A Retrospective Study on Iraqi Patients to Explore the Impact of Cesarean Section on Women's and Fetal Health

Dr. Huda Ameen Rasheed Alzubaidi

M.B.Ch.B., D.G.O., C.A.B.O.G. \ (Obstetrics & Gynecology), Specialist Obstetrics & Gynecology \ IVF Subspeciality, Iraqi Ministry of Health, Al-Rusafa Health Directorate, Kamal Al-Sameraaae Teaching Hospital, Baghdad, Iraq

Dr. Wasan Fawzi Sanad

M.B.Ch.B., D.G.O., C.A.B.O.G. \ (Obstetrics & Gynecology), Specialist Obstetrics & Gynecology \ IVF Subspeciality, Iraqi Ministry of Health, Al-karkh Health Directorate, Om Al-Banin Center for IVF, Baghdad, Iraq

Dr. Nadia Abdulaziz Ibrahim

M.B.Ch.B., D.G.O., H.D.L.M., G.O. \ (Obstetrics & Gynecology), Specialist Obstetrics & Gynecology \ Laser Subspeciality, Iraqi Ministry of Health, Al-Diwanyia Health Directorate, Women and Children Teaching Hospital, Al-Diwanyia, Iraq

Dr. Ali Qais Abdulkafi

M.B.Ch.B., D.C.H. \ (Pediatrics), Iraqi Ministry of Health, Kirkuk Health Directorate, Kirkuk Teaching Hospital, Kirkuk, Iraq

Abstract: Nowadays, one of the most prevalent maternal procedures is caesarean sections. All medical and non-medical causes are contributing to the rising number of cesarean deliveries. The purpose for this study was to look at how a cesarean section affects the health in the fetus and mother. Eighty-three pregnant women, aged 20 to 40, who had caesarean sections and were hospitalized to different hospitals in Iraq among February of 2023 and January 2024, were the subjects of retrospective research. For the six earlier investigations, maternal as well as fetal outcomes were collected.

Additionally, a multivariate evaluation was conducted to compare the current study with the previously stated investigations. The findings showed that 80% of the sample, or the bulk of women who had caesarean sections, were between the ages of 20 and 30. Furthermore, 4% of pregnancies were twins, whereas 96% for pregnancies were singletons. 6.02% of women were at danger of dying, while the maternal death rate was 2.41%. 36.14% of newborns needed to be admitted to the neonatal critical care unit, while the fetal fatality rate was 9.64%. Additionally, 66.27% of newborns weighed below 2,500 grams. According to the current study, in situations involving medical emergencies such as placental abruption and fetal distress, a caesarean section is regarded as a life-saving surgical treatment.

Keywords: Maternal and Neonatal Outcomes; Caesarean Delivery; Death; and Complications.

1. Introduction

The global prevalence of caesarean section is high, with an estimated 21% of pregnancies in Europe, 26% in the United States, 23% in Australia, and a rate exceeding 50% in several Latin American countries, including Chile, Argentina, Brazil, Paraguay, and Mexico. In Ecuador, the cesarean section rate among the MSP alone was 41.2% in 2014 [1]. The World Health Organization states that in no region of the world is a cesarean section rate greater than 10-15% justifiable [2]. The overall increase in caesarean section rates has been influenced by a number of factors, including advances in anaesthetic and surgical techniques, a reduction in the risk of short-term postoperative complications, demographic and nutritional factors, and a growing perception of the safety of the procedure among both healthcare providers and patients. This is a factor that has contributed to the increase in elective caesarean sections performed without a specific medical indication [3,4,5]. However, the findings of the WHO Global Maternal and Perinatal Health Survey suggest that the rise in caesarean section rates is associated with increased utilisation of antibiotic treatment during the puerperal period and an elevated incidence of severe maternal morbidity [6]. Furthermore, the rise in the proportion of caesarean section births is linked to an elevated incidence of neonatal morbidity and mortality [7]. This consequently results in an increased length of stay for newborns in intermediate or intensive care units, typically for a period of seven days [8,9]. The high incidence of caesarean sections is regarded as a significant public health concern. It has been established that the causes are diverse, including, but not limited to, inadequate assessment of obstetric risk, low prenatal control index, preferences of the doctor and the pregnant woman, and poor assessment of fetal risk [10,11,12]. The rise in caesarean sections is associated with an increased risk of morbidity and future maternal mortality, as the likelihood of developing conditions such as placenta previa and placental accreta is heightened. This increases the likelihood of obstetric haemorrhage and, consequently, the probability of maternal death, in addition to the inherent risks associated with surgery and anaesthesia. It has been demonstrated that a reduction in the rate of caesarean sections has not resulted in an increase in perinatal morbidity and mortality [13,14,15]. Conversely, there is a substantial body of evidence indicating that there is no association between caesarean section and a reduction in childhood neurological problems, including cerebral palsy and seizures. [16]

2. Patients and methods

The study included 83 pregnant women aged 20-40 years who had undergone a caesarean section. During the follow-up period between February 2023 and January 2024, all pregnant women were admitted to the Obstetrics and Gynaecology Department in different hospitals in Iraq. Following the attainment of 28 weeks of gestation, all pregnant women were admitted either to the Obstetric Emergency Department or to the Antenatal Ward.

The clinical and demographic data and outcomes of all pregnant women and fetuses were recorded. This included age, marital status (married), body mass index (BMI before pregnancy and BMI in the third trimester of pregnancy), comorbidities, parity, pregnancy types (single and twins), neonatal characteristics (live births, stillbirths, fetal presentation), maternal outcomes, and neonatal outcomes.

To be eligible for inclusion in the study, pregnant women had to be aged between 20 and 40 years old and free from any pre-existing medical conditions, including hypertension, diabetes, HIV, and others. Women who were taking regular medication were also excluded. A comprehensive review was conducted of six studies that addressed the topic of caesarean section and its impact on maternal and neonatal outcomes.

The review encompassed a detailed examination of the participation rates, methodology, objectives, findings, and conclusions of each study. Furthermore, a multivariate analysis of maternal and neonatal outcomes was conducted for all six studies and compared with the results of our study.

3. Results

Table 1. Basics features of pregnant women.

Features	Patients' variables, eighty-three	Percentage [%]
Maternal characteristics		
Martial ages, years		
20 – 30	67	80.72%
31 – 40	16	19.28%
Marital status		
Married	83	100%
BMI, kg/m2		
Body mass index before pregnancy	23.4 ± 3.6	
Body mass index at the last trimester	26.5 ± 5.1	
Comorbidities		
Yes	14	16.87%
No	69	83.13%
Hypertension	6	7.23%
Diabetes	4	4.82%
HIV	2	2.41%
Others	2	2.41%
Parity		
1 – 2	63	75.9%
> 2	20	24.1%
Type of pregnancy		
Single	80	96.39%
Twin	3	3.61%
Neonatal characteristics		
Fetal presentation		
Cephalic	80	96.39%
Breech	2	2.41%
Others	1	1.20%
Births		
Livebirths	81	97.59%
Stillbirths	2	2.41%
Maternal outcomes		
Maternal death	2	2.41%
Maternal near miss	5	6.02%
Severe maternal outcome	4	4.82%
Placenta praevia	3	3.61%
Accreta/increta/percreta placenta	1	1.20%
Abruption placenta	3	3.61%
Ruptured uterus	1	1.20%
Neonatal outcomes		
Fresh stillbirth	8	9.64%
Early neonatal death	6	7.23%
Perinatal death	10	12.05%
NICU admission	30	36.14%
Apgar score at 5 min <7	23	27.71%
Preterm birth (<37 weeks)	60	72.29%
Low birth weight (<2500 g)	55	66.27%

Table 2. *Identify hospitalization data of participants for the six last studies.*

No. of articles	Authors	No. of participants	Aim	Methods used
1	Chumnan Kietpeerakool, et.al	173,124	Investigating the connection between a previous CS and adverse outcomes in the mother as well as the fetus in a subsequent pregnancy was the aim of the study.	Using information collected by the World Health Organization's Multicountry Survey of Maternal as well as Newborn Health (WHOMCS), the association between previous caesarean sections and pregnancy outcomes, including maternal near miss, maternal mortality, severe mother's outcomes, aberrant placentation, and uterine rupture, was investigated.
2	Rima Irwinda et al.	603	To help moms, families, and healthcare professionals make the required preparations, the project intends to develop a tool for predicting a pregnant woman's need for a cesarean section.	Six hundred three expectant mothers took part in the study's initial round of developing a c-section prediction tool. The tool looked at how maternal and fetal factors affected the risk of cesarean sections. Following external validation with sixty-one women, discrimination as well as calibration plots were assessed using the Hosmer-Lemeshow test.
3	Ohad Houri et al.	322	Examining maternal and newborn outcomes for a pregnancy which previously underwent a cesarean section (CS) was the aim of the study.	Maternal as well as perinatal outcomes between October 15th – April 14th, 2020, were examined in a retrospective chart analysis of pregnant women with prior CS.
4	Engy Shokry, et.al	200	Our study examines the metabolic changes of maternal with cord blood related to cesarean section (CS) and vaginal delivery (VD) to determine potential causal pathways.	Over two hundred metabolites were included in the LC-MS/MS-targeted metabolomics analysis of samples taken from PREOBE trial participants.
5	Margo S Harrison, et al.	384,461	The study's objective was to quantify the mortality and morbidity of women	Maternal as well as Newborn Health Registry (MNHR) cohort prospective study

No. of studies		Findings	Conclusions
4		and infants associated with cesarean sections (CS) vs vaginal delivery (VD) either between and within sites in countries with low or middle incomes.	
6	Rojana Dhakal, et.al	The study examined the results of cesarean sections at a tertiary hospital for both the mother and the fetus.	Study conducted in the past with secondary data from medical records. Data was examined using the Chi-square test, frequency, and percentage.

Table 3: Enrolling clinical findings of patients for the six last studies.

No. of studies	Authors	Findings	Conclusions
1	Chumnan Kietpeerakool, et.al	According to the study, prior CS were related to greater chances for stillbirth, early neonatal death, perinatal death, neonatal near miss, and NICU hospitalization. It was additionally related to a lower risk of macerated stillbirth and a higher risk of preterm delivery, neonatal near miss, and neonatal admission.	Although prior CS has been associated with serious subsequent pregnancies, the results should be read in caution because there's not enough information available on prior CS indications.
2	Rima Irwinda et al.	Gestational age < 37 wg, no previous experience in vaginal delivery, a history of uterine operation, obstetrical complications, birthweight d 3500 g, and non-cephalic presentation were all independently linked to c-section delivery, according to a study that included 251 vaginal delivery cases and 352 c-sections. A seven-item scoring instrument had these criteria.	To create a prediction tool, a study found seven maternal-fetal characteristics that were highly correlated with c-section delivery: gestational age, underweight, prior uterine surgery, obstetric problems, birthweight, vaginal delivery history, as well as non-cephalic presentation.
3	Ohad Houri et al.	Because 40.3% rejected VBAC and 58.7% did not fulfill VBAC criteria, 96.2% of cases required total CS. 36.6% of births were premature. Three mothers required ICU hospitalizations. Neonatal complications included low birth weight in 14.2% of cases, birth asphyxia in 3.1% of cases, and NICU hospitalizations for 5.2% of all cases. One stillbirth and intrauterine fetal death occurred in 8/322 pregnancies.	It is possible to enhance maternal and newborn outcomes by anticipating and planning for the main surgical obstacles and problems that pregnant women with prior cesarean sections (CS) experience.
4	Engy Shokry, et.al	The metabolomes of maternal as well as cord blood are impacted by	The metabolomes of maternal and cord blood are impacted

		elective CS. CS-born infants had reduced amounts of phospholipids, aaPC, pyruvic acid, and BCKA, along with gluconeogenic substrates in their mother's blood.	by elective cesarean sections. Reduced corticosteroid levels can have detrimental effects on health.
5	Margo S Harrison, et al.	In all sites, CS rates rose from 8.6% to 15.2%; however, in African sites, they stayed low. CS was more common in younger, nulliparous mothers, those with more education, and newborns weighing 1500–2499 g. Antepartum and postpartum problems were more prevalent in CS pregnancies, and maternal and newborn deaths was greater.	During the research period, CS rates rose at every site. In African sites, CS was linked to unfavourable results.
6	Rojana Dhakal, et.al	According to the research, poor maternal outcomes, including problems like low birth weight and hypoxia, affected 17.1% of moms and 11.8% of newborns.	The results of the cesarean section were favorable to the mother and the fetus. Mothers frequently experienced complications, including postpartum hemorrhage and extended hospital stays.

Table 4: Conduct a multivariate analysis to compare our study with the other six previous studies.

Studies	Findings, OR	CI 95%
Chumnan Kietpeerakool, et.al	2.1	0.9 – 4.7
Rima Irwinda et al.	1.3	1.0 – 3.8
Ohad Houri et al.	2.2	1.4 – 5.9
Engy Shokry, et.al	1.0	0.7 – 1.8
Margo S Harrison, et al.	1.4	0.6 – 4.5
Rojana Dhakal et al.	1.1	0.4 – 6.0

4. Discussion

Several of these characteristics were shown to be important in connection to caesarean patches, to the point that a built prediction model could correlate the relationship. Most pregnant women that have previously undergone a cesarean section are more likely to experience difficulties during birth and to experience issues for both the mother as well as the unborn child. In fact, addressing common issues and preparing for them beforehand might benefit both moms and infants [17, 18, 19]. Past C-section was linked to considerable complications in later pregnancies. That said, these results should be interpreted with caution in the absence of data regarding the reasons for the prior cesarean section. [20]

Out of all these factors, several variables were found to have a significant correlation with caesarean deliveries, including gestational age less than thirty-seven weeks, maternal body mass index less than twenty-five pre-pregnancy, history of caesarean section, pregnancy-related problems, infant weight less than two and a half kilograms and position of the fetus. From these predictors a model for assessment of the probability of c-section has been constructed. [21,22,23]

[24] Prior to pregnancy, a mother's underweight BMI was the only maternal demographics factor that reduced the likelihood of having a cesarean section (OR: 2.1, 90%). CI: 0.9–4.7. This result was in line with other studies that were gathered, which demonstrated that being an underweight

BMI prior to pregnancy reduced the probability of a caesarean birth by half (OR: 1.3, 88%, CI: 1.0 – 3.8).

Although individuals in the obese group were believed to be more likely than other patients to require a cesarean delivery, there was no appreciable difference between them in the current study. This was surprising because, according to a previous study, pregnant women that were obese as well as nulliparous had a higher chance of undergoing a cesarean section. The differing results might be due to the varying cutoff values for each BMI category in the two Asian-Pacific and WHO standards. [25, 26]

Furthermore, it is well-known that one among the main risk factors for a C-section operation is obstetrical problems. Since preeclampsia/eclampsia, gestational glucose mellitus, IUGR, placenta previa, as well as placental abruption are the most common pregnancy problems in Indonesia, we included them in this study. [27]

According to earlier research, the relative risk of c-section births was around 1.45–1.7 for those pregnancy problems [28, 29]. However, our study shown that the risk of a cesarean section is increased by preterm birth measured at fewer than thirty-seven weeks in gestation. This was consistent with previous research that found that giving birth before 37 weeks of pregnancy raised the chance of a sessional delivery, as demonstrated by the odds ratio: 1.45, 95% 1.16–1.72 is the confidence interval. [30]

An earlier study that found the likelihood of a cesarean birth increased with fetal weight also supported this pattern.14,30 Previous studies also confirm this finding, showing that 39.3% of c-sections were performed on pregnancies weighing less than 3500 g, whereas 60.7% of pregnancies weighing more than 2500 g were delivered via c-section. Previous studies have demonstrated that there is no significant difference from the estimated fetal weight and the actual birth weight in a population of normal weight, even though our study used the clinical assessment of birth weight rather than the projected forty-week fetal weight. [31,32,33]

5. Conclusion

The present study indicated that cesarean section is considered a life-saving surgery in medical emergencies such as placental abruption or fetal distress. Moreover, cesarean section was associated with serious maternal and fetal health morbidity in terms of mortality and birth outcomes, as well as slower fetal bonding in terms of breastfeeding.

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