

Proportion of Emergency Cesarean Section in Maternity Hospitals in Kirkuk Governorate, in 2022–2023

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Abstract

Background: Emergency cesarean sections are undertaken before or during labor when there is an immediate concern for the mother or the fetus. Inadequate maternal management and unreliable referral systems are responsible for the massive incidence of emergency cesarean section. **Objectives:** This study aims to identify the rate of emergency cesarean section in Kirkuk governorate. **Subjects and Methods:** A cross-sectional study was conducted at the postoperative Obstetrical and Gynecological wards in Azadi Teaching Hospital and Kirkuk General Hospital, Kirkuk, Iraq, from December 1st, 2022, to February 28th, 2023. Four hundred women, who have had cesarean sections, were directly interviewed using a structured questionnaire. Official approval was obtained. Categorical data were analyzed using the Chi-square or Fisher's exact tests $P < 0.05$ was considered statistically significant. **Results:** One hundred and ninety-nine (49.8%) mothers were within 26–35 years of age. One hundred and forty-three (35.8%) had an emergency cesarean section, whereas 257 (64.3%) had an elective cesarean section. Emergency indications included failure to progress 45 (31.5%), cephalopelvic disproportion (CPD) 36 (25.2%), fetal distress 32 (22.4%), and severe preeclampsia 22 (15.4%). Poor pregnancy outcomes included bad obstetrical history 49 (12.3%), macrosomia 7 (1.8%), premature rupture of membrane 4 (1.0%), and postterm 21 (5.3%). Elective cesarean sections were significantly higher in husbands >35 years, with husbands' education (primary school), parity of 2–4, and with no pregnancy-induced hypertension ($P = 0.035$, $P = 0.034$, $P < 0.001$, and $P < 0.001$), respectively. Emergency cesarean sections (CSs) were significantly higher among diabetic mothers; $P = 0.022$. **Conclusions:** One-third of all CSs in Kirkuk were done as emergency operations with failure to progress, CPD, and fetal distress as the main indications.

Keywords: Antenatal care, emergency cesarean section, poor pregnancy outcomes

INTRODUCTION

Cesarean section (CS) is a surgical delivery of the baby by an abdominal and uterine incision to ensure the mother's and infant's well-being.^[1] Cesarean delivery rates are rising globally, although the causes of this phenomenon are not well understood. The International Federation of Obstetrics and Gynecology and the World Health Organization (WHO) have raised worry over this persistent rise, calling this global trend an "epidemic." Since 1985, the WHO has believed that CS rates should not exceed 10%–15%, regardless of region. However, doubts were raised about the wisdom of this threshold, and the necessity to update the suggested rate has become more widely acknowledged in the international community.^[2]

The timing of a cesarean section can be classified into elective when the operation is planned days or weeks in advance before the onset of labor, and emergency CSs before or

during labor due to immediate concerns for the mother or the fetus. According to different studies, emergency CSs carry substantially more fetal complications. For the mothers, emergency CSs can also cause negative psychosocial outcomes including posttraumatic stress, health-related quality of life, experiences, infant-feeding, satisfaction, and self-esteem.^[3]

In Iraq, a study conducted in Baghdad at Al-Yarmouk Teaching Hospital in 2014 revealed that the rate of CS

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deliveries was 47.1%. Of these procedures, 65.9% were elective and 44.6% were emergency.^[4] The overall cesarean section rates in the 2018 survey remarkably increased compared to the rates of the 2011 survey. The relative change (RC) for Iraq was 49.5%, 58.5% for the Kurdistan region, and 45.1% for the rest of Iraq. The increase was highest in Kirkuk (RC = 119.5%).^[5]

Inadequate maternal treatment and unreliable referral systems are the principal causes of the increased incidence of emergency CSs; the predominance of emergency cesarean may therefore be an indication of deficient antenatal care (ANC) and poor referral services. Incidence can be reduced by early recognition of and referral of mothers who are likely to require elective CSs; thus, studies should be done to detect determinants of emergency CSs that need to be caught early to reduce emergency CSs.^[3] This study aims to identify the rate of emergency CSs in the Kirkuk government and the determinants of emergency cesarean sections.

SUBJECTS AND METHODS

This study is a cross-sectional survey carried out in the postoperative obstetrical and Gynecological wards in Azadi Teaching Hospital and Kirkuk General Hospital, Kirkuk, Iraq, over the period of December 1, 2022–February 28, 2023.

All women delivered by CSs in Azadi Teaching Hospital and Kirkuk General Hospital were eligible for participation in this study. Exclusion criteria included those who refused to voluntarily participate and those who were severely ill (RCU patients, depression, anxiety, etc.) and were therefore unable to respond to the questions. Convenience sampling was used in this study.

A structured questionnaire was used to obtain data through direct interviews for 10–15 min with every patient. The questionnaire was divided into six sections: Demographic data, obstetric history, medical history, indications for emergency CSs, determinants of poor pregnancy outcomes, and postoperative complications. Within each section, different variables were covered such as the mother and her husband (age, education, and occupation), parity, and past and present obstetric history including ANC attendance. The medical history section of the questionnaire included many disorders that are exacerbated by pregnancy such as cardiovascular, gastrointestinal, and endocrine diseases.

Microsoft Excel 2010 and IBM SPSS version 26 (SPSS Inc., Chicago, IL, USA) were used for data entry, management, and analysis. Descriptive data were presented as tables and graphics. Categorical data were tested using the Chi-square or Fisher's exact tests. Quantitative data were analyzed using a *t*-test $P < 0.05$ was considered statistically significant.

The study protocol was approved by the scientific committee at the Department of Family and Community Medicine, College of Medicine, University of Baghdad, and approved by the college council. Ethical approval was obtained from the Center of Training and Human Resources Development. Official approval

was obtained from the hospital management. Verbal consent was obtained from all women. Data were used only for this research, and all personal information was kept confidential.

RESULTS

This study included 400 mothers; 199 (49.8%) of them were within the age group of 26–35 years, 120 (30.0%) were 25 years of age or less, and 81 (20.3%) were older than 35 years. Two hundred and five (51.3%) of husbands were within the age group of 26–35 years, 145 (36.3%) of them were older than 35 years, and 50 (12.5%) were 25 years of age or less. Forty-eight (12%) mothers and 103 (25.8%) husbands were employed. Mothers and husbands had a primary school level of education among 233 (58.3%) and 212 (53.0%), respectively. There were 251 (62.8%) multiparous mothers (2–4 children), and 104 (26.0%) mothers who had a history of abortion [Table 1].

There were 35 (8.8%) mothers who had hypertension and 10 (2.5%) mothers who had diabetes mellitus (DM). Regarding

Table 1: Distribution of the sample ($n=400$) according to sociodemographic features

Sociodemographic features	<i>n</i> (%)
Maternal age	
≤25	120 (30.0)
26–35	199 (49.8)
>35	81 (20.3)
Husband age	
≤25	50 (12.5)
26–35	205 (51.3)
>35	145 (36.3)
Mother's occupation	
Employed	48 (12.0)
Not employed	352 (88.0)
Husband's occupation	
Employed	103 (25.8)
Not employed	297 (74.3)
Mother's education	
Illiterate	40 (10.0)
Primary school	233 (58.3)
Secondary school	39 (9.8)
College	88 (22.0)
Husband's education	
Illiterate	23 (5.8)
Primary school	212 (53.0)
Secondary school	61 (15.3)
College	104 (26.0)
Parity	
Primiparous	105 (26.3)
2–4	251 (62.8)
≥5	44 (11.0)
History of abortion	
Yes	104 (26.0)
No	296 (74.0)
Total	400 (100.0)

obstetrical history, 8 (2.0%) of mothers have gestational DM and 47 (11.8%) mothers have pregnancy-induced hypertension (PIH) as shown in Table 2.

Out of the total participants, 143 (35.8%) mothers underwent emergency CS, and 257 (64.3%) underwent elective CS [Figure 1].

As shown in Figure 2, the indications of emergency CS were, from highest to lowest, failure to progress 45 (31.5%), cephalopelvic disproportion (CPD) 36 (25.2%), fetal distress 32 (22.4%), severe preeclampsia 22 (15.4%), antepartum hemorrhage 6 (4.2%), and cord prolapse 2 (1.4%).

The outcome of CS was 288 (97.0%) alive babies, one (0.3%) dead, and 11 (2.8%) alive but distressed babies (admitted to NC). Determinants of poor pregnancy outcomes are obstetrical history 49 (12.3%), macrosomia 7 (1.8%), premature rupture of membrane 4 (1.0%), and postterm 21 (5.3%) [Table 3].

Table 4 shows the distribution of sociodemographic features of participants according to the ANC attendance in the current pregnancy. Three hundred and ninety-six (92.3%) their time of their first ANC visits were in the first trimester.

Table 5 shows the distribution of sociodemographic features of participants according to the types of C-sections. Elective C-sections were significantly higher when husbands were older than 35 years, when the husbands had a primary school level of education, and with mothers of 2–4 parity ($P = 0.035$, $P = 0.034$, and $P < 0.001$), respectively. Emergency CS was significantly more common among diabetic mothers, $P = 0.022$. Elective CS was significantly more common among mothers without PIH, $P < 0.001$ [Table 6].

The distribution of CS outcomes, ANC visits, and postoperative complications according to the types of CS among participants are shown in Table 7. No significant association was observed between these variables and types of CS, $P > 0.05$.

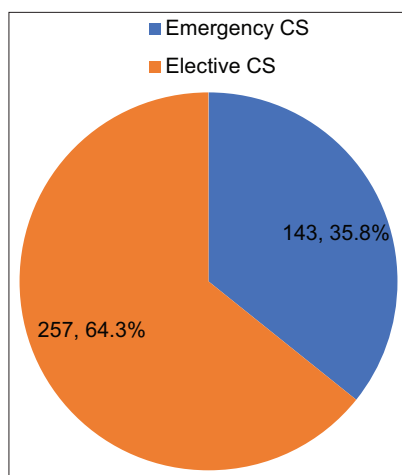


Figure 1: Type of cesarean section among participants. CS: Cesarean section

DISCUSSION

In our study, 79.8% of the selected samples were younger or equal to 35 years of age, and 88% of them were unemployed. This is consistent with other studies from Mosul and Kirkuk,^[6,7] due to cultural similarities. While findings were inconsistent with Indian and Nigerian studies,^[8] which might be due to different cultures. 68.3% of the selected sample were illiterate

Table 2: Distribution of the sample ($n=400$) according to the obstetrical and medical history of participants

Variables	n (%)
Past medical history	
HT	35 (8.8)
DM	10 (2.5)
Obstetrical history	
Gestational DM	8 (2.0)
PIH	47 (11.8)
Total	400 (100.0)

DM: Diabetes mellitus, HT: Hypertension, PIH: Pregnancy-induced hypertension

Table 3: Features of cesarean section and antenatal care service among participants

Variables	n (%)
The outcome of C-section	
Healthy baby (APGAR score=10)	388 (97.0)
Distressed baby admitted to NCU (APGAR score <10)	11 (2.8)
Dead baby (APGAR score=0)	1 (0.3)
Cord prolapse	2 (1.4)
Determinants of poor pregnancy outcome	
Bad obstetrical history	49 (12.3)
Macrosomia	7 (1.8)
PROM	4 (1.0)
Postterm	21 (5.3)
Negative	319 (79.8)
Total	400 (100.0)

PROM: Premature rupture of membranes, NCU: Neonatal care unit

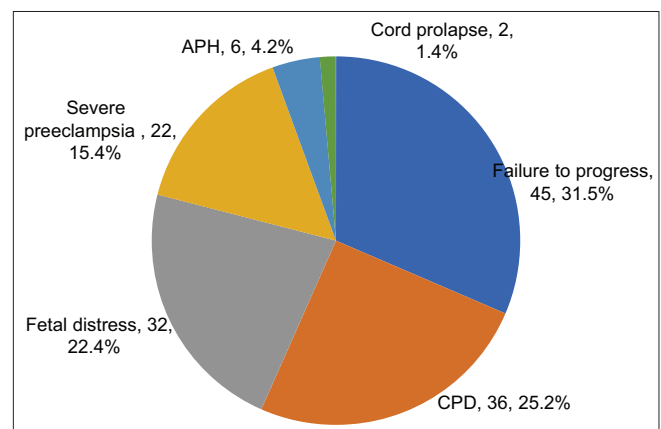


Figure 2: Indications of emergency cesarean section. CS: Cesarean section, APH: Antepartum hemorrhage, CPD: Cephalopelvic disproportion

Table 4: Features of antenatal care service and postoperative complications among participants

Variables	n (%)
ANC attendance in the current pregnancy	369 (92.3)
Time of first ANC visit (GA)	
First trimester	117 (31.7)
Second trimester	244 (66.1)
Third trimester	8 (2.2)
Number of ANC visits	
0	31 (7.8)
1–3	204 (51.0)
>3	165 (41.3)
Postoperative complications	
Infection	11 (2.8)
Bleeding	16 (4.0)
Thromboembolism	2 (0.5)
Negative	371 (92.8)
Total	400 (100.0)

ANC: Antenatal care, GA: Gestational age

or finished their primary school education, and 89% of them had a parity of <5, similar to the study from Kirkuk.^[6]

Elective cesarean sections formed 64.2% of all cesarean sections, this was in agreement with a study from Mosul^[7] but was not in agreement with another study from Nepal.^[9] 35.8% of the selected mothers got through emergency cesarean sections, and this finding was in agreement with an Indian study^[8] and inconsistent with a study in Bangladesh.^[10] These differences in the incidence of both C-sections in general and emergency C-sections, in particular, might be due to different sociodemographic characteristics.

The current study revealed that 97% of the babies were alive (good outcome), similar to a study from Rwanda^[11] but disagrees with a study from Ethiopia.^[12] This variation between the current study and the Ethiopian study^[12] might be because our study included newborns delivered by both elective and emergency cesarean sections, whereas the Ethiopian study included only those who were delivered by emergency cesarean sections.

The most common indication for emergency cesarean sections was failure to progress (31.5%), followed by cephalopelvic disproportion (25.2%) and fetal distress (22.4%). These findings were not in line with other studies from Bangladesh and Nigeria,^[10,13,14] which might be attributed to the diverse methods used by the doctors as well as the variations among individuals of different nations that would make them more liable to a specific complication more than others (e.g. variations in pelvimetry).

This study revealed that almost all of the mothers attended ANC in their current pregnancies, which was in agreement with a study in Guatemala.^[15] This might be striking since 68.3% of the mothers had a low level of education or even illiterate, which would affect their health awareness and their antenatal visits, but the finding above includes both regular and irregular

Table 5: Distribution of sociodemographic features of patients and types of cesarean section

Sociodemographic features	Types of CS		P*
	Emergency CS, n (%)	Elective CS, n (%)	
Maternal age			0.058
≤25	52 (43.3)	68 (56.7)	
26–35	69 (34.7)	130 (65.3)	
>35	22 (27.2)	59 (72.8)	
Husband age			0.035
≤25	26 (52.0)	24 (48.0)	
26–35	70 (34.1)	135 (65.9)	
>35	47 (32.4)	98 (67.6)	
Mother's occupation			0.31
Employed	14 (29.2)	34 (70.8)	
Not employed	129 (36.6)	223 (63.4)	
Husband's occupation			0.1
Employed	30 (29.1)	73 (70.9)	
Not employed	113 (38.0)	184 (62.0)	
Mother's education			0.29
Illiterate	16 (40.0)	24 (60.0)	
Primary school	75 (32.2)	158 (67.8)	
Secondary school	14 (35.9)	25 (64.1)	
Collage	38 (43.2)	50 (56.8)	
Husband's education			0.034
Illiterate	11 (47.8)	12 (52.2)	
Primary school	62 (29.2)	150 (70.8)	
Secondary school	25 (41.0)	36 (59.0)	
Collage	45 (43.3)	59 (56.7)	
Parity			<0.001
Primiparous	71 (67.6)	34 (32.4)	
2–4	56 (22.3)	195 (77.7)	
≥5	16 (36.4)	28 (63.6)	
History of abortion			0.77
Yes	36 (34.6)	68 (65.4)	
No	107 (36.1)	189 (63.9)	

*Chi-square test (or Fisher's exact test). CS: Cesarean section

ANC visits, where more than half of them had only one to three visits during the duration of their pregnancies.

About 7.3% of the recruited sample was with postoperative complications, and bleeding was found to be the most common postoperative complication. This finding was inconsistent with a study in Tanzania,^[16] in which the most common complications were anesthesia related. This variance between them would be justified by the differences among health-care systems, and different economic backgrounds between Iraq and Tanzania that reflect different financial support for health systems.

In the current study, husbands who were older than 35 years and with primary education were determinants of elective cesarean sections ($P = 0.035$) and ($P = 0.034$), respectively. Primary education would affect the health awareness of the husband, making him unaware of the hazards of emergency cesarean sections, so he would choose the elective approach

as a favorable option. It was observed that mothers with a parity of 2–4 were dominant among elective cesarean sections ($P < 0.001$) and these findings agreed with other studies.^[7,17]

Emergency cesarean sections were significantly higher in diabetic mothers ($P = 0.022$). This may be explained by the fact

that diabetes among pregnant mothers increases the chances of preterm birth;^[18] thus, it would cause a higher rate of emergency cesarean sections. Elective cesarean sections in this study were dominant among mothers without PIH ($P < 0.001$). This finding was consistent with other studies.^[19]

Healthy babies among those delivered by emergency were noticed in 34.8% which was inconsistent with a study in Ethiopia.^[20] This variance might be due to different categorizations of outcome depending on the Apgar score. There was an insignificant difference in Apgar (10) between emergency cesarean sections and elective cesarean sections ($P = 0.06$). This finding might be explained by the fact that the definitions of emergency and elective differ between consultants. The difference between consultants enforces the introduction of guidelines. Supervision and monitoring force the consultants to follow the guidelines. No Iraqi guidelines were introduced to manage this conflict.

In our study, there was no significant association between types of cesarean sections and ANC visits, and postoperative complications. These observations were inconsistent with two other studies from Nepal.^[15] The difference between this study, and the Nepalese study may be because the inclusion and exclusion criteria of the current study differed from the study of Nepal.

Limitations of the study

The sampling method used was consecutive convenient sampling not randomized this can cause an inability to generalize the result and the study design was cross-sectional

Table 6: Distribution of obstetrical and medical history of participants and types of cesarean section

Variables	Type of CS		P*
	Emergency CS, n (%)	Elective CS, n (%)	
Medical history			
HT			
Yes	16 (45.7)	19 (54.3)	0.19
No	127 (34.8)	238 (65.2)	
DM			
Yes	7 (70.0)	3 (30.0)	0.022
No	136 (34.9)	254 (65.1)	
Obstetrical history			
Gestational DM			
Yes	4 (50.0)	4 (50.0)	0.39
No	139 (35.5)	253 (64.5)	
PIH			
Yes	30 (63.8)	17 (36.2)	<0.001
No	113 (32.0)	240 (68.0)	

*Chi-square test (or Fisher's exact test). DM: Diabetes mellitus, HT: Hypertension, PIH: Pregnancy-induced hypertension, CS: Cesarean section

Table 7: Distribution of cesarean section outcome, antenatal care service, and postoperative complication according to the types of cesarean section among participants

Variables	Type of CS		P*
	Emergency CS, n (%)	Elective CS, n (%)	
Outcome of CS			
Healthy baby (APGAR score=10)	135 (34.8)	253 (65.2)	0.059
Distressed baby admitted to NCU (APGAR score <10)	7 (63.6)	4 (36.4)	
Dead baby (APGAR score=0)	1 (100.0)	0	
ANC attendance			
Yes	132 (35.8)	237 (64.2)	0.97
No	11 (35.5)	20 (64.5)	
Time of first ANC visit (GA)			
First trimester	43 (36.8)	74 (63.2)	0.95
Second trimester	86 (35.2)	158 (64.8)	
Third trimester	3 (37.5)	5 (62.5)	
Number of ANC visits			
0	11 (35.5)	20 (64.5)	0.68
1–3	69 (33.8)	135 (66.2)	
>3	63 (38.2)	102 (61.8)	
Postoperative complication			
Infection	2 (18.2)	9 (81.8)	0.13
Bleeding	7 (43.8)	9 (56.3)	
Thromboembolism	2 (100.0)	0	
Negative	132 (35.6)	239 (64.4)	

*Chi-square test (or Fisher's exact test). CS: Cesarean section, ANC: Antenatal care, NCU: Neonatal care unit, GA: Gestational age

and cannot therefore address the changes in the rates of emergency C-sections over time.

It can be concluded from this study that emergency C-sections constituted one-third of all C-sections in Kirkuk and a third of those delivered by emergency C-sections got ANC of more than 3 visits. Failure to progress, CPD, and fetal distress were the main indications for emergency C-sections. We would therefore recommend monitoring and supervision of ANC services in primary health-care centers and monitoring maternal and fetal well-being during the active phase of labor to enhance decision-making.

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Conflicts of interest

There are no conflicts of interest.

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