Original Article

Maternal and Neonatal Outcomes after Cesarean Section among Primigravid Postpartum Women Attending Kirkuk City Hospitals

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Abstract

Background: Globally, the incidence of cesarean section (CS) deliveries is increasing and it is becoming an important cause of concern. **Objectives:** This study aimed to find out the maternal and neonatal outcomes after CS among primigravid postpartum women attending maternity units in Kirkuk city hospitals, and to identify the relationship between maternal and neonatal outcomes with some demographical and reproductive characteristics. **Materials and Methods:** A quantitative descriptive study design was carried out from August, 2022 to May, 2023 included 200 primigravid postpartum women who delivered by CS at maternity units in Kirkuk city hospitals (Azadi Teaching Hospital, Kirkuk General Hospital, Maternity, Gynaecology, and Paediatric hospital). An interviewing questionnaire were used for collecting data. **Results:** Complication of anesthesia, severe anemia after CS, requiring blood transfusion, having post-partum hemorrhage, and wound infection were maternal complications. While neonatal complications following CS included the need for neonatal resuscitation, drug and/or intubation, low Apgar scores, the need for a neonatal intensive care unit, respiratory distress syndrome, low birth weight, perinatal asphyxia, stillbirth, meconium aspiration, congenital abnormalities, prematurity, and neonatal. There was significant relationship between maternal occupation and maternal outcome after CS at *P* value = 0.017. A strong and highly significant relationship was accounted between "Maternal and Neonatal Outcomes" at (*P* = 0.00). **Conclusions:** Apparently, there were several maternal and neonatal complications after CSs among primigravid postpartum, in addition strong relationship between maternal and neonatal outcomes.

Keywords: Cesarean section, Kirkuk city, maternal outcome, neonatal outcome, primigravid

Introduction

Cesarean section (CS) is one of the most common surgical procedures conducted by creating an incision in the mother's uterus and abdominal wall. According to the World Health Organization, the ideal CS rate is between 10% and 15%.[1]

Not only in Iraq but globally the incidence of CS deliveries is increasing and it is becoming an important cause of concern. According to surveys, the rate of CS in Kurdistan Region was 58.5%, whereas in the rest of Iraq it was 45.1%.[2] The most current study compared the rates of CS and vaginal deliveries from 2008 to 2018 at the Sulaimani maternity teaching hospital indicated that 31.4% of people had CS.[3]

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Although a CS is regarded as a life-saving procedure, there are a number of complications that may lead to increased rates of maternal death and morbidity. These include both short-term complications like anemia, organ damage, blood transfusion, infection, anesthesia-related complications, and thromboembolic diseases, as well as long-term complications like an increased risk of obesity and multiple pregnancy-related problems like

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uterine rupture, placenta previa, placenta accreta, intra-abdominal adhesions, and ectopic pregnancy.[4,5]

CS has a higher risk of maternal morbidity and death than vaginal deliveries and complicate the management of subsequent pregnancies, despite the fact that modern technology and facilities have made them extremely safe.[6]

Despite the city of Kirkuk having a high CS rate[2] and having many maternity departments in Kirkuk hospitals, there was no study regarding the maternal and neonatal outcomes after CS among primigravid women; therefore, this study was conducted to determine the maternal and neonatal outcomes after CS among primigravid women.

Research questions

The research questions of this study were as follows:

1. What are the maternal outcomes after CS?
2. What are the neonatal outcomes after CS?

Materials and Methods

Study design and patients

A quantitative descriptive study design was carried out from August 2022 to May 2023 included 200 primigravid women who were chosen by using the purposive sampling method at maternity units in Kirkuk city hospitals (Azadi Teaching Hospital, Kirkuk General Hospital, Maternity, Gynecology and Pediatric hospital), data were collected during 24 h after delivery by CS, the primigravid women were directly interviewed in the maternity units at the days when the researcher was attending the hospital (6 days/week) with different shifts.

After delivery, the weighing scale was used to determine the newborn's birth weight, and the Appearance, Pulse, Grimace, Activity, and Respiration (Apgar) scores were measured by the pediatrician. Abdominal ultrasound was evaluated to identify the gestational age and their hemoglobin level was checked to determine the anemia. The researcher made a follow-up, through the patients' phone numbers, for both the mother and newborn within a full week of the date of birth also giving the necessary information regarding the postpartum and neonatal daily care.

Women, who were primigravid and at least 28 weeks pregnant, were included in the study but it excluded women who were multi gravid and multipara. A structured questionnaire was constructed for the purpose of the study throughout the review of literature and background experience and field tested before using it to obtain the relevant data. A panel of experts evaluated the validity of the questionnaire (16 experts). Moreover, a pilot research was carried out to evaluate the validity of the questionnaire. By using Cronbach α, a reliability score of 0.75 was obtained which proved the questionnaire's internal consistency.

Statistical analysis

The Statistical Package for the Social Sciences (SPSS) version 26.0 (SPSS, IBM Company, Chicago, Illinois) was used for the statistical analysis. Both descriptive and inferential statistical methods were used. A P value ≤ 0.05 was considered statistically significant.

Ethical approval

The study was conducted in accordance with the ethical principles that have their origin in the Declaration of Helsinki. It was carried out with patients verbal and analytical approval before conducting the study. The study protocol and the subject information and consent form were reviewed and approved by a local committee on publication ethics at Kirkuk Health Directorate under the reference No. 1956/7/3 on October 31, 2022.

Results

Table 1 shows the socio-demographical characteristics of studied sample where the mean age ± standard deviation of the study participants was 23.62 ± 5.62, ranging from 15 to 44 years. About 42.5% of them were institute, college, and higher education graduates, more than half of the study participants were housewives, and 76.5% of them were from urban, 45.5% of women were high monthly income. The majority of the sample (80.5%) were ≥38 weeks in gestation, more than half were regularly attending the antenatal care of both private clinic and primary health care centers, and 47.0% of them were having anemia. Majority of women (93.5%) were taking iron/folic acid supplementation regularly from the 1st trimester.

Table 2 shows that the complication of anesthesia, severe anemia after CS, requiring blood transfusion, having postpartum hemorrhage, and wound infection were maternal complications.

Table 3 shows that the need for neonates resuscitation, drug &/or intubation, low Apgar score, need for neonatal intensive care unit, respiratory distress syndrome, low birth weight, perinatal asphyxia, stillbirth, meconium aspiration, congenital abnormalities, prematurity, and neonatal hypoglycemia were neonatal complications after CS.

Table 4 shows that there was no significant relationship between sociodemographic characteristics and maternal–neonatal outcomes except between occupation and maternal outcome after CS at P value = 0.017.

Table 5 shows a strong and highly significant relationship was accounted between "maternal and neonatal outcomes" at (P = 0.00).

Discussion

Despite the fact that pregnancy and labor are regarded as physiological processes, there are always the possibility of life-threatening issues developing quickly.[7]

Table 1: Distribution of socio-demographical characteristics and reproductive history of studied sample (n = 200)

Variables	Groups	Frequency	%
Maternal age in years	15-19	64	32.0
	20-24	55	27.5
	25-29	55	27.5
	30-34	16	8.0
	35-39	5	2.5
	40-44	5	2.5
	Mean ± SD	23.62 ± 5.62	
Level of education	Illiterate	6	3.0
	Read and write	6	3.0
	Primary school	66	33.0
	Intermediate school	19	9.5
	Secondary school	18	9.0
	Institute, college & higher education	85	42.5
Occupation	Housewife	119	59.5
	Employee	32	16.0
	Free work	26	13.0
	Student	23	11.5
Residence	Urban	153	76.5
	Rural	47	23.5
Monthly income	Sufficient	91	45.5
	Barely-sufficient	80	40.0
	Insufficient	29	14.5
Gestational age/weeks	<38	39	19.5
	≥38	161	80.5
Type of antenatal care	Not attending	7	3.5
	Private clinic/irregular attending	70	35.0
	Primary health care/irregular attending	4	2.0
	Both/regular attending	119	59.5
Anemia	No	106	53.0
	Yes	92	47.0
Taking iron/folic acid supplementation regularly when?	1st trimester	187	93.5
	2nd trimester	9	4.5
	3rd trimester	1	0.5
	Not taking	3	1.5

SD = standard deviation

Table 2: Distribution of studied maternal outcomes of studied samples

Maternal outcomes	Groups	No.	%
Need for maternal intensive care unit	No	200	100
	Yes	0	0.00
Puerperal sepsis	No	200	100
	Yes	0	0.00
Wound infection (surgical site infection)	No	188	94
	Yes	12	6.00
Postpartum hemorrhage	No	171	85.5
	Yes	29	14.5
Severe anemia	No	155	77.5
	Yes	45	22.5
Required a blood transfusion	No	163	81.5
	Yes	37	18.5
Breast feeding initiation	No	108	54.0
	Yes	92	46.0
Complication of anesthesia	No	113	56.5
	Yes	87	43.5

Table 3: Distribution of studied neonatal outcomes of studied samples

Neonatal outcomes	Groups	No.	%
Need for neonatal intensive care unit	No	74	37.0
	Yes	126	63.0
Stillbirth	No	195	97.5
	Yes	5	2.5
Prematurity	No	199	99.5
	Yes	1	0.5
Low birth weight	No	163	81.5
	Yes	37	18.5
Perinatal asphyxia	No	194	97.0
	Yes	6	3.0
Respiratory distress syndrome	No	127	63.5
	Yes	73	36.5
Neonatal hypoglycemia	No	199	99.5
	Yes	1	0.5
Low Apgar score	No	7	3.5
	Yes	193	96.5
Low Apgar score	1 min	7	3.5
	5 min	190	95.0
	10 min	3	1.5
Meconium aspiration	No	197	98.5
	Yes	3	1.5
Congenital abnormalities	No	198	99.0
	Yes	2	1.0
Resuscitation requiring drugs and/or intubation	No	68	34.0
	Yes	132	66.0

Table 4: Relationships between maternal outcomes, and neonatal outcomes with some socio-demographical characteristics variables (*N* = 200)

Variables	Relationships			
	Maternal outcomes		Neonatal outcomes	
	C.C.	*P*-value	C.C.	*P*-value
Maternal age per (years)	0.114	0.758 (NS)	0.102	0.835 (NS)
Education	0.167	0.332 (NS)	0.156	0.418 (NS)
Occupation	0.221	0.017 (S)	0.078	0.745 (NS)
Residency	0.002	0.977 (NS)	0.041	0.563 (NS)
Monthly income	0.037	0.872 (NS)	0.135	0.155 (NS)
Type of antenatal care	0.114	0.448 (NS)	0.150	0.205 (NS)

Table 5: Relationships among the reproductive history, maternal outcomes, and neonatal outcomes

Spearman's rho correlations		Maternal outcomes	Neonatal outcomes
Reproductive history	Correlation coefficient	-0.014	0.005
	Sig. (2-tailed)	0.845	0.949
	No.	200	200
Maternal outcomes	Correlation coefficient		0.249*
	Sig. (2-tailed)		0.000
	No.		200

*significance at $p = 0.000$ which is < 0.05

None of the studied samples in the present study needed an admission to the intensive care unit. A result of another study reported that many primigravida women were hospitalized in intensive care unit for non-obstetric reasons.[8] Also the puerperal sepsis among the study sample was absent. A study mentioned that just 32 individuals with sepsis were found among 3819 women who underwent cesarean delivery in this study, making the frequency of sepsis in these cases 0.84% overall.[9] The reason for absence for both the admission to maternal intensive care unit and puerperal sepsis may be attributed to the general culture of the participants and the high level of prenatal health care, the success of the operation, as well as the extent of and the post-operative care, or may be during the collection of the data, there was no cause to admission.

Surgical site infection is also a significant outcome of cesarean birth and a vital measure of patient care quality.[10] About surgical site infection in the present study just 6% of the women suffered from it, which is almost corresponding with the study that was conducted in Baghdad, in which the rate of surgical site infection post CS was 6.3%.[11] According to the researcher's opinion, the reason could be their knowledge about the signs and symptoms of early infections and their commitment to the instructions of the gynecologist and the health care staff.

In our study, the rate of postpartum hemorrhage among the study sample was 14.5%. A study conducted at Bulawayo, Zimbabwe, the incidence of postpartum hemorrhage (PPH) was 1.6%,[12] which is lower than that reported in the present study. About the anemia, 22.5% of mothers had severe anemia after CS. A study showed 29.09% as post CSs anemia.[13] It is worth mentioning that this rate of PPH and the post CSs anemia could be due to antenatal anemia among the participating women.[14,15]

Despite the risk involved, blood transfusion is still a life-saving procedure.[16] A blood transfusion required rate was 18.5%, which is almost close to the rate of a study which was (20.8%) of post cesarean women received blood transfusion.[17] Requirement for blood transfusion in women undergoing CS significantly contributes to preoperative anemia and blood loss at operation also emergency CS raising the probability of blood transfusion.[18]

More than two fifths of the sample in current study initiated breast feeding, and this result is close to a study which showed that almost 40.1% of newborns with CS initiated breastfeeding.[19] The mothers who underwent cesarean delivery declared that it was painful to hold or look for their infant, or to sit up and nurse, due to the surgical site.[20] General anesthesia and regional anesthesia are both used for cesarean birth in this study, and more than two fifths of the study sample have experienced the side effect from anesthesia. These side effects were explained as headache, post spinal anesthetic back pain, larynx pain, hypotension, and nausea which was consistent with the result of another study in which the side effects were close to what were founded in this study.[21]

During delivery, complications could arise that might require the transfer of the newborn to a neonatal intensive care unit. In the present study, more than two third of the newborns were admitted to the neonatal intensive care unit during the first 24 h of delivery. This result was proven by a study which reported results similar to what was mentioned in this study.[22] About 2.5% of all newborns were stillbirths, which is low if compared to another previous study where the percentage of stillbirths was 12.4%.[23]

In the present study, just one neonate was preterm (0.5%); this percent is low if it is compared to a study conducted in China where preterm births were (7.2%).[24] The reason for the low percentage of prematurity may be due to high antenatal care among the study participants, or there was no chance to report prematurity cases during data collection by the researcher. The rate of low birth weight infants in this study was 18.5%, where it corresponds to a previous study conducted in Yemen and the ratio was 18%.[25]

The rate of perinatal asphyxia in this study was 3.0%. And the reason for that was due to several indications of CS; breech presentation of fetus, cephalopelvic disproportion, prolonged obstructed labor, and fetal distress. This is low percentage if we compare it to a study reported (11.4%) of perinatal asphyxia.[22] In addition, newborns of primigravida women have a higher risk for asphyxia than multi gravida women, as well as type of CS, emergency CS causes perinatal asphyxia more than elective CS, and mothers who were anemic at the delivery time are more affected with perinatal asphyxia.[26]

The respiratory distress syndrome among neonatal in the present study (36.5%) may due to CS; both elective CS and emergency CS increase the risk of respiratory distress syndrome among neonatal, and some of them required respiratory support or oxygen therapy and others required admission in the neonatal intensive care unit.[27] The incidence of neonatal hypoglycemia in this study was 0.5% only which is a low rate if compared to previous study where the rate was 17.5%.[22] Although there was no medical history of diabetes among current study sample, neonatal hypoglycemia could be due to caesarean delivery or birth asphyxia.[28,29]

In this study, the prevalence of low Apgar scores was 95% at five minutes and the health staff continued to check them at ten minutes; again which showed only 1.5% of them had low Apgar score. These percentages are higher than what found in a study which 69.8% had high Apgar score at one minute whereas 91.2% had high Apgar score at five minutes and 12.8% had high Apgar

score at ten minutes.[30] The reasons for the low Apgar scores in current study may be due to having Caesarean delivery, fetuses' low birth weight, meconium stained amniotic fluid, general anesthesia, meconium aspiration, and birth asphyxia during caesarean delivery leading to low Apgar score.[31] In this study, the meconium aspiration was 1.5%, which is a low rate if compared with a previous study where the result was 6.25%.[32] The reason of having meconium aspiration in this study is oligohydramnios and fetal distress.[33]

In the present study, the prevalence of congenital malformations among the newborns was 1.0% lower than other studies from India that indicated incidence (2.22%).[34] In the current study, the genitourinary system and musculoskeletal system were involved with the pattern of congenital abnormalities. According to researcher's opinion, the lower percent of congenital abnormalities in the current study is due to the high rate of antepartum health care and regularly taking iron/folic acid. All newborns in this study at the first minute of live have received stimulation, warming, suctioning, measurement of height and weight, evaluating Apgar score, and cleaning. But more than half of them needed resuscitation and required a drug or oxygen because of prematurity low birth weight birth asphyxia respiratory distress syndrome neonatal hypoglycemia low Apgar score and meconium aspiration. The science of neonatal resuscitation is used to treat babies in the days following birth as well as neonates moving from the fluid-filled womb to the air-filled birthing room. The risk of death and morbidity is decreased by efficient newborn resuscitation. Even healthy newborns who are able to breathe on their own benefit from aiding in the natural transition, which includes proper cord management and temperature protection with skin-to-skin care.[35]

Occupation has significant relationship with maternal outcomes at P value of 0.017, which is lower than $P < 0.05$. This result agrees with a study result which showed a relationship between maternal employment and pregnancy outcomes as their participants were housewives.[36] Women occupationally exposed to gases may increase the risk of birth defects such as urinary tract defects, congenital heart defects, and congenital malformation, and also women may be exposed to all psychological and physical stress that can lead to bleeding and premature birth. Working in unclean environmental conditions may also cause exposure to infections.

There is no association between reproductive history and maternal-neonatal outcomes at $P > 0.05$; this is incompatible with studies that founded a relationship between reproductive history and maternal-neonatal outcomes which is in reverse with the result of the present study.[37,38]

A strong and highly significant relationship was accounted between "maternal and neonatal outcomes," at $P < 0.01$. Other few studies indicated a relationship between "maternal and neonatal outcomes" in their studies.[39,40] Mother's fatigue during labor before an emergency CS and the exposure to anesthesia during CS may lead to perinatal asphyxia and respiratory distress syndrome that needs a resuscitation requiring drugs and/or intubation as well as admission to neonatal intensive care unit; this is because the health of the mother is fully linked to the health of her fetus.

Criteria for inclusion

Women who were primigravid and at least 28 weeks pregnant were included in this study.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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