



# Cesarean Section Rate in a Sample of Primigravida Women in the Public Maternity Hospital in Erbil City, Iraq

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## Abstract

**Objectives:** The worldwide rise in the cesarean section rates might be associated with maternal factors and health care services. This study aimed to measure the rate of cesarean section in a sample of primigravida women and find out the association of the cesarean section rate with the socio-demographic characteristics of pregnant women, pregnancy risk factors, and the utilization of antenatal care services.

**Materials and Methods:** A cross-sectional study was carried out from the 1st of July, 2015 to 30th of June, 2016. The study sample included 400 primigravida women with singleton pregnancy at the labor room of Erbil Maternity Teaching Hospital. A specially designed questionnaire was used for data collection. Chi-square test and Fishers exact test were used for statistical analyses.

**Results:** The rate of cesarean section in the primigravida women was 30%. Cesarean section was significantly associated with the increasing maternal age ( $P < 0.001$ ) and the history of treatment for infertility ( $P = 0.027$ ). The cesarean section rates had a statistically significant ( $P < 0.001$ ) strong positive correlation ( $r = 0.84$ ) with the maternal age and a significant ( $P < 0.001$ ) weak positive correlation ( $r = 0.005$ ) with the gestational age.

**Conclusions:** The cesarean section rate in the primigravida women was much higher than the “ideal rate” recommended by the World Health Organization (WHO). Efforts should be undertaken to reduce the rate of cesarean delivery as recommended by the WHO.

**Keywords:** Cesarean section, Primigravida, Infertility, Singleton pregnancy, Erbil

## Introduction

Cesarean section is usually performed when a vaginal delivery would put the baby's or mother's life or health at risk. Cesarean section can save lives, but it is frequently performed without medical indications (1). It is often done as an emergency procedure in women with cephalopelvic disproportion, obstructed labor, fetal distress, antepartum hemorrhage and previous cesarean section resulting in high perinatal and maternal morbidities (2).

Cesarean section rates have risen worldwide. A study that involved 150 countries reported a rate of 18.6% ranging from 6% in the least developed countries to 27.2% in the most developed countries. Cesarean section rates are highest in the Latin America and the Caribbean region (40.5%) and Northern America (32.3%), while they are lowest in Asia (19.2%) and Africa (7.3%) (3). In the Arab countries, cesarean section rates vary widely with Egypt having the highest cesarean section rate (26.2%) and Mauritania the lowest (5.3%) (4).

Studies from industrial countries have shown that the indications for the cesarean section have changed over the last decades and increased knowledge about current indications could lead to the reduction of cesarean section

rates through correct counseling and advice to pregnant women and health workers (5-8).

The worldwide increase in cesarean section rate which might be associated with maternal factors and health care services provided the impetus for carrying out this study. It is important to ensure that a cesarean section is provided to women in real need. This study aimed to determine the rate of cesarean section in a sample of primigravida women and find out the association between the cesarean section rate and the socio-demographic characteristics of pregnant women, pregnancy risk factors, and the utilization of antenatal care services.

## Materials and Methods

This cross-sectional study was conducted at Erbil Maternity Teaching Hospital in Kurdistan region of Iraq from 1st of July, 2015 to 30th of June, 2016. A sample of 400 primigravida women was selected for the study by convenient sampling technique. All the primigravida women who were present in Erbil Maternity Teaching Hospital in the days when the researcher was attending the hospital for data collection were invited to participate in the study. The study included the primigravida women



who were above 24 weeks of gestation. Women with chronic diseases such as hypertension, cardiovascular disease, diabetes mellitus, renal disease, and bronchial asthma in addition to the women with multiple pregnancies or pre-eclampsia were excluded from the study.

A structured questionnaire was designed and field tested before using it to obtain the relevant data. The primigravida women were directly interviewed in the labor room or post labor wards of the hospital to collect the data. A detailed history was obtained and physical examination of each woman was performed. The hemoglobin level was measured for the participants and abdominal ultrasound was performed to ascertain the viability of the fetus and determine the gestational age. Caesarean section was taken as the dependent variable, while current maternal age, history of treatment for infertility, psychosocial stress, antenatal care, iron/folic acid supplementation, and anemia during the current pregnancy were considered as independent variables.

The Statistical Package for the Social Sciences (SPSS) version 21.0 was used for the statistical analysis. Chi-square analysis test and Fisher exact test, as relevant, were used. A  $P$  value  $\leq 0.05$  was considered statistically significant. The association of the cesarean section rates with the gestational and the maternal age was further analyzed by regression analysis.

## Results

The mean age  $\pm$  SD of the study participants was  $22.55 \pm 4.37$ , ranging from 15 years to 37 years. Antenatal care visits were reported by 390 (97.5%) primigravida women with 271 (69.5%) having adequate antenatal care (i.e., 4 visits and more) and 180 (46.2%) starting the visits during the 1st trimester of pregnancy. Anemia was diagnosed in 108 (27%) participants. One hundred twenty-three (30.8%) primigravida women had cesarean section; 41 (33.3%) of them were anemic and 30 (24.0%) were infertile.

The most common indications for the cesarean section were cephalopelvic disproportion (21.1%) and fetal distress (21.1%). Mother's request for cesarean section constituted 7.3% of all cesarean sections (Table 1).

Caesarean section was significantly associated with increasing maternal age ( $P < 0.001$ ) and history of treatment for infertility ( $P = 0.027$ ) as shown in Table 2.

There was a significant strong positive correlation between cesarean section rates and the maternal age ( $\beta = 0.048$ ;  $r = 0.84$ ;  $P < 0.001$ ), while a significant weak positive correlation was detected between the cesarean section rates and the gestational age ( $\beta = 0.3746$ ;  $r = 0.005$ ;  $P < 0.001$ ) as shown in Figures 1 and 2.

## Discussion

The rate of cesarean section has increased remarkably in Iraq in the recent years, particularly in the Kurdistan region of Iraq (9). A retrospective study based on the annual reports of Ministry of Health revealed an

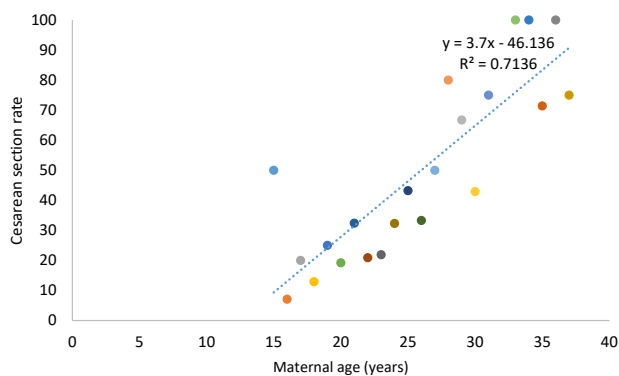
**Table 1:** Indications for Cesarean Section of Study Sample, Maternity Teaching Hospital in Erbil City, 2015, (n = 123)

Indications	No. (%)
Cephalopelvic disproportion	26(21.1)
Fetal distress	26(21.1)
Fetal malpresentation	18(14.7)
Failure induction of labor	17(13.8)
Severe oligohydramnios	13(10.6)
Post date	9(7.3)
Mother request	9(7.3)
Placental causes	4(3.3)
Cord prolapse	1(0.8)
Total	123(100.0)

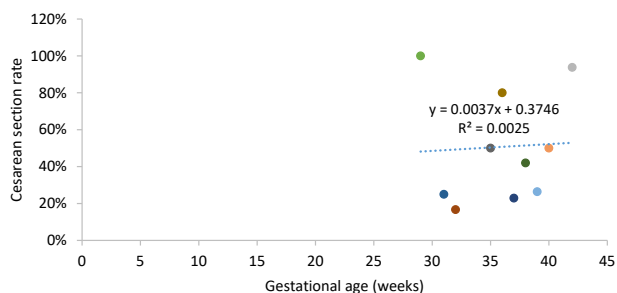
**Table 2.** Association of Cesarean Section With Certain Sociodemographic and Obstetric Characteristics

Variables	No.	CS		P
		No.	%	
<b>Maternal age (y)</b>				
<20	62	9	14.5	
20-34	325	104	32.0	<0.001
$\geq 35$	13	10	76.9	
<b>History of treatment for infertility</b>				
Yes	72	30	41.7	0.027
No	328	93	28.4	
<b>Psychosocial stress</b>				
Yes	42	11	26.2	0.498
No	358	112	31.3	
<b>Number of ANC visits (n = 390)</b>				
<4	119	45	37.8	0.216
$\geq 4$	271	78	28.8	
<b>Time of first ANC visit (n = 390)</b>				
1st trimester	180	46	25.6	0.093
2nd trimester	171	57	33.3	
3rd trimester	39	16	41.0	
<b>Blood transfusion</b>				
Yes	11	7	63.6	0.040
No	389	116	29.8	
<b>Ferro-folic supplementation</b>				
Yes	353	106	30.0	0.391
No	47	17	36.2	
<b>Anemia</b>				
Yes (Hb < 11 g/dL)	108	41	38.0	0.057
No	292	82	28.1	
Total	400	123	30.8	

increasing trend in the overall cesarean section rate in public hospitals from 24.6% to 29.3% in 2012 and the private hospitals from 74.8% in 2009 to 77.9% in 2012. The overall rates of cesarean section in Erbil governorate varied between 20.9% in 2008 and 37.6% in 2012. No specific data on each of the public or private sectors were available for Erbil governorate (10). The increased rates of cesarean section in the private health care sector were attributed to provider-induced demand (11). Presence of a large number of private hospitals in Iraq might be partially responsible for the increased rates of cesarean



**Figure 1.** Regression Line Drawn on Scatter Diagram Relating Cesarean Section Rate and Maternal Age ( $y = 0.038x + 0.048$ ,  $r = 0.84$ ,  $P < 0.001$ ).



**Figure 2.** Regression Line Drawn on Scatter Diagram Relating Cesarean Section rate and Gestational Age ( $y = 0.0037x + 0.3746$ ,  $r = 0.005$ ,  $P < 0.001$ ).

section potentially due to provider-induced demand (9). Such factor might also be responsible for having a higher increase in the cesarean section rates in the Kurdistan region of Iraq, since the Kurdistan Region has witnessed a rapid expansion of the private healthcare sector which is poorly regulated (12).

The rate of cesarean section revealed by this study (30.8%) was similar to that reported in Iraq in the public hospitals in 2012 (29.3%) (10). The rate was higher than the rate in some neighboring countries including Turkey (21.2%) and Jordan (18.5%). However, a higher rate of 41.9% was reported in Iran (13).

This cesarean section rate revealed in this study was much higher than the optimal rate of 10% (1,14). However, the World Health Organization (WHO) stated that the “ideal rate” for cesarean section is to be between 10% and 15%, but when the rate goes above 10%, there is no evidence that maternal and neonatal mortality rates improve (1). Identifying and addressing these risk factors need setting policies to reduce surgical deliveries (4,11).

This study revealed that medical reasons constituted the vast majority of the indications for the high rate of cesarean section, which cannot be avoided. However, obstetricians’ opinion about the urgent need for cesarean section and maternal request are other factors responsible also for the relatively high proportion of the indications

for elective surgery, which can be avoided. The common maternal request has constituted variable proportions of elective cesarean section (7,8,15). It is worth to mention that in Kurdistan region, assisted vaginal delivery such as forceps delivery and vacuum extraction is not a common practice as the majority of senior house officers are not well trained and not allowed to carry out the procedure. Consequently, the procedure is carried out only by trained specialists and consultants. This may have contributed to having a high rate of cesarean section. For example, the rate of the operative vaginal delivery in the United States is around 5% (16).

In this study, cesarean section was significantly associated with increased maternal age, a finding which is in agreement with that of studies conducted in Nigeria in 2011 (17) and the United Kingdom in 2013 (18). Advanced maternal age can be associated with a number of maternal and neonatal complications and consequences including gestational diabetes, placenta previa, abruptio placenta, pre-eclampsia, cesarean section, stillbirth, preterm delivery, low birth weight and increased perinatal mortality (19). The significant association between cesarean section and the history of treatment for infertility was similarly revealed by a study in Israel on nulliparous women with singleton pregnancies (20). This finding could be attributed to maternal request and the increased concerns of the family about the safety of the baby. In this study, a statistically significant association between cesarean section and higher mean gestational age was demonstrated. In a study that involved 17 European countries and the United States, the cesarean section rate was negatively associated with the increasing gestational age with the lowest rate being at 40 weeks of gestation. The rate typically increased at 41 and 42 weeks (21).

This study has two main limitations. Firstly, selection of a convenient sample limits the representativeness of the sample to all women attending the hospital. Secondly, the inclusion of only one center in the study would affect the generalizability of the findings.

## Conclusions

The cesarean section rate in the primigravida women was much higher than the “ideal rate” recommended by the WHO. Efforts should be undertaken to reduce the rate of cesarean delivery according to WHO recommendations. There is a need for a larger study sample to determine the association of other risk factors with pregnancy outcomes.

## Conflict of Interests

Authors declare that they have no conflict of interests.

## Ethical Issues

The study was reviewed and approved by the Research Ethics Committee of the author’s institution and the informed consent was obtained from the participants.

## Financial Support

None.

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