

Caesarean Section Rates and Associated Factors in Karbala: A Retrospective Study

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Abstract

Background: The most common obstetric surgical procedure performed worldwide is a Caesarean Section (CS). When performed properly, CS can enhance maternal and/or newborn outcomes. Although it saves the mother and child in some cases, it carries risks and complications, and the percentage of women who choose it without a medical reason is increasing, so awareness must be increased.

Objective: Determine the frequency of CS and analyze the indications, so as to introduce measures to control the CS rate, as decreasing this rate will reduce maternal morbidity and mortality and increasing awareness among women about CS.

Participants and method: The ongoing study was conducted from various hospitals in Karbala during December 2024. In this study, information and data were taken from all women who underwent a CS and Vaginal delivery by a questionnaire designed for this purpose.

Results: The percentage of CS is 60% and the percentage of elective ones were 43.3% The most common indication for CS was inability to give birth naturally, followed by a previous CS, health problems for the mother (hypertension or diabetes), and pregnancy with twins, the rate of complications also increased after CS, (bladder and intestine injury, postpartum hemorrhage, and admission to the intensive care unit etc.) While in natural childbirth, complications are few and less severe.

Conclusions: The increasing rate of the CS rate in Karbala populations highlight the need to apply more improvement and attention to primary health care in order to increase awareness and cooperation of health institutions and medical staff to spread risks and complications.

معدلات العمليات القيصرية والعوامل المرتبطة بها في كربلاء: دراسة استيعادية

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الملخص

الخلفية: تُعدّ العملية القيصرية (Caesarean Section – CS) أكثر الإجراءات الجراحية التوليدية شيوعًا على مستوى العالم. وعند إجرائها بالشكل الصحيح، يمكن أن تُحسّن من نتائج صحة الأم و/أو المولود. وعلى الرغم من أنها تنقذ حياة الأم والطفل في بعض الحالات، إلا أنها تنطوي على مخاطر ومضاعفات، كما أن نسبة النساء اللواتي يخترنها دون وجود سبب طبي في ازدياد، مما يستدعي رفع مستوى الوعي حولها.

الهدف: تحديد معدل العمليات القيصرية وتحليل دواعي إجرائها، بهدف اقتراح إجراءات للسيطرة على ارتفاع هذا المعدل، إذ إن خفضه يسهم في تقليل معدلات المراضة والوفيات لدى الأمهات، وزيادة وعي النساء حول العملية القيصرية.

المشاركات والطريقة: أُجريت هذه الدراسة المستمرة في عدد من مستشفيات محافظة كربلاء خلال شهر كانون الأول/ديسمبر 2024. تم جمع المعلومات والبيانات من جميع النساء اللواتي خضعن للولادة القيصرية والولادة المهبلية، وذلك باستخدام استبيان مُعدّ خصيصًا لهذا الغرض.

النتائج: بلغ معدل العمليات القيصرية 60%، وكانت نسبة العمليات القيصرية الاختيارية 43.3%. وكان أكثر دواعي إجراء العملية القيصرية شيوعًا عدم القدرة على الولادة الطبيعية، تلاه وجود عملية قيصرية سابقة، ثم المشكلات الصحية لدى الأم (مثل ارتفاع ضغط الدم أو داء السكري)، والحمل بتوأم. كما لوحظ ازدياد معدل المضاعفات بعد العمليات القيصرية، مثل إصابات المثانة والأمعاء، نزف ما بعد الولادة، والدخول إلى وحدة العناية المركزة، في حين كانت المضاعفات في الولادة الطبيعية أقل عددًا وأخف شدة.

الاستنتاجات: إن الارتفاع المتزايد في معدل العمليات القيصرية بين نساء محافظة كربلاء يسبب الضوء على الحاجة إلى تعزيز وتحسين الرعاية الصحية الأولية، وزيادة مستوى الوعي، وتعزيز التعاون بين المؤسسات الصحية والكوادر الطبية لنشر المعرفة حول مخاطر ومضاعفات العملية القيصرية.

1. Introduction

Caesarean Section CS is a surgical procedure in which a baby is delivered through an incision made in the mother's abdomen and uterus. Typically, the incision is made at a low level, approximately around the bikini line (Nichols et al., 2019; Ray Dorsey et al., 2018). There are two types of CS: planned (elective) and unplanned (emergency). A planned CS involves the decision, between the mother and her doctor, to have a caesarean birth prior to the onset of either labor or unexpected complications requiring urgent delivery. Conversely, an unplanned CS may be imperative in situations where complications arise, requiring swift delivery either during or before the onset of labor (Gedefaw et al., 2020; Tegegne et al., 2024). Elective CS refers to a planned surgery for nonmedical reasons. It can be offered by some health professionals to women who want more control over when their baby will be born and to avoid the anxieties connected with waiting for labor to begin. However, it must be noted that an elective CS has inherent risk. While there may be benefits in terms of more control and less anxiety, the disadvantage should not be forgotten. It is also appropriate to state that some health insurance plans do not cover elective CS. (Hannah, 2004). According to the Centers for Disease Control and Prevention, close to one-third of C-Sections are done because of prolonged labor, labor can be considered prolonged if it takes 20 hours or more for women having their first baby, or 14 hours or more for women who have given birth before. Contributory factors to prolonged labor encompass considerations such as fetal size exceeding the dimensions of the birth canal, protracted cervical thinning, and the presence of multiple fetuses. In instances where these factors are evident, CS delivery is deemed a prudent measure to mitigate potential complications (Bakker et al., 2024; Gaudernack et al., 2020). Several analgesics may be used to treat post-operative pain following a CS. The choice of analgesics is based on the demands of the patient as well as criteria like the intensity of the pain. Nonsteroidal anti-inflammatory medicines (NSAIDs) used mainly to treat pain and inflammation, ibuprofen, diclofenac, or ketorolac. Are frequently prescribed drugs whereas Opioids (such as morphine, oxycodone, or tramadol) are used to treat more severe pain following a CS, in addition and to target pain treatment in certain regions, local anesthetics like lidocaine or bupivacaine can be used as nerve blocks or wound infiltration (Gaudernack et al., 2020; Singh et al., 2022). In general, spinal anesthesia is preferred for CS. Spinal anesthesia provides a numb sensation from the waist down, allowing the mother to remain awake and alert during the procedure. It is considered safe for both the mother and the baby, as the medication does not cross the placenta in significant amounts. Spinal anesthesia offers several advantages over general anesthesia for CS, It has a rapid onset, providing quick pain relief and minimizing the need for additional medications. It also allows for better control of pain during the surgery, ensuring the mother's comfort. Since the mother remains conscious, she can also bond with her newborn immediately after delivery (Singh et al., 2022; Sung et al., 2021). Aim of the study: Determine the prevalence of CS and deeply analyze the indications behind it so as to strategically maneuver steps toward lowering the rate of CS. Lowering this rate will lead to lower maternal morbidity and mortality. It will raise the level of knowledge among women about cesarean sections.

2. Patients and Methods

2.1. Study Design

The study took place in several of the hospitals at Karbala in December 2024. assessing the prevalence of CS with its association factors among delivering women during that time. A total of 548 pregnant women who gave birth at these

hospitals during that period were enrolled in this study, out of them ,329 delivered by CS –approximately 60% while 219 delivered by vagina about 40% provided an adequate basis for comparison of maternal and perinatal outcomes between the groups of CS and vaginal delivery as well as their pattern on analgesic use and post-delivery recovery characteristics.

2.2. Data Collections

A special questionnaire was developed for this study and was filled out by the researcher during a direct interview with most of the cases.

Limitations: The limitations of the study may include:

A. Sample Bias

The study may be limited to a specific population or sample of women who underwent CS in Karbala. This may not be representative of all pregnant women in the area.

B. Recall Bias

The study relies on the accuracy of the information provided by participants, which may be subject to recall bias. Participants may not accurately recall or report information about previous pregnancies, medical history, or other relevant factors.

C. Generalizability

The study results may not apply to other regions or population groups. Factors Influencing CS rates can vary based on cultural, social, and healthcare system differences.

3. Results

The prevalence of caesarean sections within the studied population was observed to be 60%. The indications and determinants of Caesarean delivery, as reported by the participants of the ongoing study, are delineated in the subsequent Table1.

Table1: CS Frequency and Indications

Variables	Caesarean sections	
	Frequency	Percentage %
Number	329	60%
Indications of CS		
Inability to give birth vaginally/dystocia	117	35,67%
Previous cs	82	25%
Health problems for the mother	23	7%
Pregnancy with twins	16	4,87%
The mother's young age	13	3,96%
Health problems for the fetus	14	4,26%
Child breech position	10	3,04%
Low amniotic fluid	6	1,82%
Increased age	1	0,3%
Ectopic pregnancy	1	0,3%
Type of anesthesia		
General	194	59,14%
Spinal	133	40,54%

Elective CS are scheduled deliveries performed before labor begins, usually in cases of pregnancy complications or by the mother's choice. Research shows that scheduling elective CS between the 39th and 41st weeks of pregnancy has positive effects on the baby's health, lowering the chances of needing respiratory support and improving neonatal

outcomes. However, it is important to remember that elective CS should not be done before the 39-week mark. (Shatnerian, N.2021). in the present study, Findings about the women undergo elective CS are shown in Table2. The last part of the study including a comparison between the women delivered by normal vaginal method and those who undergo CS (elective or emergency) and the results is shown in Table3.

Table2: Demographic Criteria of Women Undergo Elective CS

Variables	Frequency	Percentage%
Mother's age at CS		
14_19 yrs.	5	5.31 %
20_29yrs	66	70.21 %
30_39yrs	22	23.40 %
>40yrs	1	1.06 %
# of Previous CS		
No previous	36	38.29 %
1	32	34.04 %
2	19	20.21 %
>3	7	7.44 %
Education status		
University and above	64	68.08 %
Primary/middle/preparatory stage	28	29.78 %
Nothing	2	2.12 %
Residence		
Rural	22	23.40 %
Urban	72	76.59 %
Working Status		
Working	59	62.76 %
Housewife	35	37.23 %
Gestational age in weeks		
37_42 weeks	62	65.95 %
<37 weeks	30	31.91 %
>42 weeks	1	1.06 %
Socio-economic		
high	26	27.65 %
middle	64	68.08 %
low	4	4.25 %
Type of facility		
Governmental	20	21.27 %
Private	74	78.72 %
Having risk factors		
Yes	14	14.89 %
No	80	85.10 %
Birth order of child		
1	46	48.93 %
2-4	42	44.68 %
>5	6	6.38 %

Table3: Comparison Between Women Undergoing Cesarean Sections and Vaginal Deliveries

Parameters	Vaginal delivery		Cesarean sections		P value
Variables	Frequency	Percentage %	Frequency	Percentage %	
number	219	39.9%	329	60%	
Type of complications					
Bladder and Intestinal injury	None		4	1.2%	2*10 ⁻¹⁶
Nothing	155	70.7%	316	96%	
Postpartum hemorrhage	22	10%	35	10.6%	
ICU admission	3	1.3%	9	2.7%	
Pain in the bones, back and pelvis	14	6.3%	6	1.8%	
Hysterectomy	None		3	0.9%	
Pelvic organ prolapses	None		3	0.9%	
Wound dehiscence and sepsis	2	0.9%	8	2.4%	
Thrombosis problems	None		5	1.5%	
Recovery time after delivery					
2_7 days	70	31.9%	84	25.5%	0.123
8_15 days	39	17.8%	124	37.6%	
16_21 days	22	10%	41	12.4%	
22_30 days	28	12.7%	64	19.4%	
31_40 days	None		16	4.8%	
41-60 days	None		5	1.5%	
61_90 days	None		4	1.2%	
Duration of use of the analgesic					
1_5 days	88	40.1%	175	53.1%	0.086
6_10 days	51	23.2%	118	35.8%	
11_15 days	4	1.8%	10	3%	
>15 days	None		10	3%	
If necessary	31	14%	27	8.2%	
5-Stay in hospital for period					
1 day	57	26%	206	62.6%	5*10 ⁻¹¹
2 day	19	8.6%	94	28.5%	
3 day	6	2.7%	27	8.2%	
4_10 day	5	2.2%	30	9.1%	
Hours	63	28.7%	19	5.7%	
Type of analgesic					
IM	47	21.4%	48	14.5%	3*10 ⁻⁸
Oral	51	23.2%	44	13.3%	
IV	89	40.6%	251	76.2%	
*significant when p value <0.05					

4. Discussion

In the ongoing study, the main cause of CS was the difficulty in childbirth and inability for vaginal delivery, which is considered one of the main factors leading to the cs procedure. In a previous study across several cities, it was found that having a previous cs is a major factor contributing to the recurrence of cesarean deliveries. Our study confirmed this point. Obstetricians may recommend this approach to address risks associated with prior CS scars or when information about the previous cesarean delivery is limited. This underscores the significance of considering medical history in decision-making (Ashiko et al., 2025; Maroyi et al., 2021; Sung et al., 2021; Tesfahun et al., 2023). Maternal health problems are the leading reasons for CS. Among these problems high blood pressure ranks as the most common conditions and the major factor influencing the decision about conducting the operation. CS present several benefits towards the delivery of obstetric care. they reduce dangers related to further aggravation of high blood pressure during delivery, this lead to reduced chances for more serious conditions like uterine bleeding. (Ashiko et al., 2025). Additionally, the exact timing of CS enables better childbirth preparation, thereby reducing the psychological stress related to uncertain timing. Moreover, unlike natural childbirth, CS help alleviate the physiological strain on the body, including the elevation of blood pressure and stress levels. for women with pre-existing high blood pressure, CS provide a ways of managing specific risks, such as increased bleeding or clotting affinities. These benefits highlight the importance and practicality of C-sections in obstetric care (Liana et al., 2018; Nuampa et al., 2023; Tesfahun et al., 2023). Women with pre-existing diabetes before pregnancy are more susceptible to cesarean delivery. This result support the findings from other studies, including an Omani study that found a link between pregnancy toxemia and an increased risk of CS. Controlling blood sugar levels during natural childbirth can potentially decreasing the risk of complications for both the mother and the baby. Additionally, gestational diabetes may heighten the risk of fetal oxygen deprivation (Liana et al., 2018) during natural childbirth, In cases of gestational diabetes, a CS may be a safer option to avoid complications like vaginal tearing and leakage. Moreover, mothers with gestational diabetes are more likely to be labor baby with overweight at birth, that lead to increase their susceptibility to future health problems. So it's important to manage gestational diabetes during childbirth (Al Bekai et al., 2025). Fetal health issues, such as spinal deformities, increased weight and size, growth retardation, deficiency of oxygen ,elevated levels of bilirubin (jaundice), and organ malformations, played a role in increasing the likelihood of CS. Non-cephalic presentation (fetal malpresentation) was recognized as another independent risk factor for CS. This finding aligns with a British study investigating the reasons for C- sections, which found a correlation between breech births and this type of procedure (Moh et al., 2012). According to our study, the most common anesthesia used in CS is general anesthesia may due to that general anesthesia is deemed necessary in urgent cases, particularly for accelerated deliveries due to medical necessities. Choosing between general and regional anesthesia may be guide by past experiences or physician recommendations. Furthermore, certain medical conditions, like spinal problems or complex surgical procedure, may favor the use of general anesthesia for C- sections. (Ring et al., 2021a, 2021b). as shown in Table2, Advanced maternal age, defined as 35 years of age or older, has a higher probability of choosing elective CS. due to increased risks associated with labor complications, such as fetal distress or prolonged labor. The mother's advanced age is also associated with a higher prevalence of diseases, which could impact her decision

regarding the mother's delivery. A younger mother, as shown in Table2, may choose elective CS because of the lack of information and heightened fears surrounding natural birth (Moh et al., 2012; Ring et al., 2021a, 2021b). The impact of education status on the choice of a planned CS can vary, as shown in Table2, and is influenced by decision-making abilities, access to information, and understanding of medical procedures. However, it is important to note that education status alone does not solely determine the choice of a planned CS. Higher education levels can enhance understanding of the risks and benefits associated with different birthing methods, including CS. On the other hand, individuals with lower education levels may choose CS (Zare et al., 2021). because they have limited access to accurate childbirth information, resulting in a lack of knowledge and understanding. Additionally, it is worth noting that the CS rate tends to be higher among highly educated women. This may be due to factors such as getting married and becoming pregnant at an older age which are commonly observed in highly educated individuals (Tesfay et al., 2022; Yunitawati et al., 2024). The choice of planned CS can be influenced by healthcare access, medical facilities, and cultural beliefs, as mentioned in Table 4, In urban areas with well-developed healthcare resources, there is a higher likelihood of planned CS due to convenience skilled providers and awareness of its benefits. However, in rural areas, there is a preference for vaginal delivery due to limited healthcare services, affordability, and cultural influences. It is worth mentioning that some women in rural areas may choose planned CS due to the lack of healthcare services. Healthcare providers should consider these factors when discussing delivery options with patients (Dlugatch et al., 2024; Reyes-Amargant et al., 2025). The working status (whether an individual is employed or a housewife) can influence the decision to have a planned CS and by a complex issue that depends on multiple factors. Working individuals often have busy schedules and limited flexibility making vaginal delivery challenging. Planned CS offer a more predictable and controllable delivery process allowing individuals to better manage their work responsibilities. Working individuals may have better access to healthcare resources and insurance coverage, making planned CS more feasible. On the other hand, those who do not work or are housewives may have financial constraints that limit their options (Dlugatch et al., 2024; Reyes-Amargant et al., 2025; Yunitawati et al., 2024; Zare et al., 2021). Ethnic and societal expectations also come into play. In some national, there may be pressure on working individuals to quickly return to their professional duties after childbirth so This may lead to a favorite the CS. The gestational age of the pregnancy plays a role choosing CS, as shown in Table3 Typically, a planned CS is considered optimal between 39 and 40 weeks of gestation, unless there are specific medical reasons for an earlier delivery. Royal Australian and New Zealand College of Obstetricians (Michael et al., 2024; Roudsari et al., 2015) .When a pregnancy is full-term (between 37 and 42 weeks), healthcare providers may discuss the option of a planned CS with the expectant individual. Reasons for this choice could include medical conditions that pose risks to a vaginal delivery, such as placenta previa or certain uterine abnormalities. Another case for CS decision when ithe baby is in a breech position later in the pregnancy in order to minimize potential risks associated with a vaginal breech birth. (Jirra et al., 2023; Meena et al., 2023; Roudsari et al., 2015). The decision-making process regarding planned CS can vary depending on socio-economic status, In higher socioeconomic groups, factors like convenience and personal preferences often influence the decision, even without medical indications. Middle socio-economic groups consider medical indications, healthcare professionals' recommendations, and also factors like public healthcare availability and costs. Lower socio-economic groups face financial constraints and limited access to healthcare, leading them to

rely on public healthcare services and prioritize medical indications and professional recommendations. Choosing to undergo a planned CS at a government or private facility is determined by various factors such as accessibility, availability, quality of care, cost, and trust in the healthcare system. The government facilities are usually cheaper, more accessible, and offer competent medical professionals. Many women may choose private facilities, because they provide more personalized and luxurious care with better amenities, although at a higher cost. Trust in the healthcare system can affect a person's decision-making, with some individuals preferring private facilities due to confidence in the care provided, while others trust the experience of doctors in government facilities (Jirra et al., 2023; Michael et al., 2024; Reyes-Amargant et al., 2025; Roudsari et al., 2015). Compared to vaginal deliveries, women delivered by CS had a significantly longer hospital stay indexing the extra time needed for surgical recovery, wound care, and post-operative problems monitoring such as infection, thrombo embolism, or hemorrhage. While many women with uncomplicated vaginal delivery were discharged within even within hours after delivery, This increasing length of stay has important effects for health-system planning, bed occupancy, and the total delivery costs, especially in cases with rising CS frequency. In addition, Women may experience a delay in regaining their physical strength, as well as a longer healing process for the surgical incision, which may result in limitations in physical activity and a prolonged time to resume normal daily activities (Kebede et al., 2024; Qiao et al., 2023; Taylor et al., 1995). The present study showed that the duration of analgesic use tended to be longer and more frequent among CS women and its clinically expected because CS is a major abdominal surgery and have tissue trauma and pain, which often requires systemic analgesics to maintain mobilization and relief. From a pharmaceutical point of view, this result highlights the need for accurate pain-management protocols after CS and focusing the attention to adjust dosing, adverse drug effects monitoring, and educated women about the duration of analgesic use to avoid side or adverse effects. The type of analgesic used also differed significantly between the two groups, with a higher dependence on parenteral form for CS women, while vaginal deliveries frequently received oral doses. This is clinically expected because clinicians often use fast-acting and potent routes of administration to control acute post-operative pain, whereas the less invasive nature of vaginal birth allows adequate pain control with oral or intramuscular regimens. These findings urgent the creation of evidence-based analgesic protocols specified to mode of delivery, aiding in balance effective pain relief and minimize opioid using and promotion of early breastfeeding and maternal mobility (Goel et al., 2023; Wang & Doan, 2024).

5. Conclusion

Cesarean section, especially the elective one, is influenced by a number of maternal, fetal, socio-economic, and cultural factors. Maternal age, educational level, employment status, financial stability, and access to healthcare significantly affect the decision to undergo a planned CS. The rising rates of CS highlight the urgent need to increased awareness and education about the potential risks and benefits of the procedure. From a pharmaceutical perspective, CS presents unique challenges in postoperative care, particularly in pain management. The surgical nature of the procedure necessitates personalized analgesic protocols to balance between the efficacy and safety, lowering opioid consumption

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