Women perceive that normal vaginal birth equals pain and that C-section is the same as relief and painlessness. Many midwives and clinicians also believed women’s preferences toward C-sections increased due to fear of labor pain [18]. Pelvic floor damage and urinary incontinence also contributed to the fear of vaginal delivery. Women with previous painful birth experiences were aware of the pain and would not experience that painful condition again.

##### *1.2 Fear of damage to body and sexual function*

Women thought that vaginal birth would harm their genitalia irreversibly and cause a vaginal tear or widening, for which in future they would undergo constructive surgeries. They believe that C-section is the procedure of choice in these circumstances to maintain their body image and sexual satisfaction [18, 19]. Some studies have suggested that C-section helps preserve vaginal strength and sexual function and supports the anatomy and part of the pelvic floor and intrapelvic organs [3].

##### *1.3 Safety and comfort for the baby/mother*

Studies report concerns for baby care and safety. Women believe C-sections to be less traumatic to the baby and that

the baby would get injured during vaginal birth. C-sections are believed to be safe due to improvements in anesthetic and surgical techniques, routine use of antibiotics, availability of blood products, and clinical experts [10-12].

#### *1.4 Influence of shared beliefs of family, friends, health professionals, and society*

Childbearing women (mostly the nulliparous ones) are curious to hear from their relatives and friends about the experience of vaginal delivery they have gone through. Women said they got frightened when their families and friends shared bad experiences with vaginal delivery. Women also reported they would opt for C-sections because their mothers or husbands desired to undergo C-sections [18-19]. Health professionals believe that non-standard clinical facilities present an ugly image to women and those women communicate these unpleasant experiences to other women. Stories of women’s experiences or of relatives or friends who had experienced undesirable, unfavorable, or even rude behavior from labor and delivery ward staff have been reported, making the next coming woman choose a C-section as a suitable method of giving birth.

#### *1.5 Belief in being modern, fashionable, educated, and from the upper socio-culture class*

C-sections are associated with modern, luxurious, and higher-class methods of birth for many women. The said belief plays a vital role in the decision-making process for a mode of childbirth. They pay a lot for a C-section to demonstrate the husband’s love and care for his wife. The considerable money spent on C-sections is sometimes measured as a symbol of higher social status [6]. Some women think that people in their social circle might think they are poor and cannot afford C-sections if they go for expected vaginal delivery.

Women have role models and celebrities who favor the cesarean mode of delivery. They are influenced by the decision of their role models and choose a C-section for themselves (4). They like to follow their role models in every stage of life. Women quote easiness and suitability as a reason, predominantly in cultures where females do a job and have family responsibilities or if they want tubal ligation and C-section simultaneously. In the perception of some families, the advantage of a C-section is the date of birth. Parents want their child’s birthday on a special date, like their wedding anniversary or Christmas eve.

#### *2 Factors related to health professionals*

The American College of Obstetricians and Gynecologists (ACOG) states, “If the doctor believes that cesarean mode of delivery encourages the overall health and welfare of the woman and her fetus more than vaginal birth, they are ethically justified in performing a cesarean delivery. Similarly, suppose the doctor believes that a C-section would be unfavorable to the overall health and welfare of the woman and her fetus. In that case, they are ethically obliged to refrain from performing the surgery” [20].

The advice of healthcare providers that “C-section is safer” influences many pregnant women towards selecting a C-section. Childbearing women frequently rely on their medical advisors’ judgment and understanding when deciding on health. Health professionals, more private than public, acknowledge women’s right to choose a mode of birth independently (5). Some clinicians reported that vaginal

delivery takes too much time and is unpredictable. It disturbs their routine of sleep. They state they have no time to deal with vaginal delivery, so they prefer C-sections [18].

Many countries have malpractice lawsuits that make health professionals' lives and jobs vulnerable. Some clinicians say that the C-section increases due to legal matters and cases. They fear being taken to court for issues that occurred during vaginal delivery. They think they are more prone to be sued for problems during vaginal delivery than for unnecessary cesarean delivery [13, 18]. In the USA, the reason for increasing C-sections is doctors' fear of legal punishment due to the poor prognosis of Normal Vaginal Delivery. Some clinicians consider that the risks associated with C-sections are so small that it is valid to accept the mother's demand for a C-section even without any medical indication. In a study conducted in Iran, women were asked about their intention for C-section. It was observed that more doctors and midwives encourage C-section, which is why they chose C-section as a mode of delivery [3].

### 3 Factors related to the healthcare system financing, organization, and culture

In many regions, the rate of cesarean delivery is higher in the private sector. Thus, 80-90% of children in Brazil are born by C-section in the private medical sector, compared with 30-40% in the public sector. In some facilities, personal maternity care sustains the finances of whole hospitals. Since C-sections deliver higher income than vaginal births, there is a financial motivation to encourage women to choose C-sections as the best option for them and their babies.

Another reason for higher C-section rates was the inability of young doctors to perform vaginal deliveries because they were not trained well and lacked the experience and skills to perform assisted vaginal deliveries. While in many health care systems, young obstetricians have made themselves specialists in C-sections but are not confident to undertake vaginal assisted deliveries. Low-quality antenatal atmospheres, instruments/equipment, communication with the health care team, and delivery procedures are linked with a lack of trust in the facility and staff for a patient. This distrust can initiate a decision to undergo a C-section to avoid poor-quality labor and birth care. These women go out and make other women do the same by sharing the whole experience.

The recurrent practice of C-sections in major hospitals is due to unqualified primary-care personnel in low-resource areas who postpone transfer because they cannot notice danger signs. Thus, the referred patient reaches late in a deep state, and the only solution is an emergency C-section.

Depiction of the medical (e.g., breech presentation, fetus count, previously done C-section, etc.) and non-medical aspects that influence the incidence of C-section are displayed in figure 3. The non-medical factors are shown in the first, second, and third outer circles, while the medical elements (according to the Robson classification [21]) are shown in the center. This figure represents the layers of complexity of the influences involved.

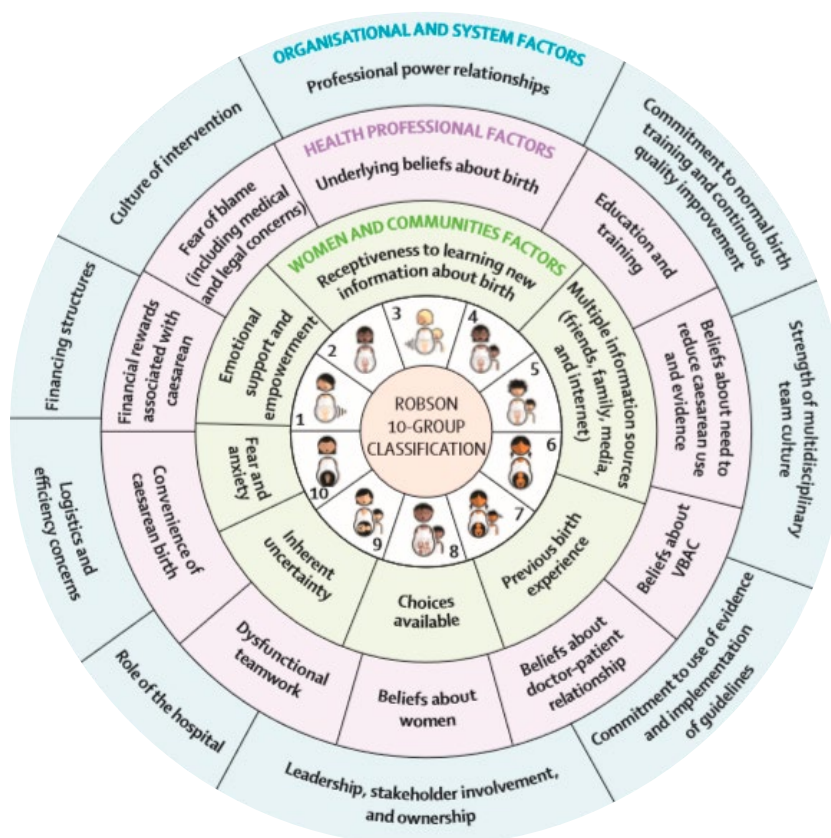


Figure 3 – A schematic representation of medical and non-medical factors contributing to higher cesarean section rates [21]

The literature review shows that the C-section rate is rising globally. In developed countries, currently, 30% of C-sections are repeated after primary cesarean delivery, 30% for dystocia, 11% for breech presentation, and 10% are performed for fetal distress [4]. C-section was supposed to be a life-saving emergency procedure. Still, some believe they are making it a method of choice and comfort, raising the rate higher than the WHO recommendation.

For example, a study in Iran shows the relationship between the intention of women to go for a C-section and their level of education, income status, and fertility intention (Table 1).

A study conducted between 1st May 2018 and 30th April 2019 in Lahore, Pakistan, included childbearing women of any age going for cesarean delivery. In total, they delivered 3438 over the study period; 2380 (69%) were cesarean deliveries, and 1058 (31%) were standard vaginal deliveries. The percentage of CDMR was 7% (167). Out of 167, 72 women already had a previous cesarean delivery and did not want the trial of labor. Consequently, most women who requested cesarean delivery had recent labor trials [10].

A cross-sectional study conducted in Iran, Isfahan, in September 2016 included 200 pregnant women [2]. 53% of births were through C-section, and 47% happened through the typical birth canal.

The current study defines the medical and non-medical factors behind the rising trend of C-section delivery. On reviewing the literature related to our topic, our findings are:

- We can reduce the number of unnecessary C-sections by addressing the factors that lead a woman to request a C-section.
- Effective counseling of women should be ensured. Women requesting C-sections without any medical indication need psychological help.
- Spreading awareness about the positive and negative aspects of C-sections to the community should be ensured.
- There should be an investigative body for private sector healthcare facilities that do not allow unnecessary c-sections.
- Clinicians should show loyalty to their profession by not endangering the lives of their patients. If a woman does not need C-section medically, she should not be cut.

**Discussion:** Experts have presented their opinions in favor and against CDMR. Key issues include Safety, cost, free will, and maternal satisfaction. Over the past two decades, our knowledge of the hazards and Safety of C-sections does not stand still. C-section revealed that it has undeniable rewards, including benefit planning, low uncertainty, escaping labor issues and birth canal trauma, and reducing child exposure to severe delusions, psychological trauma, and stress. However, the fact is that there is unsatisfactory information and no solid result from randomized controlled trials in which any recommendations regarding CDMR [13] can be made. A well-managed randomized controlled trial will be able to evaluate the exact risk/benefit ratio of the CDMR. In the meantime, numerous guidelines that can interpret the best available evidence and approvals are discussed below.

Guidelines for the Canadian Society of Obstetricians and Gynecologists of Canada (SOGC) state that a C-section should not be performed to save the mother/baby when there is a risk to their lives with standard vaginal delivery.

The American Congress of Obstetricians and Gynecologists (ACOG) guiding principles do not recommend CDMR for women who wish to have more than one child. Australian guidelines recommend that despite all the discussion, if the patient still wants a C-section, the obstetrician may choose one of the given strategies: a) present all the risks and benefits to the patient, and after ensuring that the patient has received it, he gets agree to do the procedure; b) refusing to perform section C in cases where the obstetrician is assured that there are severe risks to the mother or baby if the procedure is followed or the patient appears to be insufficient to give informed consent to the procedure, or c) advises the patient to seek help from another obstetrician [12].

The U.K. guidelines in C-section recognize that before counseling the women requesting a CDMR, a case can be individualized and managed by approaching a healthier exploration method, recording, and discussing the reasons/factors behind the request. As mentioned in the present study, the frequent reason for demanding a C-section is tocophobia or fear of giving birth. Satisfactory investigation of the concern and psychological therapy have shown that at least 50% of these women eventually opt for standard vaginal delivery and are extremely satisfied with their choice. To get effective results, you will need many sittings at the clinic, including an obstetrician, counselor, and psychiatrist. It also has the potential to cost according to the long-term needs of psychosocial support [12]. It was concluded that after sufficient counseling if a woman still does not agree to do a standard vaginal delivery, these women should be given a C-section for the full benefit of the mother and child.

Without any other indication, if a woman requests a C-section, the risks and benefits of a C-section compared to standard delivery should be discussed and documented, including a discussion with other midwives and group members of the obstetricians. The essential things to be considered from the patient side are: a) it must be ensured that the woman has complete and accurate information, b) for support purposes, a partner or family must be involved.

The obstetrician who does not want to perform CDMR should refer the woman to an obstetrician who will perform a C-section.

**Conclusion:** Women requesting a C-section without a specific medical indication were anxious, lacking confidence, fearful of giving birth, primiparity, higher education level, and better economic condition. This finding suggested psychological counseling and support for women requesting C-sections, as it may reduce unnecessary C-sections. For C-section rates to be decreased, people need awareness and education about the risk factors, morbidity, and mortality, the WHO guidelines, and clinicians' beliefs. The overall C-section rate can be reduced by addressing the factors for requesting CDMR and providing psychological support to women asking for C-section without medical indication.

Table 1 – Education, income, and number of children vs. the C-section rate [3]

Personal factors	Share of women choosing C-section
<b>Level of education</b>	
Primary and secondary education	37.2%
Graduate	70%
Post-graduate	86%
<b>Income status (per month)</b>	
High income (>10 million rials)	90%
Moderate income (8-10 million rials)	81%
Low income (<8 million rials)	39%
<b>Desired number of children</b>	
One child	83%
Two children	76%
Three children	42%

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## ФАКТОРЫ, СПОСОБСТВУЮЩИЕ УВЕЛИЧЕНИЮ ЧАСТОТЫ КЕСАРЕВА СЕЧЕНИЯ: ОБЗОР ЛИТЕРАТУРЫ

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### Аннотация

**Актуальность:** Во всем мире наблюдается растущая тенденция применения кесарева сечения. По данным ВОЗ, темп роста составляет около 15%.

**Цель исследования** – поиск возможных решений для снижения частоты кесарева сечения не требуемых медицинскими показаниями.

**Методы:** Поиск литературы включал исследовательские и обзорные статьи по кесареву сечению (кесарево сечение), доступные в Google Scholar, PubMed, Sci-Hub и Biomedical Corner.

**Результаты:** Обзор литературы выявил ежедневное увеличение частоты кесарева сечения. Если ранее кесарево сечение считалось экстренной процедурой, спасающей жизнь, сегодня некоторые воспринимают его как метод выбора и комфорта, что приводит к превышающим рекомендованным ВОЗ нормам проведения операции. В этом обзоре обсуждаются факторы, которые приводят к увеличению частоты кесарева сечения по материнской просьбе. Для снижения частоты кесарева сечения необходимо информировать людей о факторах риска, заболеваемости, смертности, рекомендациях ВОЗ и мнениях врачей.

**Заключение:** Общий уровень кесарева сечения можно снизить, если устранить факторы, приводящие к выбору кесарева сечения по желанию матери, и оказывать психологическую поддержку женщинам, которые обращаются за кесаревым сечением без медицинских показаний.

**Ключевые слова:** кесарево сечение, материнский запрос, восходящая тенденция кесарева сечения, родовая боль, медицинские показания

## КЕСІР ТІЛІГІ ЖИЛІГІНІҢ ӨСУІНЕ ӘСЕР ЕТЕТІН ФАКТОРЛАР: ӘДЕБИ ШОЛУ

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### Аннотация

**Өзектілігі:** Бүкіл Әлемде кесір тілігі тенденциясының өсуі байқалады. Бүкіл әлемдік денсаулық сақтау ұйымының (ДДСҰ) зерттеулері бойынша ол 15% құраған.

**Зерттеудің мақсаты** – зерттеулер медициналық көрсетілім болмаған кезде, әлемнің әртүрлі аймақтарында кесір тілігімен сәбиді өмірге әкелуді сұрайтын әйелдердің жиілігін төмендету үшін мүмкін болатын жолдарды іздестіруге бағытталған.

**Нәтижелер:** Кесір тілігіне байланысты түрлі зерттеу мақалалары Google Scholar, PubMed, Sci-Hub және Biomedical Corner-ден жиналды.

**Нәтижелер:** Әдебиеттерге шолулар бойынша кесір тілігі жиілігінің тәулік сайын ұлғаятындығы анықталды. Бұрын кесір тілігі адам өмірін құтқарушы төтенше жағдайдағы процедура болып есептелсе, қазіргі таңда кейбіреулер оны таңдауға болатын және жайлы әдіс ретінде қабылдайды, ол ДДСҰ ұсынған нормалар бойынша жүргізілетін оталардан да артып кетуіне әкелген. Бұл шолуда ананың өтініші бойынша кесір тілігі жиілігінің артуына әкелетін факторлар талқыланады. Кесір тілігі жиілігін төмендету үшін адамдарды қауіптілік факторлары, ауру, өлім, ДДСҰ ұсыныстары мен дәрігерлер пікірі туралы ақпарат беру қажеттілігі айтылады.

**Қорытынды:** Аналардың өтініші бойынша кесір тілігін таңдауға әкелетін факторларды шектеу және медициналық көрсетілімсіз кесір тілігін жасатуға бел буған әйелдерге психологиялық қолдау көрсету арқылы кесір тілігінің жалпы деңгейін төмендетуге болады.

**Кілтті сөздер:** кесір тілігі, аналар сұранысы, кесір тілігі тенденциясы, босану кезіндегі ауырсынулар, медициналық көрсетілімдер

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