

Maternal and Newborn Outcome among Women Undergoing Elective versus Emergency Caesarean Section: A Comparative Study

Doaa Shehta Said Farag¹, Manar Fathy Heiba Eid Bakr², Heba Abd Elrehem mohamed Zedan³, Hanan Elzeblawy Hassan⁴, Somaia Ragab Eid⁴

1- Maternal and Newborn Health Nursing, Faculty of Nursing, Helwan University, Egypt

2- Maternity, Obstetrics and Gynecological Nursing, Faculty of Nursing, Port Said University, Egypt

3- Woman's Health and Midwifery Nursing, Faculty of Nursing Mansoura University, Egypt

4- Maternal and Newborn Health Nursing, Faculty of Nursing, Beni-Suef University, Egypt

Abstract

Caesarean section preferred as an emergency or elective procedure are entirely different entities according to the measures taken, facilities and skilled staff available, and preparation done. Complications are greater in emergencies compared with elective caesarean section. The aim of the present study was to compare maternal and neonatal outcomes among mothers undergoing elective versus emergency caesarean section. A prospective design was carried out for this study, and a representative sample of 300 parturient mothers (150 with elective CS and 150 with emergency CS) at the delivery unit in Mansoura University was recruited for this study. The tools used for data collection were; an interview questionnaire sheet, a clinical assessment form, the partograph, a summary of labor sheet, and a neonatal assessment sheet. Results: mothers who had emergency cesarean section were significantly in the young age category, i.e., below 25 years old, illiterate or could not read and write, and were housewives. Previous cesarean section was the most common indication among mothers undergoing elective CS, and the least common indication was diabetes mellitus. While fetal distress was the most common indication for emergency CS, the least common indication was cord presentation. There are no statistically significant differences in maternal intra-operative and postoperative complications of CS between the two groups. Apgar scores at the first and fifth minutes were lower, with the lowest mean birth weight among neonates of mothers with emergency CS than those in the elective CS group, with a statistically significant difference. Meanwhile, asphyxia was the major cause of fetal morbidity at birth. It can be concluded that, previous cesarean section was the most common indication among mothers undergoing elective CS. While fetal distress was the most common indication for emergency CS. There are no statistically significant differences in maternal intra-operative and postoperative complications of CS between the two groups. The study recommended reducing the higher incidence of emergency cesarean section because emergency cesarean section is associated with intra-operative and postoperative complications by improving the quality and availability of antenatal care services.

Key word: Maternal and neonatal outcome, Elective cesarean section, Emergency cesarean section

Introduction

Cesarean section (CS) is the worldwide process of pregnancy termination that delivers live or dead fetuses with an incision on the abdominal wall and uterine wall. In the last decades, cesarean sections have been proven to be a safe operation and have improved the parturition outcome (Prediger, et al., 2020). A cesarean section can be considered one of the earliest

forms of modern birth technology. The rate of cesarean sections has increased dramatically worldwide over the past three decades. The availability of wide-spectrum antibiotics, aseptic and antiseptic methods, safe anesthesia techniques, and blood transfusion facilities have all contributed to the dramatic decrease in maternal mortality seen during the last century

(Mazzoni, et al., 2016).

According to the World Health Organization's guidelines for optimal cesarean section rates, the best outcome for mothers and babies appears to occur with cesarean section rates of 5% to 10%. The use of cesarean sections has become increasingly controversial, and uncertainty exists about the relative risks and benefits to women. But cesarean sections have increased in frequency in many countries around the world in recent decades (Vogel, et al., 2015).

There is a large variation in the CS rates found across countries. The rate is 36% in Brazil, 40% in Chile, and 34.0% in Taiwan. And it is also about 17–40% in 19 countries in Latin America, 22.4% in Italy, 21.4% in the United Kingdom, and 26.1% in Turkey. In the United States, 23% in 1985, 25% in 1988, and, in 2017, 32% in Mauritania, were 5.3%. In Egypt, it was 22% in 2000. It was 34.3% in 2004 (WHO, 2015, Khawaja, et al., 2004).

Several factors have contributed to the rising cesarean rate: increased use of electronic fetal monitoring; increased use of cesareans for breech deliveries; complications such as diabetes and preeclampsia; dystocia; changing demographics of the mother; and decreasing use of forceps and vacuum extraction. As well as fear of litigation, reduced parity led to an increased number of nulliparous pregnant women and an increased maternal age, leading to an increased frequency of CS (Balachandran, et al., 2014).

Other factors include increased interventions before active labor establish fetal and maternal medical conditions; non-reassuring fetal heart rate testing; delay in childbirth and reduced parity; decreased perinatal mortality with cesarean delivery; routine repeated cesareans; and the safer the procedure became, the easier it was to make a decision to perform the operation (Diana & Tipandjan, 2016).

Cesarean sections could be classified differently according to the time of performance into elective and emergency cesarean sections. Elective cesarean section (a planned or scheduled cesarean section) (EICS) is defined as when the decision to deliver the baby by cesarean section has been made during the pregnancy and before the onset of labor, generally around 39 weeks of gestation. Indications of an elective caesarean section include: Cephalopelvic disproportion, or the low

transverse incision, is a side-to-side incision made in the lower, thinner part of the uterus that contracts minimally during labor. This incision is proportional to multiple pregnancies and has a major degree of placenta previa, pelvic tumor, and malpresentation (Maskey, et al., 2019).

An emergency cesarean section (unplanned, selective) is performed when adverse conditions develop during labor. Indications of an emergency caesarean section include cord prolapse, uterine rupture, eclampsia, failure to progress in the first or second stage of labor, and fetal distress (McCourt, et al., 2011). The nurse's role is crucial in preventing complications and assessing patient needs at the hospitals because she stays with the patient 24 hours per day, which is why she should have sound knowledge of medical management and nursing care of the women during the pre- and post-operative periods. Furthermore, the nurse is in a key position to educate others and influence many aspects of the care provided to the women undergoing cesarean sections and their families.

Significance of the study:

High cesarean delivery rates have become a public health concern throughout the world. Considerable care is still required to maintain and improve rates of maternal and neonatal morbidity and mortality. The average cesarean rate worldwide is about 25%, while in Egypt it was 22% in 2000. It was 34.3% in 2004. Cesarean section, as with any surgical intervention, is associated with increased mortality and morbidity, both maternal and neonatal. Thus, the assessment of maternal and neonatal outcomes in elective and emergency cesarean sections is deemed necessary to reduce the mortality and morbidity risks that might be encountered among mothers and their neonates.

Aim of the Study

The aim of this study was to compare maternal and neonatal outcomes among mothers undergoing elective versus emergency caesarean sections.

Objectives:

1. To identify indications for elective and emergency cesarean sections.
- 2: To establish comparisons between elective and emergency cesarean sections regarding intraoperative and postoperative complications among mothers and their neonates

Research questions

1. What are indications of elective and emergency cesarean sections?
2. What are intraoperative and postoperative complications among maternal patients undergoing elective and emergency caesarean sections and their neonates?

Subject and Method:

Design: A prospective design was used for the determination of elective and emergency cesarean sections regarding intraoperative and postoperative complications among women and their neonates.

Research Setting:

This study was conducted at the delivery unit at Mansoura University, Egypt. This ward is affiliated with the department of obstetrics and gynecology during the period from December 1, 2022, until the end of April 20, 2023.

Sample:

A sample was selected for this study, namely a sample of parturient mothers. The sampling population consisted of all mothers coming for delivery, undergoing CS, and attending the study settings. The sample size was taken according to the statistical equation, with confidence interval (CI = 95%), power = 80%, and odds ratio (G2/G1 = 1). A total of 300 parturient women (150 with elective CS and 150 with emergency CS) were randomly recruited for this study with the

Inclusion criteria:

Maternal undergoing cesarean section with gestational age 37 weeks

Exclusion criteria

Maternal who underwent normal delivery

Tools for data collection

- 1: An interviewing questionnaire was used to collect data from parturient women in both groups. It included personal, medical, family, and obstetrical history such as age, presence or absence of the following: hypertension and diabetes mellitus; parity; types of previous deliveries; and spacing between deliveries.
- 2: Clinical assessment form "on admission to labor room," which includes the findings of: general examination, such as maternal vital

signs; abdominal examination to determine fetal heart rate; and evaluation of the uterine contractions' frequency, length, and force. Ultrasonography: to assess the gestational age, fetal viability, fetal weight, presentation, etc.

- 3: Partograph: This was used for mothers who had emergency cesarean sections to evaluate maternal and neonatal conditions as well as labor progress during the active phase of the first stage of labor.
- 4: Record used for labor; entails data about the type of cesarean section, whether elective or emergency, and indications of cesarean section. As well as included data about maternal postnatal problems such as postpartum hemorrhage and hysterectomy. Evaluation of neonatal conditions and neonatal complications, such as the need for resuscitation

Administrative considerations

Official permission was obtained by the submission of an official letter from the Faculty of Nursing to the responsible authorities of the study setting to obtain permission for data collection.

Ethical Considerations

Ethical approval was obtained from the Research Ethics Committee at the Faculty of Nursing at Mansoura University (Ref. No: 0484). For privacy and confidentiality, all moral issues were taken into account. Consents were obtained from the women participating in the study after a brief explanation of the study's aim, and they were reassured that the information obtained would be private and used only for the study, with their right to withdraw at any time without any consequence. The subject of this study will not address religious, ethical, moral, or cultural issues among women.

Pilot Study:

The pilot study was carried out on 20 women in the study setting who were excluded from the study sample to test the applicability and clarify the feasibility of the study tools and to estimate the time needed to complete the tools. It was also beneficial to identify any challenges and issues that would prevent the collecting of data. A few changes to the tools were made based on the results of the pilot research. Following this pilot study, the process of data collection was performed.

Field work:

Data was collected from the 1st of December 2022 to the end of April 2023. After getting official permission, pilot testing of the study tools was done and analyzed. The investigator started the data collection three days per week. I approached them, explained to them the purpose of the study, and obtained their written consent. Maternal were notified that they could withdraw at any stage of the research; the researcher started to collect data through two phases:

Interviewing Phase

The investigator attended the labor unit at the study setting three days per week for six months. All mothers in both groups were interviewed to collect data related to sociodemographic characteristics, present medical history, family history, and obstetric profile. A personal interview was done at the delivery unit for both groups, and it took 25 minutes for each one.

Assessment Phase:

Assessment Phase: The investigator, together with the on-duty physician, started the examination of the parturient mother.

Regular assessment of the maternal and neonatal conditions started immediately after admission to the labor and delivery unit by measuring vital signs and carrying out general, local abdominal and pelvic examinations. The investigations required were done. Neonatal conditions were assessed using the Cardio-Toco graph. Care was provided to the mother during this stage, and pertinent data was recorded. Medical records for mothers with previous cesarean sections were obtained and reviewed in detail to obtain data pertaining to the operative report and discharge summaries. This revealed the date, number, type, and indication of the previous CS, as well as whether there was a history of previous vaginal delivery or not.

Fetal monitoring by CTG was done for each studied woman throughout labor by the investigator, under the supervision of the on-duty obstetrician to manage any problem that happened, such as non-reassuring fetal heart rate patterns.

The type of cesarean section, the duration, and the condition of the mother during labor were also assessed. Neonatal assessment was done by measuring the Apgar score and finding any abnormalities. These data were recorded in the

summary of labor and neonatal sheets.

Statistical analysis

The data collected was processed and analyzed using the statistical package for social science (SPSS) version 20. Quantitative data was expressed as means SD, while qualitative data was expressed as numbers and percent. The student t-test was used to test the significance between quantitative variables, while the Chi square and Fisher's exact tests were used to test the significance between qualitative variables. For all statistical tests done, the threshold of significance was fixed at the 5% level (p-value).

P value = level of significance:

$P > 0.05$ à insignificant

$P \leq 0.05$ à significant

$P \leq 0.001$ (highly significant)

The smaller the p-value obtained, the more significant the result, with the p-value being the probability of error of the conclusion.

Results

Table 1 describes the distribution of the studied mothers according to their socio-demographic characteristics. Mothers who had emergency cesarean sections were significantly younger than 25 compared to women who had elective cesarean sections (54.0% vs. 31.3%, respectively). The table also points out statistically significant differences between the two groups regarding education and job status. Thus, women who had emergency CS tend to be illiterate or can read and write and are housewives compared to women with elective CS (55.3% vs. 46.0% and 86.7% vs. 54.7%, respectively).

Table 2 points out statistically significant differences between the two groups as regards their mean number of gravidity and parity. It is evident that the emergency CS group had a lower mean number of gravida and para (2.2 1.3 and 2.1 1.0, respectively) compared to women who had elective CS (2.4 ±1.5 and 2.7±1.2, respectively). Regarding the history of abortion, the emergency CS group was more likely to have had a previous abortion (64.4%) compared to the elective CS group (31.3%), and the differences observed were statistically significant.

Table 3 points to statistically significant differences between the two groups as regards the mode of previous deliveries. It is evident that the highest percentage (75.6%) of elective CS patients had previous CS, in contrast to the 35.6%) of

women who had emergency CS. Regarding the indications of previous CS, it was obvious that previous cesarean sections accounted for two-fifths (42.4%) of women in the elective CS group versus none in the emergency CS group. Meanwhile, mal-presentation and failed induction of labor were present in 52.3% and 26.2% of women in emergency CS, compared to 33.3% and 8.1% of women in the elective cesarean section group. The differences observed are statistically significant. As for history of pelvic surgery (9.3%), women who had elective CS had a positive history of pelvic surgery compared to only 5.3% of women who had emergency CS, with statistically significant differences.

Table 4 clarifies that there are no statistically significant differences between the two groups as regards their gestational age. It is evident that the gestational age ranged between 37 and 40 weeks in 88.0 percent of women who had emergency CS compared to 92.0 percent of women who had elective CS. As regards antenatal care received, the majority (94.0%) of women in elective CS had received antenatal care, in contrast to 82.7% of women in emergency CS, with statistically significant differences. Meanwhile, the majority (83.7%) of women who had elective CS had ideal antenatal care, compared to 66.1% of women who had emergency CS. Concerning hospitalization during pregnancy, nearly one quarter (11.3%) of women who had elective C/S were hospitalized during pregnancy, compared to 4.0% of women who had emergency C/S. The differences observed are statistically significant.

Table 5 reveals the current indications for cesarean sections among women undergoing elective CS cesarean sections. It is evident that previous cesarean section was the most common indication, with the highest percentage (50.0%), followed by pre-eclampsia (12.0%) and malpresentation (7.3%). Cephalopelvic disproportion and a large fetus accounted for 6.7% and 4.7% of indications, respectively. The least common indications were diabetes mellitus (3.3%), postdate (2.0%), and congenital anomalies (0.6%).

Table 6 points to current indications for emergency cesarean sections among women. It is obvious that fetal distress was the most common indication, with the highest percentage (28.0%), followed by malpresentation (20.7%)

and failure of labor progress (18.0%). The table also shows that failed induction of labor and abruptio placenta accounted for 14.0% and 6.7% of the indications, respectively. The least common indications were cord presentation (4.0%) and twin pregnancy (3.3%).

Table 7 shows the distribution of studied women according to intraoperative complications of CS. Women who had emergency CS were more likely to have postpartum hemorrhage (10.7%), respiratory complications (4.7%), extension of the uterine incision (4.0%), and injury of the bladder (3.3%) compared to women who had elective CS (5.3%, 1.3%, 2.6%, and 1.3%, respectively). The differences observed were not statistically significant.

Table 8 points Post-operative complications were higher in emergency caesarean sections compared to elective caesarean sections. Postpartum hemorrhage is the most common, followed by wound infection, in emergency group compared to 4.0% and 2.0%, respectively, of women who had elective CS.

Table 9 points to statistically significant differences between the two groups as regards their APGAR scores at the 1st and 5th minutes. It is evident that the emergency CS group had a lower mean APGAR score at the 1st minute (6.8 ± 1.2) and 5th minute (7.6 ± 1.5) compared to women who had elective CS (7.5 ± 1.6 and 8.3 ± 1.9 , respectively). In addition, the newborns of women with emergency C-S were more likely to have the lowest mean birth weight (2.5 ± 0.52) compared to those in the elective C-S group (3.1 ± 0.47). Also, the difference observed was statistically significant.

Table 10 presents the distributions of the studied women according to neonatal complications. It is obvious that the newborns of women in the emergency CS group had a higher percentage of asphyxia (7.3%) compared to 2.0% in the newborns of women in elective CS. Also, they were significantly more likely to be admitted to the NICU (10.7%) and have a need for resuscitation (9.0%) compared to those in the elective CS group (1.3% and 2.0%, respectively).

Table (1): Distribution of the Studied Mother According to general characteristics (n=300).

	Elective C.S (n=150)		Emergency C.S (n=150)		Test	P-value
	No	%	No	%		
Age						
< 25 years	47	31.3	81	54.0	X ² =24.7	0.000**
25-	84	56.0	66	44.0		
35+	19	12.7	3	2.0		
Mean ± SD	26.8 ± 5.3		25.7 ± 4.3		t=5.6	0.000**
Education						
Illiterate and read write	69	46.0	83	55.3	X ² =14.3	0.001**
Primary school	12	8.0	9	6.0		
Secondary school	56	37.3	51	34.0		
University	13	8.7	7	5.8		
Job status						
House wife	82	54.7	130	86.7	X ² =18.0	0.000**
Working	68	45.3	20	13.3		

** P < 0.01

Table (2): Distribution of the studied women according to their obstetrical history, the mode of previous delivery, indications of previous cesarean section

Variables	Elective C.S (n=150)		Emergency C.S (n=150)		X2	P
	No	%	No	%		
Gravidity						
Primigravida	19	12.7	32	21.3	9.14	0.002**
2-3	101	67.3	97	64.7	0.06	0.86
4+	30	20.0	21	14.0	10.9	0.000**
Mean ± SD	2.4 ± 1.5		2.2 ± 1.3		t=5.5	0.000**
Parity						
Para 0	19	12.7	32	21.3	9.14	0.002**
Para 1	10	6.7	26	17.3	14.81	0.000**
2	27	18.0	24	16.0	0.24	0.000**
3+	94	62.7	68	45.3	6.47	0.01*
Mean ± SD	2.7 ± 1.2		2.1 ± 1.0		t=2.59	0.011*
Abortion^u	(n=131)		(n=118)			
Negative	90	68.7	42	35.4	10.2	0.001*
Positive	41	31.3	76	64.4		

** P < 0.01

* P < 0.05

^u Not applicable for primigravida women

Table (3): Distribution of the studied women according to the mode of previous delivery, indications of previous cesarean section and history of pelvic surgery (n=300)

Variables	Elective C.S (n=150)		Emergency C.S (n=150)		Test	P
	No	%	No	%		
Mode of previous deliveryⁿ	(n=131)		(n=118)		46.11 [^]	0.000**
Vaginal	32	60.0	76	64.4		
Cesarean section	99	40.0	42	35.6		
Indications of previous C.S	(n=99)		(n=42)		67.3 [^]	0.000**
Previous cesarean section	42	42.4	0	0.0		
Mal-presentation	30	33.3	22	52.3		
Cephalopelvic disproportion	3	3.0	0	0.0		
Failed induction of labor	8	8.1	11	26.2		
Preeclampsia	2	2.0	7	16.7		
Fetal distress	3	3.0	4	9.5		
Twins	5	5.0	0	0.0		
Ante partum hemorrhage	2	2.2	0	0.0		
Others	4	4.0	0	0.0		
History of pelvic surgery(n=150)					4.19	0.014*
Negative	136	90.7	142	94.7		
Positive	14	9.3	8	5.3		

[^] P value based on Mont Carlo exact test

** P < 0.01

* P < 0.05

ⁿ Not applicable for Primigravida women**Table (4):** Distribution of the studied women according to current pregnancy (n= 300)

Current pregnancy	Elective C.S (n=150)		Emergency C.S (n=150)		Test	P
	No	%	No	%		
Gestational age					X ² = 0.46	0.49
37-40 weeks	138	92.0	132	88.0		
> 40 weeks	12	8.0	18	12.0		
Antenatal care received (ANC)					X ² =11.7	0.001**
Yes	141	94.0	124	82.7		
No	9	6.0	26	17.3		
Number of ANC visits	(n=141)		(n=124)		X ² =3.6	0.063
Un ideal	23	16.3	42	33.9		
Ideal	118	83.7	82	66.1		
Hospitalization during pregnancy					X ² =16.5	0.000**
Yes	17	11.3	6	4.0		
No	133	88.7	144	96.0		

** P < 0.01

Table (5): Distribution of the studied women according to indications for elective cesarean section (n=150)

Indications	No.	Percent
Previous cesarean section	75	50.0
Large fetus	7	4.7
Antepartum hemorrhage	8	5.3
Pre eclampsia	18	12.0
Malpresentation	11	7.3
Cephalopelvic disproportion	10	6.7
Post date	3	2.0
Twins	6	4.0
Congenital anomalies	1	0.6
Diabetes Mellitus	2	3.3
Others	9	6.0

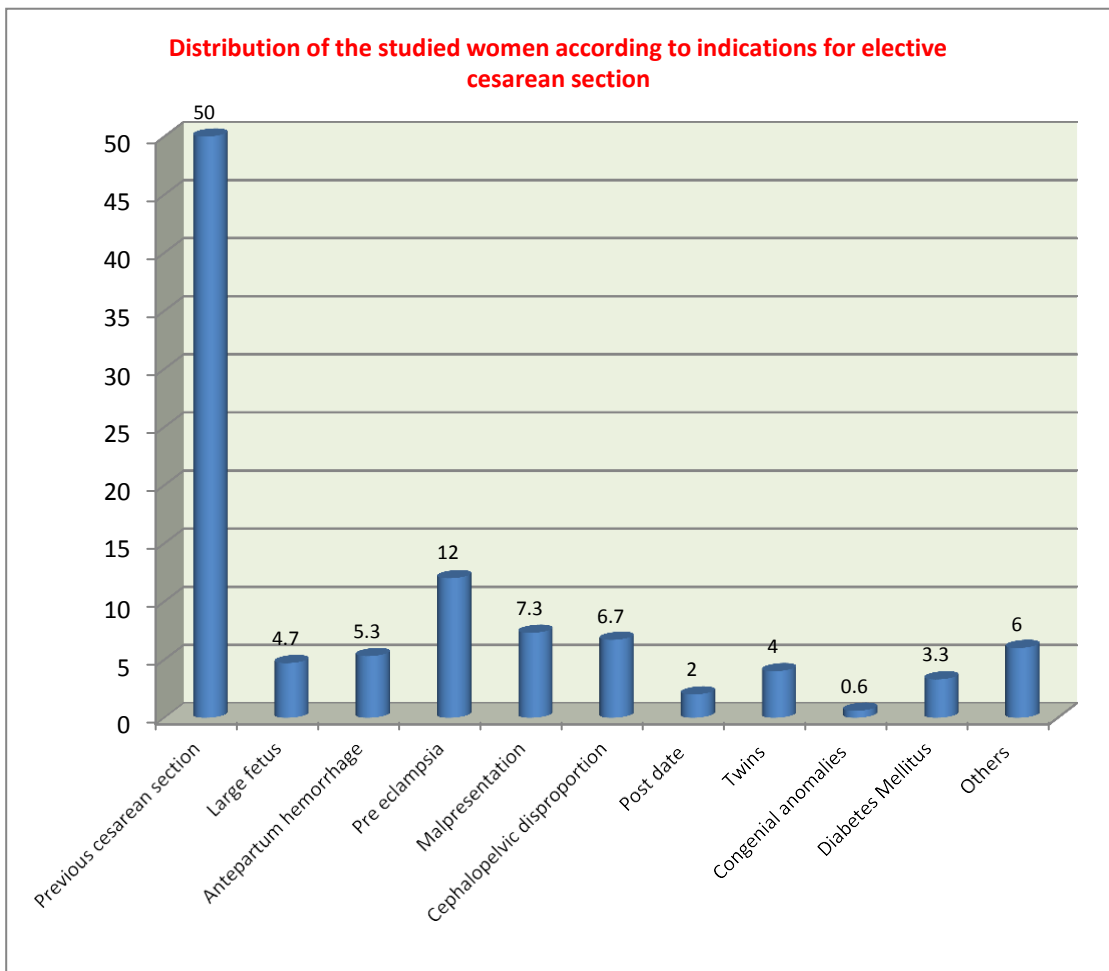
*Figure (1): Distribution of the studied women according to indications for elective cesarean section*

Table (6): Distribution of the studied women according to indications for emergency cesarean section (n=150)

Indications	No.	Percent
Fetal distress	42	28.0
Mal-presentation	31	20.7
Failure of labor progress	27	18.0
Failed induction of labor	21	14.0
Abruptio Placenta	10	6.7
Cord Presentation	6	4.0
Twins pregnancy	5	3.3
Others	8	5.3

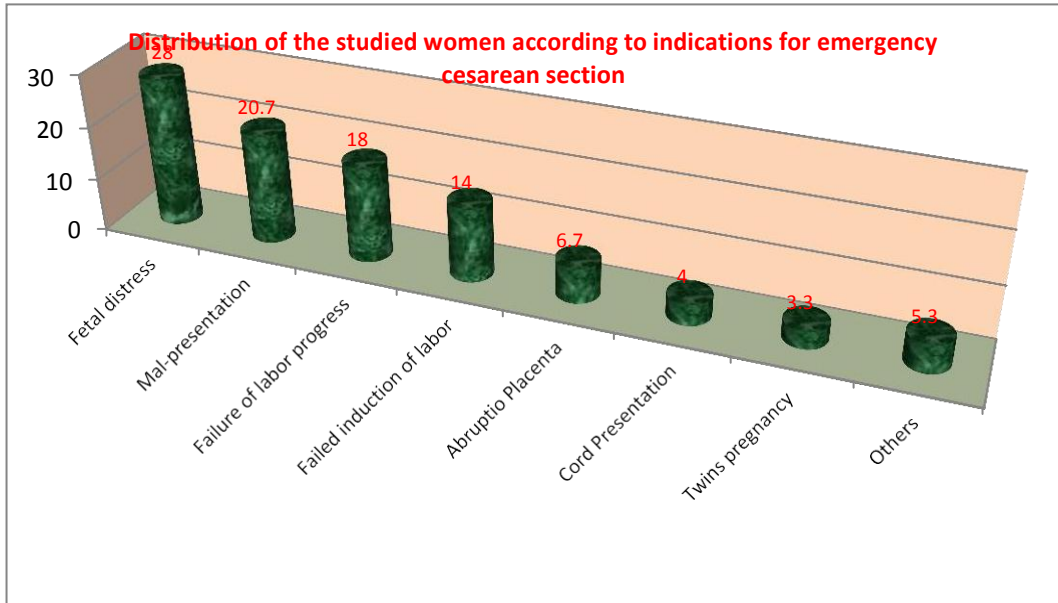


Figure (2): Distribution of the studied women according to indications for emergency cesarean section

Table (7): Distribution of the studied women according to intra-operative complications of cesarean section (n=300)

Intraoperative complications	Elective C.S (n=150)		Emergency C.S (n=150)		X2	P
	No	%	No	%		
None	134	89.3	116	77.3	5.7 [^]	0.078
Post-partum hemorrhage	8	5.3	16	10.7		
Extension of uterine incision	4	2.7	6	4.0		
Injury of the bladder	2	1.3	5	3.3		
Respiratory complication	2	1.3	7	4.7		

[^] P value based on Mont Carlo exact test

Table (8): Distribution of the studied women according to postoperative complications of cesarean section (n=300)

Post-operative complications	Elective C.S (n=150)		Emergency C.S (n=150)		Test	P
	No	%	No	%		
None	136	90.7	116	77.3	5.22 [^]	0.174
Postpartum hemorrhage	6	4.0%	14	9.3		
Wound infection	3	2.0	11	7.3		
Puerperal pyrexia	1	0.6	5	3.3		
Urinary tract infection	2	1.3	3	2.0		
Hysterectomy	1	0.6	0	0.0		
Wound dehiscence	2	1.3	0	0.0		
Maternal death	0	0.0	1	1.3		

[^] P value based on Mont Carlo exact test

Table (9): Distribution of the studied women according to neonatal outcomes (n=300)

Neonatal assessment	Elective C.S (n=150)		Emergency C.S (n=150)		Test	P
	No	%	No	%		
Apgar score at 1 min					30.5 [^]	0.000*
< 4	1	0.7	3	2.0		
4-6	17	11.3	45	30		
7+	132	88.0	102	68		
Mean ± SD	7.5 ± 1.6		6.8 ± 1.2		Z = 8.5	0.000*
Apgar score at 5th minutes					19.7 [^]	0.000*
< 4	0	0.0	1	0.7		
4-6	4	2.7	31	20.7		
7+	146	97.3	118	78.7		
Mean ± SD	8.3 ± 1.9		7.6 ± 1.5		Z = 11.6	0.000*
Birth Wight					24.9 [^]	0.000*
< 2.5 kg	22	14.7	42	28.0		
2.5-3.5 kg	120	80.0	105	70.0		
>3.5 kg	8	5.3	3	2.0		
Mean ± SD	3.1 ± 0.47		2.5 ± 0.52		Z = 31.2	0.000*

[^] P value based on Mont Carlo exact test * P < 0.05 (significant)

Table (10): Distribution of the studied women according to neonatal complications (n=300)

Neonatal complications	Elective C.S (n=150)		Emergency C.S (n=150)		Test	P
	No	%	No	%		
None	139	92.7	110	73.3	X ² = 18.1	0.001**
Asphyxia	3	2.0	11	7.3		
Sepsis	2	1.3	6	4.0		
Need for resuscitation	3	2.0	9	6.0		
Admission to NICU	2	1.3	10	6.7		
Neonatal death	1	0.6	4	2.7		

** P < 0.01

Discussion:

A cesarean section has been one of the most widely used procedures. Cesarean section rates have increased dramatically in recent years regardless of maternal age, race, or number of babies; improved anesthetic techniques and antiseptic procedures have revolutionized obstetric practice (Aaisha, et al., 2018).

Among factors that may affect the type of CS are the sociodemographic characteristics of the mother, such as age, educational level, and job status. It is also affected by the maternal obstetrical profile. The present result shows that mothers who had emergency cesarean section were significantly in the young age category, i.e., below 25 years old. These findings are in agreement with Renuka and Suguna (2017) in Mamata's study about a comparative study of maternal and fetal outcomes in patients undergoing elective or emergency caesarean section, who reported that emergency C-section rates were more common in the age group of 18–24 years than elective C-section.

On the same line, Thakur et al. (2015), in their study about " Study of maternal and fetal outcome in elective and emergency cesarean section," It is accepted that older mothers tend to have more previous CS, which may necessitate elective CS. On the other hand, this may indicate attending an obstetrician to allow vaginal deliveries in younger women to preserve their future reproductive performances and only resorting to CS when there is a threat of danger to the mother or her baby.

Concerning education and job status, the results of this study point to a statistically significant difference between the two groups; it is evident that more than one-half of mothers with emergency CS were illiterate or could read and write, compared to nearly one-fourth of mothers with elective CS. They also had a higher percentage of housewives.

These present study findings relate to education and job status. These findings were corroborated by Lee et al. (2010) in South` Korea, who have pointed to some associations between the rates of cesarean section and the level of education and job status.

On the same line, Thakur et al. (2017), in their study about "The Study of Maternal and Fetal

Outcome in Elective and Emergency Cesarean Section," accepted that older mothers tend to have more previous CS, which may necessitate elective CS. On the other hand, this may indicate attending an obstetrician to allow vaginal deliveries in younger women to preserve their future reproductive performance and only resorting to CS when there is a threat of danger to the mother or her baby.

Concerning education and job status, the results of this study point to a statistically significant difference between the two groups; it is evident that more than one-half of mothers with emergency CS were illiterate or could read and write, compared to nearly one-fourth of mothers with elective CS. They also had a higher percentage of housewives. These present study findings relate to education and job status. These findings were corroborated by Lee et al. (2010) in South` Korea, who have pointed to some associations between the rates of cesarean section and the level of education and job status.

The great majority of emergency caesarean section in the present study had previous abortions, compared to less than one-third of the elective CS group. This underscores the importance of providing quality antenatal and postnatal care to this group. These findings were corroborated with those reported by Rajaei et al. (2010) in Iran in a study about " The Effect of Maternal Age on Pregnancy Outcome.

Concerning the history of previous labors, the highest percentage of elective CS groups in the present study had previous CS, in contrast to less than two fifths (3.6%) of emergency CS groups. This figure is very close to that revealed by Daniel et al. (2014) in their studies about the study of maternal outcomes of emergency and elective caesarean section in a semi-rural tertiary hospital, who stated that most elective caesarean sections were done for previous caesarean sections compared to less than two tenths of emergency CS group.

Regarding antenatal care antenatal care received: the majority of women in elective CS had received ideal antenatal care in contrast to women in the emergency CS group, compared to 4.0% among the emergency CS group. This finding is quite alarming given the importance of such services for safe motherhood and childbirth. Similarly Oluwarotimi et al. (2014) in Lagos, Nigeria, found

that the mean total antenatal care visits were lower among emergency CS women than the elective CS group. This underscores the importance of providing quality antenatal and postnatal care to this group. These might be due to the fact that CS is not a common cultural concept among most mothers. Meanwhile, nearly one-fourth of the elective CS group in the present study was hospitalized during pregnancy, compared to 4.0% of women who had emergency C/S. The differences observed are statistically significant. Similar findings were reported by Sowmya and Dutta (2014) in a rural medical college hospital in their study about the comparative study of neonatal outcome in caesarean section done in referred cases vs. elective caesarean delivery.

Conversely, Karlstrom et al. (2013) in Swedish show no statistically significant difference in the mean hospital stay during the antenatal period between the two groups.

According to the present study findings, the common indications for elective CS were previous cesarean section indications, pre-eclampsia, and malpresentation. cephalopelvic disproportion and large fetus, diabetes mellitus, postdate, and congenital anomalies While in the emergency group, the major indications were fetal distress, malpresentation, failure of labor progress, and failed induction of labor.

These findings are congruent with those of Naeem et al. (2017), who reported that the common indications for elective CS were previous cesarean section, pre-eclampsia, and plus eclampsia, while in the emergency group, the major indications were fetal distress, failed induction of labor, and failure of labor progress. On the contrary, Daniel et al. (2016) have reported that the most common indications for emergency CS were prolonged obstructed labor and pre-eclampsia, while the least common indications were fetal malpresentation and breech at term.

The present study reveals no statistically significant differences between the two groups as regards intra-operative and post-operative complications of CS. The most common intra-operative complications were postpartum hemorrhage and respiratory complications in emergency CS, and the most common post-operative complications of CS were postpartum hemorrhage and wound infection in emergency CS;

On the same line, Santhanalakshmi et al. (2015) stated that intraoperative complications were mainly primary hemorrhage and respiratory distress. This was supported by Agrawal and Agarwal (2018) in India, who revealed that the risk of postpartum hemorrhage was greater in women who had emergency CS as opposed to elective cesarean section.

This is in coherence with Garima et al. (2019) in Bangaluru, India, who reported that there were no statistically significant differences between elective and emergency section in the maternal intra-operative and postoperative complications in the compared groups.

These findings may be attributed to the improved aseptic and antiseptic techniques, the increased safety of blood transfusion, and the use of antibiotics, which have made it a safe procedure. Conversely, Burshan et al. (2015) in Libya stated that intra-operative and postoperative complications of CS in emergency CS were higher than in the elective CS group, and the difference was statistically significant.

As regards neonatal outcome, the mean Apgar score at the first and fifth minutes was lower, with the lowest mean birth weight among neonatal women with emergency CS compared to those in the elective CS group, with a statistically significant difference. These results are similar to those of Foumane et al. (2014), who mentioned a statistically significant difference in the mean APGAR score at the 1st and 5th minutes between newborns of elective and emergency CS groups. Furthermore, the present result is in line with Abdissa et al. (2013), who mentioned that fetal demographic characteristics such as fetal weight, fetal malformations, and pre-operative fetal heart rate have also been linked to low APGAR.

Concerning neonatal complications, the emergency caesarean section had more neonatal complications as compared to the elective caesarean section, with a statistically significant difference. Similarly, Najam and Sharma (2013) in North India observed that the perinatal morbidity was comparatively greater in the emergency CS group in their study about mother and fetal outcomes in elective and emergency caesarean sections at a teaching hospital. Poor fetal outcomes may be attributed to malpresentation, fetal distress, and prolonged labor. The major cause of fetal morbidity was birth asphyxia. These facts were also found in

Nyirahabimana et al. (2017).

Conclusion

According to the findings, it can be concluded that:

Maternal patients who had emergency cesarean section was significantly in the young age category, i.e., below 25 years old, illiterate or could read and write, and were housewives. Previous cesarean section was the most common indication among mothers undergoing elective CS, and the least common indication was diabetes mellitus. While fetal distress was the most common indication for emergency CS, the least common indication was cord presentation. There are no statistically significant differences in maternal intra-operative and postoperative complications of CS between the two groups. Apgar scores at the first and fifth minutes were lower, with the lowest mean birth weight among neonates of mothers with emergency CS than those in the elective CS group, with a statistically significant difference. Meanwhile, asphyxia was the major cause of fetal morbidity at birth.

Recommendations:

On the basis of the most important findings of the study, the following recommendations are suggested:

1. Avoiding unnecessary cesarean section can be achieved through educational efforts and encouraging the trial of labor after cesarean section. As well as the attendance of pediatric staff to provide care needed for neonates in emergency CS.
2. Reduced higher incidence of emergency cesarean section because emergency cesarean section is associated with intra-operative and
3. Postoperative complications can be prevented by improving the quality and availability of antenatal care services, proper and updated training of health personnel for better management, and timely referral.
4. The concept of quality care should always be emphasized in nursing curricula and in service training programs and should be applied to women with cesarean deliveries to improve nursing practice and increase maternal satisfaction.

References

- Aaisha A., Uzair A., Rubeena Z., Ahmed U., and Zakar Z, and Muhammad & Forian F(2018) : Factors associated with Caesarean deliveries among childbearing women in Pakistan: Secondary analysis of data from the demographic and health survey. *BMC Pregnancy and Childbirth* 18.10.1186/s12884-018-1743-z.
- Abdissa Z., Awoke T., Belayneh T., Tefera Y. (2013): Birth outcome after caesarean section among mothers who delivered by caesarean section under general and spinal anesthesia at Gondar University teaching hospital north-west . Ethiopia. *J Anesth Clin Res.*; 4(7): 4–8.
- Agrawal S., and Agarwal V. (2018): Maternal and fetal outcome in emergency versus elective caesarean section . *International Journal of Reproduction, Contraception, Obstetrics and Gynecology al. Int J Reprod Contracept Obstet Gynecol.*;7(12):4845-4848 www.ijrcog.org. 7(12): 4846.
- Balachandran L., Vaswani P.R., Mogotlane R. (2014): Pregnancy outcome in women with previous one cesarean section. *J Clin Diagn Res.*; 8:99–102.
- Batieha A.M., Al-Daradkah S.A., Khader Y.S., Basha A., and Sabet F. (2017): Cesarean section: Incidence, causes, associated factors and outcomes: A national prospective study from Jordan. *Gynecol Obstet Case Rep.*, 3(3): 55
- Burshan M. N., Abusnena O., Alhamdi R. M., Oommen S. El Heggiagi M .A. (2019): Emergency caesarian section among Libyan women at Khaddar hospital, Tripoli, Libya.; *IOSR-JDMS* 2015; 14(1): 20-22.
- Daniel C.N., and Singh S. (2016): Caesarean delivery: An experience from a tertiary institution in north western Nigeria; 19(1):1-7
- Daniel S., Vishwanathan M., Simi B.N., and Nazeema A. (2014): Study of maternal outcome of emergency and elective caesarean section in a semi rural tertiary hospital. *Nat J Med Res* 2; 1: 14-18

- Diana V., Tipandjan A. (2016): Emergency and elective caesarean sections: Comparison of maternal and fetal outcomes in a suburban tertiary care hospital in Puducherry. *Int J Reprod Contracept Obstet Gynecol* 5:3060–3065
- Foumane P., Mando E., Mboudou E.T., Sama J.D., Pisho W.D., Minkande J.Z. (2014): Outcome of cesarean delivery in women with excessive weight gain during pregnancy. *Open J Obstet Gynecol.*; 4(3): 139.
- Garima N., Padmalatha V., and Shubha R. (2019) : Maternal and fetal outcomes in emergency versus elective cesarean sections at a Tertiary Healthcare setting in Southern India: A Prospective observational Study . *Journal of South Asian Federation of Obstetrics and Gynaecology*, ;10(Suppl 2): 413-418. Sections at a Tertiary Healthcare Setting. Bangalore, India.
- Karlstrom A., Lindgren H., and Hildingsson I. (2013): Maternal and infant outcome after caesarean section without recorded medical indication: findings from a Swedish case-control study. *Br J Obstet Gynecol*; 120: 479-486
- Khawaja M., Jurdi R., Khasholian T., and Khasholian (2004): Rising trends in cesarean section rates in Egypt. *Bright issues in perinatal care*. 31(1): 12-16. <https://doi.org/10.1111/j.0730-7659.2004.0269.x>
- Lee S.I., Khang Y.H., Yun S., and Jo M.W. (2010): Rising Rates, Changing Relationships: Cesarean section and its correlates in South Korea. *BJOG*; 112 (6): 810-9.
- Maskey S., Bajracharya M., and Bhandari S. (2019): Prevalence and indication of elective and emergency caesarean section in a Tertiary Care Hospital. *J Nepal Med Assoc* ; 57(216).
- Mazzoni A., Althabe F., and Gutierrez L. (2016): Women's preferences and mode of delivery in public and private hospitals: a prospective cohort study. *BMC pregnancy and childbirth*, 16(1): 34.
- McCourt C., Weaver J., and Statham H. et al., (2011): Elective and emergency cesarean section and decision making: A critical review of the literature. *Birth*; 34(1): 65-79.
- Naeem M. Khan I.U., Abbas H.S, Khan A.A., and Khan U.M. (2015): Rate and indication of elective and emergency caesarean section: A study in a tertiary care hospital of Peshawar; *J AYUB Med V coll Abbottabad*; 27(1)
- Najam R., Sharma R. (2013): Maternal and fetal outcomes in elective and emergency caesarean sections at a teaching hospital in North India. A retrospective study. *JARMS*; 5(1): 5-9
- Nyirahabimana N., Ufashingabire C., Lin Y., Hedt G., Riviello R., Odhiambo J., Mubiligi J., et al., (2017): Maternal predictors of neonatal outcomes after emergency cesarean section : a retrospective study in three rural district hospitals in Rwanda. *Maternal Health, Neonatology, and Perinatology*.
- Oluwarotimi I. , Adetokunbo O.F. Adetokunbo O.T., and Kabiru A . (2014) : Caesarean section- an appraisal of some predictive factors in lagos Nigeria. *BMC pregnancy and child birth*; 14(217): 1471-2393
- Prediger B., Polus S., Mathes T., Bühn S., Louwen F., Neugebauer E. et al., (2020): Caesarean sections on maternal and neonatal health – a protocol. *Syst Rev.*, 7(1):119
- Rajae M., Amirzadeh S., Mirblook F. and Soltani M. (2010): The Effect of maternal age on pregnancy outcome. *Asian Journal of Medical Sciences*; 2(3): 159-162.
- Renuka P., and Suguna V. (2017): A comparative study of maternal and fetal outcomes in patients undergoing elective or emergency caesarean section. *Journal of Medical Sciences and Clinical Reserch* ; 4(12): 15059.
- Santhanalakshmi C., Gnanasekaran V., and Chakravarthy R. A. (2015): A retrospective analysis of caesarean section in a tertiary care hospital; *IJSR.*; 6.14: (2097-2099)
- Soren R., Maitra N., Patel P., and Sheth T. (2016): Elective versus emergency caesarean section: Maternal complications and neonatal Outcomes .*IOSR Journal of Nursing and Health Science (IOSR-JNHS)* 5(5): 01-04
- Sowmya M.I., and Dutta I. (2014): comparative study of neonatal outcome in caesarean section done in referred cases vs elective

caesarean delivery in rural medical college hospital. JEMDS; 3: 13993-13998

- Thakur V., Chiheriya H., Thakur A. , and Mourya S . (2017): Study of maternal and fetal outcome in elective and emergency caesarean section .int J med Res; 3 (11): 1300-1305 .doi ;17511/ijmrr.2015.i11.236.
- Vogel J. P., Betrán A.P., Vindevoghel N., Souza J.P., Torloni M.R., Zhang J. et al., (2015) : on behalf of the WHO multi-country survey on maternal and newborn health research network. Use of the Robson classification to assess caesarean section trends in 21 countries: a secondary analysis of two WHO multicountry surveys. Lancet Global Health; 3(5): e260-70.
- World Health Organization Human Reproduction Programme (2015): A WHO statement on caesarean section rates. Reprod Health Matters; 23(45):149–150. doi: 10.1016/j.rhm.2015.07.007. - DOI - PubMed