

Maternal and Neonatal Outcomes in Elective versus Emergency Cesarean Section in Zagazig University Hospitals

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Abstract

The evolution of cesarean section during this century is a relatively safe procedure. It is generally accepted that a planned operation often does better in terms of morbidity than one performed as an emergency. The **aim** of the present study were to find out indications for elective and emergency CS and to compare elective and emergency CS regarding intra-operative and postoperative complications in both mother and her newborn. A prospective **design** was selected in carrying out this study and a representative **sample** of 400 parturient women (200 with elective CS and 200 with emergency CS) were recruited for this study in the Maternity hospital at Zagazig University. **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. **The results** of the present study revealed that there were no statistical significant differences in intra-operative and postoperative complications between two groups. Additionally, women who had elective cesarean section had a higher mean apgar score at the first and fifth minutes (7.7 ± 1.2 and 9.2 ± 1.3) than those who had emergency cesarean section (6.9 ± 1.0 and 8.3 ± 1.5). **It can be concluded that**, the women who had emergency CS were younger than 25 years, had less mean number of gravida and para and had lack of antenatal care attendance than those who had elective CS. **The study recommended** that: higher incidence of emergency cesarean section is associated with intra-operative and postoperative complications, so cesarean should be done at earliest possible time to reduce drastic outcome.

Keywords: Elective cesarean section, Emergency cesarean section

Introduction

Cesarean section is one of the common surgical interventions to save lives of the mothers and/or the newborns. The rate of cesarean section has increased dramatically world wide over the past three decades. Aseptic and antiseptic methods with antibiotic therapy, use of blood transfusion and improved anaesthesia have all contributed to the dramatic decrease in mortality seen during the last century. Despite these improved results, considerable care is still required to maintain and improve the rates of

maternal and perinatal morbidity and mortality (Althabe & Belizan, 2010).

Cesarean section (CS) is defined as the birth of a fetus through an incision in the abdominal wall (laparotomy) and the uterine wall (hysterotomy). This definition does not include removal of the fetus from the abdominal cavity in the case of rupture of the uterus or in case of an abdominal pregnancy (Cunningham et al., 2010).

The use of cesarean section has

become increasingly controversial, uncertainty exist about the relative risk and benefits to the patients. But there has been a dramatic rise all over the world in the recent decades. In United State of America (USA) it was 23% in 1985 and 25% in 1988 (**Declercq, Menacker & Macdorman, 2006**). In addition, **Khawaja, Choueir and Jurdi (2009)** documented that, there is a large variation in the CS rates found across countries, with Egypt having the highest CS rate at 26.2% and Mauritania the lowest at 5.3%. In Egypt, it was 22% (1990-2000). According to the registries of Zagazig University Hospital, **Abd-El Hamid (2004)** reported that CS rate was 34.3%.

Increased CS rate in developed world is largely due to fear of litigation, reduced parity leading to increased number of nulliparous pregnant female, increased maternal age leading to increased frequency of CS (**Fuglenes, Oian & Kristiansen 2009**). In addition, extensive use of electronic monitoring and increased proportion of breech deliveries. Increased cesarean section rate is not the result of medico-legal concern or health insurance system. Patients are not given the autonomy of decision making but the health personnel play the key role in patients decisions (**Christilaw, 2006**).

Elective cesarean section refers to the cesarean section which is performed on the pregnant women based on the medical indication, request of the pregnant woman or obstetrical staff. Elective cesarean section is also called "planned cesarean section" and performed prior to labor. In contrast, cesarean section which is performed during labor by emergency is called emergency cesarean section (**McCourt, et al., 2007**).

Nurse's role is crucial in preventing complications and assessing patient needs at the hospital because she stays with the patient 24 hours per day that is why she should have sound knowledge of medical management and nursing care during the pre and postoperative period of women undergoing cesarean section.

Significance of the study:

Despite cesarean section has been shown to be a safe operation for both the mother and the fetus in many countries around the world; considerable care is still required to maintain and improve the rates of maternal and fetal morbidity and mortality. The average cesarean rate worldwide is about 25% (**Riche et al., 2005**), while at Zagazig, according to the annual statistics of the University Hospital, the researcher found that cesarean section rate was 47.3% in 2010. Thus, the assessment of maternal and neonatal outcome in elective and emergency cesarean section deemed necessary to reduce the mortality and morbidity risks that might be encountered among parturient women and their newborn.

Aim of the study:

The aim of the current study was to:

1. Find out indications for elective and emergency cesarean sections.
2. Compare elective and emergency cesarean section regarding intra-operative and postoperative complications in both mother and her newborn.

Research questions

1. What are the indications of elective and emergency cesarean sections?
2. What are the problems encountered among patients undergoing elective and emergency cesarean section?

Subjects and methods**Research design:**

A prospective design was adopted in this study to achieve the stated aim.

Setting:

The study was conducted in the Maternity hospital at Zagazig University.

Sample:

The sample size was taken according to statistical equation, with confidence interval (CI = 95%), (Power = 80%) and Odds ratio (G2/G1=1). The study population consisted of all parturient women undergoing CS and attending the study settings. A total of 400 parturient women (200 with elective CS and 200 with emergency CS) were randomly recruited for this study with the following inclusion criteria:

1. Women undergoing cesarean section
2. Gestational age \geq 37 weeks.

Tools of data collection:

Data collection was done through the use of the following tools:

I. **An interview questionnaire:** The questionnaire was designed to collect data from parturient women in both groups regarding to:

- **Personal data:** such as age, education and occupation.
- **Medical history:** it included data indicating the presence or absence of the following diseases: diabetes mellitus, pre-eclampsia and cardiac disease.....etc.
- **Family history:** it included data indicating the presence or absence of the following diseases: diabetes mellitus, hypertension, RH incompatibility, multiple pregnancy and habitual abortion.

- **Obstetrical history:** such as gravidity, parity, number of previous abortion, spacing between deliveries and types of previous deliveries.

II. **Clinical assessment form "on admission to labor room":**

1. **General examination:** as maternal vital signs, as well as recording signs of complications during the examination of the woman.
2. **CTG:** for evaluation of the uterine contractions and fetal heart rate.
3. **Ultrasonography:** To evaluate fetal gestational age, fetal viability, placental abnormalities, Amniotic Fluid Index (AFI), fetal presentation.....etc.

III. **Partograph:** The partograph was used for women who had emergency cesarean section to evaluate fetal and maternal condition and to evaluate the labor progress during the active phase of the first stage of labor.

IV. **Summary of labor sheet:** It included data about the type of cesarean section whether elective or emergency and indications of cesarean section. It also included data about immediate postnatal complications such as:

- Presence of postpartum hemorrhage.
- Hysterectomy.
- The period of hospital stay for the woman.

V. **Neonatal assessment sheet:** For evaluation of the neonatal condition, the following data was obtained:

- Apgar scores at the first and fifth minute.
- Neonatal complications such as:
 - * Asphyxia
 - * Need for resuscitation

*Admission to Neonatal Intensive Care Unit (NICU).

Ethical and Administrative considerations:

An official permission was granted by submission of an official letter from the Faculty of Nursing to the responsible authorities of the study setting to obtain the permission for data collection. Concerning the ethical consideration, the aim of the study was explained to every woman before participation, which was totally voluntary and an oral consent was obtained. Women were assured that the study maneuver will cause no actual or potential harm on them and professional help will be provided whenever needed.

Pilot study:

A pilot study was conducted on 40 parturient women to assess the applicability of the data collection tools and the feasibility of the study. The subjects were excluded from the study sample.

Field work:

Data collection took a period of six months - from first of October 2010 to the end of March 2011. After getting the official permission the pilot testing of the study tools was done and analyzed. The researcher started the data collection for 3 days per week. The researcher interviewed the parturient women and explained the purpose of the study, and obtained their verbal consent. Women were notified that they can withdraw at any stage of the research; also they assured that the information obtained during the study will be confidential and used for the research purpose only. The researcher started to collect data through two phases:

- **Interviewing Phase:** The investigator attended the labor unit at the studied setting three days per

week for six months. All parturient women in both groups were interviewed (structured interview) to collect data related to socio-demographic characteristics, obstetric profile, family history for chronic diseases, present medical history. Personal interview was done at the labor unit for both groups and it takes 20 minutes for each one.

- **Assessment Phase:** In this phase, the researcher together with the on duty physician started the examination of the parturient woman. Regular assessment of the maternal and fetal condition started immediately after admission to labor and delivery unit, by measuring vital signs, carrying out general, local abdominal and pelvic examination. Investigations required were done. Fetal condition was assessed using the Cardio-Toco Graphy. Care was provided to the woman during this stage and pertinent data was recorded.

Medical records for patients with previous cesarean section were obtained and reviewed in detail to obtain data pertaining to the operative report and discharge summaries. This revealed, the number, type, date and indication of the previous CS, and whether there was a history of previous vaginal delivery or not..... etc.

Fetal monitoring by CTG. was done for each studied women throughout labor by the researcher, under the supervision of the on duty obstetrician. The obstetrician was present at all times in order to manage any problem that can be happened such as; non reassuring fetal heart rate patterns.

The type of cesarean section,

the duration of operation, and the condition of the mother during the labor were also assessed. Neonatal assessment was done through measuring the Apgar score and finding out any abnormality that needed admission to neonatal intensive care unit, resuscitation or death. These data were recorded in the summary of labor and newborn sheets.

Statistical analysis:

After the collection of data, it was revised, coded and fed to statistical software SPSS version 16. The statistical analysis used considered all tests to be T test with alpha error = 0.05. Microsoft office Excel software was used to construct the needed graphs. For all statistical tests done, the threshold of significance was fixed at the 5% level (p-value). A p-value > 0.05 indicates non significant result and the p-value < 0.05 indicates a significant results and the p-value is the degree of significance. The smaller the p-value obtained, the more significant is the result, the p-value being the probability of error of the conclusion.

Results:

Table (1): showed that women who had emergency cesarean section were more likely to be younger than 25 year (46.0%) compared to only 24.0% of women who had elective cesarean section. Difference observed was statistically significant ($t=26.9$ and $p=0.000$). The table also points to statistically significant difference between the two groups as regards to education ($P= 0.025$). Thus, women who had emergency CS (47.5%) tends to be illiterate or can read and write compared to 35.5% of women with elective CS.

Table (2): illustrated that emergency CS group had less mean

number of gravida (2.2 ± 1.1) and Para (1.0 ± 1.0) compared to women who had elective CS (2.9 ± 1.5 and 1.6 ± 1.2 respectively). Meanwhile, more than three quarters of both groups had no previous abortion, with no statistical significant difference.

It is obvious from **Table (3)** that previous cesarean section was the most common indication for elective CS with the highest percentage (55.2%), followed by malpresentation (10.5%) and pre eclampsia (7.1%).

Table (4): showed that failure of labor progress was the most common indication for emergency CS with the highest percentage (32.5%), followed by mal-presentation (23.0%) and fetal distress (18.0%).

Table (5): reported that woman who had emergency CS were more likely to have bleeding (12.0%) compared to (6.0%) women who had elective CS. However, the differences observed were not statistically significant.

Table (6): compared the percentages of women having postoperative complications according to the type of CS. Women with emergency CS were more likely to suffer from postpartum hemorrhage (3.0%) and to receive IV blood (7.0%) compared to (2.6% and 4.4% respectively) of women who had elective CS.

Table (7): points to statistical significant differences between the two groups as regards to their apgar score at the 1st and 5th minute ($P=0.000$). It is evident that emergency CS group had less mean apgar score at the 1st minute (6.9 ± 1.0) and and 5th minute (8.3 ± 1.5) compared to women who had elective CS (7.7 ± 1.2 and 9.2 ± 1.3 respectively).

Figure (1): Showed that the decision-to-delivery interval in women who had emergency CS that was been done after 30 minutes was (74%). Only

(26%) of emergency CS were been done before 30 minutes.

Discussion

The rate of cesarean sections has gone up in all groups of women regardless of age, the number of babies they're having, the extent of health problems, their race or other breakdowns (para 6). Improved anesthetic techniques and antiseptic procedures have revolutionized obstetric practice.

Among the factors that may affect the type of CS are the socio-demographic characteristics of the mother such as age and educational level. In the present study, women who had emergency CS were significantly more likely to be younger than 25 years. This may indicate the tendency of the attending obstetrician to allow vaginal deliveries in younger patients as long as this is feasible, with a view to preserving their future reproductive performances and only resorting to CS when there is a threat of danger to either the mother or her baby. On the other hand, it is accepted that the older patients tend to have more previous CS, which may automatically necessitate elective CS. These findings were corroborated with those reported by **Rajae et al., (2010)** in Iran in a study about " The Effect of Maternal Age on Pregnancy Outcome.

Concerning educational level, the present study revealed that the majority of women in the two groups had secondary school education. Meanwhile, women who had emergency CS (47.5%) tend to be illiterate or can read and write compared to 35.5% of women with elective CS. These findings are in agreement with **Olusanya and Solanke (2009)** in Nigeria in their study about " Maternal and neonatal factors associated with mode of delivery under a universal newborn

hearing screening programme in Nigeria". They reported that the majority of women in the two groups had secondary school education and women who had emergency CS (9.5%) tend to be illiterate or had primary school compared to 6.5% of women with elective CS. This could be attributed to the fact that less educated women may lack knowledge and practice regarding healthy lifestyle, which in turn makes them at high risk for emergency CS.

In relation to obstetric profile, findings of the present study revealed a statistically significant difference between the two groups regarding gravidity and parity. Thus, primigravida accounted for 30.5% of women who had emergency CS compared to 16.5% of elective CS group. This finding is partially in agreement with that of **Villar et al., (2007)** in their study in Latin American about "Maternal and neonatal individual risks and benefits associated with caesarean delivery" who reported that, primigravida was present in 40.0% of women undergoing intrapartum CS compared to 26.6% of elective CS group.

Professional associations of obstetricians and gynecologists recommended that the decision –to-delivery interval (DDI) for emergency CS should not exceed 30 minutes. This was accepted as a golden standard. Conversely, the present result showed that, 74% of emergency CS were not done within the golden standard. This finding was in disagreement with **Elvedi-Gasparovic, Klepac and Peter (2006)** who reported that, 39.7% of emergency CS at their clinic was done within the golden standard. The decision-to-delivery interval is mainly influenced by the facilities and staff availability.

The present study revealed that, the common indications for elective

CS were previous cesarean section, mal-presentation, pre-eclampsia, antepartum hemorrhage, cephalopelvic disproportion and pregnancy after in vitro fertilization/ embryo transfer. While in emergency group the major indications were failure of labor progress, mal-presentation, fetal distress and secondary inertia of the uterus. Similarly, these findings are congruent with that of **Ali, Ahmed and Hafeez (2005)** who reported that, the common indications for elective CS were repeated cesarean section, mal-presentation, APH, CPD and PIH plus eclampsia while, in emergency group the major indications were failure of labor progress, fetal distress, CPD, PIH, eclampsia and mal-presentation.

On the same line, these findings are in agreement with those reported by **Rehana et al., (2009)** in Rawalpindi in their study "To Determine the Factors Affecting the Pregnancy outcome in Patients with Previous one Caesarean Section". The researchers reported that, indications for elective cesarean were cephalo pelvic disproportion, bad obstetrical history, breech presentation, post date, diabetes, intrauterine growth restriction (IUGR), twins and pre-eclampsia while indications for emergency cesarean were non-progress of labor, fetal distress, premature rupture of membranes > 12 hours, twins in labor, placenta previa and accidental hemorrhage.

According to the present study results, there were no statistical significant differences between the two groups as regards to intra-operative and post operative complications. The most common intra-operative and post operative complications were bleeding and postpartum hemorrhage (12.0%, 3.0% in emergency CS and 6.0%, 2.6% in elective CS respectively). These findings are in agreement with **Hassan, Tareiq and Javaid (2008)**

who mentioned that, the incidence of intra-operative bleeding was 14.8% of women who had emergency CS compared to 4.34% of women with elective CS. Also, **Levy (2006)** in Nottingham has revealed that, the risk of postpartum hemorrhage was greater in women who had emergency CS as opposed to elective cesarean section.

Similarly, **Dimitrova et al., (2005)** in a study about "post-operative complications following elective and emergency cesarean delivery" have reported that, there were no statistical significant differences between elective and emergency sections in relation to the incidence of complications. This is in coherence with **Elvedi-Gasparovic et al., (2006)** who have similarly reported that, there were no significant differences in the maternal intra-operative and postoperative complications in the compared groups.

These findings may be attributed to the fact that anesthesia has become safer, complications are extremely rare due to availability of experienced anesthetist and most CS are being performed under regional anesthesia. The increased safety of blood transfusion, improved aseptic, antiseptic techniques and the use of antibiotics has made it a safe procedure. However, **Ali et al., (2005)** reported that, intra-operative and postoperative complications of CS are commonly higher in emergency group than elective group. Additionally, **Qublan and Tahat (2006)** carried out a study on the multiple cesarean section, the impact on maternal and fetal outcome" who demonstrated that, the complications rate is higher in the emergency cesarean delivery than in the elective one.

As regards to fetal outcome, it is evident that newborns of women who had emergency CS group had significantly less mean Apgar score at

the 1st and 5th minute. The finding is in agreement with **Elvedi-Gasparovic et al., (2006)** who have found a statistical significant differences in the mean apgar score at the 1st and 5th minute

between newborns of elective and emergency CS groups (8.44 ± 2.05 , 8.3 ± 1.5 in emergency CS group Vs 9.36 ± 2.42 and 9.75 ± 0.70 in women who had elective CS respectively). Poor fetal outcome may be related to prolonged labor, mal-presentation and fetal distress. This pattern is similar to previous study of **Onankpa and Ekele (2009)**.

Conclusion:

According to the findings of the present study, it can be concluded that there were no statistical significant differences in maternal intra-operative and postoperative complications of CS between the two groups.

Recommendations:

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

- Emergency cesarean section is associated with intra-operative and postoperative complications. This can be reduced by improving the quality and availability of antenatal care services.
- Emergency cesarean should be done at earliest possible time to reduce drastic outcome. To gather with the utilization of **the concept of gold stander of DDI**.
- There should be a pediatric staff to provide care and even needed resuscitation for neonates of emergency CS.

Table (1): Distribution of the studied women according to their socio-demographic characteristics (n=400)

Items	Elective C.S (n=200)		Emergency C.S (n=200)		X ²	P
	No	%	No	%		
Age						
< 25 yrs	48	24.0	92	46.0	26.9	0.000**
25-	129	64.5	102	51.0		
35+	23	11.5	6	3.0		
Mean ± SD	27.8 ± 5.1		25.1 ± 4.6		t=5.7	0.000**
Education						
Illiterate and Read write	71	35.5	95	47.5	12.8	0.025*
Primary school	8	4.0	8	4.0		
Preparatory school	4	2.0	0	0.0		
Secondary school	99	49.5	85	42.5		
University	18	9.0	12	6.0		
Job status						
House wife	181	90.5	188	94.0	1.7	0.191
Working	19	9.5	12	6.0		

* $P < 0.05$ (significant)** $p < 0.01$ **Table (2): Distribution of the studied women according to their obstetrical history (n=400)**

Items	Elective C.S (n=200)		Emergency C.S (n=200)		X ²	P
	No	%	No	%		
Gravidity						
Primigravida	33	16.5	61	30.5	10.9	0.000**
1-3	105	52.5	103	51.5	0.04	0.84
4+	62	31.0	36	18.0	9.14	0.002**
Mean ± SD	2.9 ± 1.5		2.2 ± 1.1		t=5.6	0.000**
Parity						
0	33	16.5	61	30.5	10.9	0.000**
1	69	34.5	94	47	6.47	0.01*
2	57	28.5	23	11.5	18.1	0.000**
3+	41	20.5	22	11	6.8	0.009**
Mean ± SD	1.6 ± 1.2		1.0 ± 1.0		t=5.5	0.000**
Abortion						
No	152	76.0	160	80.0	2.1 [^]	0.399
Yes	48	24.0	40	20.0		

[^] P value based on Mont Carlo exact test* $P < 0.05$ (significant) ** $p < 0.01$

Table (3): Distribution of the studied women according to indications for elective cesarean section (n=200)

Indications for elective cesarean section [§] (n=200)	No.	%
Previous cesarean section	116	55.2
Mal-presentation	32	10.5
Pre eclampsia	15	7.1
Ante-partum hemorrhage	12	6.2
Large fetus	10	4.8
Cephalopelvic disproportion	9	4.3
Post-term	8	3.8
Multiple pregnancy	6	2.9
Pregnancy after IVF/ET	2	0.9
Diabetes Mellitus (DM)	1	0.5
Others	8	3.8

[§] More than one response was allowed

Table (4): Distribution of the studied women according to indications for emergency cesarean section (n=200)

Indications of emergency C.S (n=200)	No.	%
Failure of labor progress	65	32.5
Mal-presentation	46	23.0
Fetal distress	36	18.0
Failed labor induction	19	9.5
Medical problems	7	3.5
Secondary inertia of the uterus	6	3.0
Umbilical cord prolapse	4	2.0
Multiple pregnancy	4	2.0
Ante-partum hemorrhage	4	2.0
Others	9	4.5

Table (5): Distribution of the studied women according to intra-operative complications of cesarean section (n=400)

Intra-operative complications	Elective C.S (n=200)		Emergency C.S (n=200)		X ²	P
	No.	%	No.	%		
None	182	91.0	165	82.5	6.9 [^]	0.070
Bleeding	12	6.0	24	12.0		
Injury of the bladder	2	1.0	6	3.0		
Injury of the uterine arteries	4	2.0	5	2.5		

[^] P value based on Mont Carlo exact test

Table (6): Distribution of the studied women according to postoperative complications of cesarean section (n=400)

Post operative complications	Elective C.S (n=200)		Emergency C.S (n=200)		X ²	P
	No	%	No	%		
None	186	93.0	180	90.0	6.22 [^]	0.184 [^]
Administration of IV blood	9	4.4	14	7.0		
Postpartum hemorrhage	5	2.6	6	3.0		
Hysterectomy	3	1.5	0	0.0		
Wound dehiscence	1	0.5	0	0.0		
Pulmonary embolism	1	0.5	0	0.0		

[^] P value based on Mont Carlo exact test

Table (7): Distribution of the studied women according to Apgar score at the 1st and the 5th minute (n=400)

Apgar score	Elective C.S (n=200)		Emergency C.S (n=200)		X ²	P
	No.	%	No.	%		
Apgar score at 1st minute						
< 4	1	0.5	2	1.0	33.3	0.000* [^]
4-6	24	12.0	70	35.0		
7+	175	87.5	128	64.0		
Mean ± SD	7.7 ± 1.2		6.9 ± 1.0		Z = 8.6	0.000*
Apgar score at 5th minutes						
< 4	0	0	0	0	17.9	0.000* [^]
4-6	10	5.0	37	18.5		
7+	190	95.0	163	81.5		
Mean ± SD	9.2 ± 1.3		8.3 ± 1.5		Z = 7.1	0.000*

[^] P value based on Mont Carlo exact test

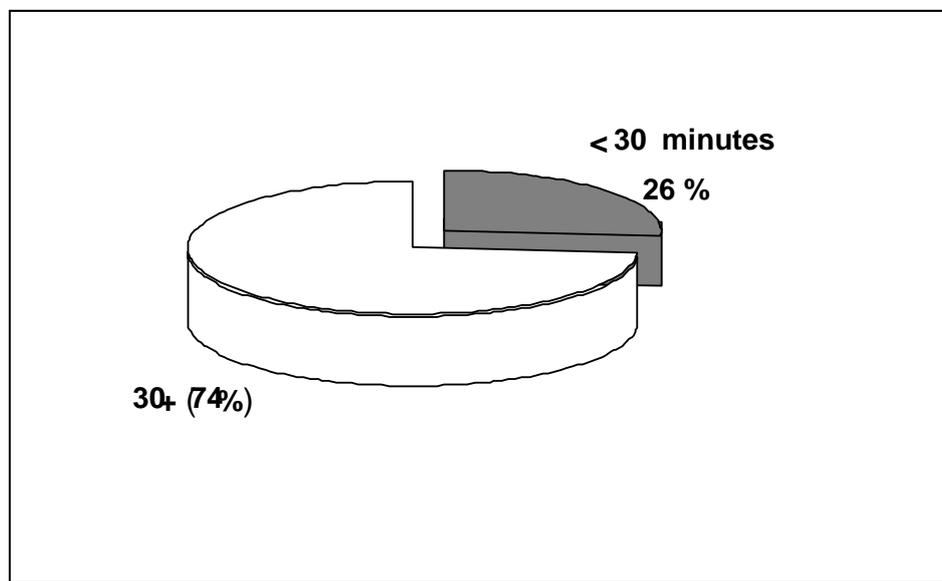


Figure (1): Distribution of the studied women who had emergency CS according to decision delivery interval (n=200)

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