

POST-OPERATIVE MORBIDITY IN ELECTIVE VERSUS EMERGENCY CAESAREAN SECTION: A PROSPECTIVE COHORT STUDY.

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ABSTRACT

Context: Caesarean delivery is associated with the risks of post-operative morbidities.

Objective: To assess post-operative morbidity in elective versus emergency caesarean section

Design: Prospective cohort study

Setting: Department of Obstetrics and Gynaecology University of Abuja Teaching Hospital, Abuja in Nigeria

Population: Women who underwent either elective or emergency caesarean sections at the hospital during the designated study period

Main Outcome measures: Wound infection, long duration of hospital stay, Postoperative fever, Urinary tract infection and blood transfusion.

Results: There were significantly higher morbidities: wound infection (OR 3.4; 95% CI 1.7-7.3; $P < 0.0001$), post-operative fever (OR 6.7; 95% CI 3.6-13.2, $P < 0.0001$), longer duration of hospital stay (OR 6.2; 95% CI 3.3-12.6; $p < 0.0001$) and blood transfusion (OR 5.4; 95% CI 2.7-11.8; $P < 0.0001$) in women who had emergency caesarean delivery compared with elective caesarean delivery. There was no significant difference in the frequency of urinary tract infection (OR 3.0; 95% CI 0.8-12.2; $P = 0.12$) in both arms of study. Following logistic regression, only unbooked status retained significant association with wound infection (OR 4.3; 95% CI 2.4-7.9), post-operative fever (OR 3.6; 95% CI 2.3-5.7); longer duration of hospital stay (OR 5.7; 95% CI 3.4-9.4) and blood transfusion (OR 7.6; 95% CI 4.2-14.0).

Conclusion: This study identified significantly higher post-operative morbidities in emergency than elective caesarean delivery. The most important predictor of post-operative morbidity was lack of antenatal care.

INTRODUCTION

Caesarean section is a surgical operation to deliver a baby or babies by means of an incision through anterior abdominal wall and uterus.¹ It is a common operation in obstetric practice.² It is performed when there is risk to the health of the mother or baby during the course of pregnancy and labour or when vaginal delivery is not feasible. This operation can be a planned or an emergency procedure.

The 'planned' procedure, also referred to as an

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'elective' caesarean section is not urgent and may be scheduled well in advance, at a time when it is convenient for the obstetrician, neonatologist, anaesthetist and the patient. The decision is taken before or during the pregnancy and planned for at term or as close to term as is possible. Emergency caesarean section is that in which the decision to do so is taken during labour or delivery, when there is danger to the mother, fetus or both.¹

While the operation is widely embraced and utilized in the developed world, aversion, miseries, misconception, fear, guilt and anger surround the operation in Nigeria.²⁻⁴ The reasons for this aversion include a sense of reproductive failure, maternal morbidity from the operation, prolonged hospital stay and perceived exorbitant hospital bills.²⁻⁵ Caesarean delivery is associated with post-operative morbidities including wound infection, urinary tract infection, post-operative fever, blood transfusion, prolonged hospital stay, re-hospitalisation, and uterine rupture in subsequent pregnancy with its poor outcome.⁶⁻⁸

The purpose of this study is to determine post-operative morbidity in elective versus emergency caesarean section at the University of Abuja Teaching Hospital, Abuja. The information thus obtained hopefully would be beneficial in formulating policies aimed at reducing the incidence of post-operative morbidity in both the hospital and Nigeria at large.

METHODS

Study location: The study was conducted at the Department of Obstetrics and Gynaecology of the University of Abuja Teaching Hospital, Gwagwalada. The hospital is a 350 bed Federal Government owned tertiary institution situated in Gwagwalada, a high population density area in Abuja, Nigeria's Federal Capital Territory. It provides health care services to the inhabitants of

Abuja and neighbouring states including Niger, Kaduna, Kogi and Nasarawa states. The Hospital has an average of 2,500 deliveries annually. According to the last National Population Census of 2006, Abuja had a population of 1,406,239 inhabitants of which 158,618 of the inhabitants resided in Gwagwalada.⁹

Ethical clearance was obtained from the Human Research Ethics Committee of the University of Abuja Teaching Hospital and informed consent for participation was obtained for all the participants.

Data were collected in a ratio of 1:2 for elective and emergency caesarean delivery respectively between May and October 2013. Those who did not consent to participate in the study, caesarean section done outside our institution, uterine rupture, chorioamnionitis, sickle cell anaemia in pregnancy, HIV in pregnancy and diabetes in pregnancy were excluded.

Sample size determination: The sample size was calculated using the formula¹⁰ $n = Z^2PQ/D^2$
 n = minimum sample size, z = 95% confidence interval using 1.96

P = prevalence rate of wound infection (9.3%)², Q = $1.0 - P$

D = degree of accuracy desired usually set at 0.05

N = 129. Adding a 5% attrition rate, anticipated response rate of 95%

The selected sample size was $129/0.95 = 136$. The elective caesarean sections were 136 participants and emergency caesarean sections were 272 participants. The minimum sample size was 408 participants.

Data collection: Women that met eligibility criteria were enrolled into the study at the maternity ward. Participants were seen, interviewed and examined in the postnatal ward on their first postoperative day and followed up till they were discharged. Data were collected by the investigator or registrars using structured proforma on a set of sociodemographic

and operation factors including age, parity, level of education, booking status, surgeon cadre, and post operative morbidities.

Data analysis: Data were entered into statistical package software for social sciences (SPSS) version 16.0. The initial analysis was by frequency tables, cross tabulation and further analysis involved chi square test to explore statistical relationship between categorical variables. Logistic regression analysis was undertaken to identify significant predictors and 95% confidence interval for odds ratio (OR) were computed. P-values of less than 0.05 were accepted as indicating statistical significance.

Definitions of outcome variables:

Long duration of hospital stay: Defined as hospital stay lasting for more than 7 days after surgery.²

Post caesarean wound infection: A wound was considered infected if there were indurations and swelling of the wound edges, discharge of pus or wound dehiscence.²

Post-operative fever: Defined as two or more axillary temperature $\geq 38^{\circ}\text{C}$ more than 6 hours apart within 10 days, excluding the first 24 hours after surgery.¹¹

Urinary tract infection: Defined as a positive urine culture in a postoperative patient with urinary symptoms.¹²

RESULTS

A total of 1,368 women delivered during the study period out of which, 430 were by caesarean section, giving an overall caesarean section rate of 31.4%. A total of 22 participants were excluded because of HIV in pregnancy, diabetes mellitus, sickle cell disease and chorioamnionitis and 408 cohorts met eligibility criteria and were included for the study. Table 1 shows sociodemographic characteristics by type of caesarean section performed. The parturients were similar in age, parity and educational level in the two arms of the study.

Women who had emergency caesarean delivery were however more likely to have been referred from peripheral hospitals than those who had elective caesarean section (Table 2).

Table 3 shows cadre of surgeon who performed elective versus emergency caesarean delivery. Most surgeries were performed by senior registrars; 61.2% and 65.0% in elective and emergency groups respectively. Registrars performed significantly higher emergency caesarean sections (32.4%) compared to elective caesarean section (21.3%; $P < 0.0001$).

Postoperative morbidity in emergency versus elective caesarean delivery is shown in table 4. The incidence rate of wound infection, urinary tract infection, postoperative fever, prolonged hospital stay and blood transfusion were 16.7%, 3.4%, 29.2%, 26.2% and 20.6% respectively. There were significantly higher morbidities; wound infection (OR 3.4; 95% CI 1.73-7.25; $P < 0.0001$), post-operative fever (OR 6.7; 95% CI 3.6-13.2, $P < 0.0001$), longer duration of hospital stay (OR 6.2; 95% CI 3.3-12.6; $p < 0.0001$) and blood transfusion (OR 5.4; 95% CI 2.7-11.8; $P < 0.0001$), in women who had emergency caesarean delivery compared to those who had elective caesarean delivery. There was no significant difference in the frequency of urinary tract infection (OR 3.0; 95% CI 0.8-12.2; $P = 0.12$) in both groups.

After adjustment for confounders of age, parity, educational level and surgeon cadre (Table 5), only unbooked status retained significant association with wound infection (OR 4.3; 95% CI 2.4-7.9), post-operative fever (OR 3.6; 95% CI 2.3-5.7); longer duration of hospital stay (OR 5.7; 95% CI 3.4-9.4) and blood transfusion (OR 7.6; 95% CI 4.2-14.0).

DISCUSSION

Results from this study have identified significantly

higher post-operative morbidity with emergency caesarean delivery compared with elective caesarean delivery. This finding collaborates earlier studies.^{8,12}

The incidence of post-operative wound infection in this study was similar to that reported by Morhason-Bello et al¹⁴ from Ibadan Nigeria. It was, however, much higher than 9.3% reported by Ezechi et al from Lagos Nigeria² and 9.6% recently reported by Wloch et al from England, United Kingdom.¹⁵ Nevertheless, this may be an underestimation of the real incidence because of the potentially missed post discharge infections. The risk of developing post-operative wound infection was more than 3 times higher in women who had emergency caesarean delivery than those that had elective caesarean delivery (OR 3.4; 95% CI 1.7-7.3). This observation correlates the report of Morhason-Bello et al who suggested that women delivered by emergency caesarean section experienced more postnatal complications such as wound infection.¹⁴ The risk of developing wound infection was also increased by more than 4 times in referred cases when adjustment was made for the potential confounders (OR 4.3, 95%CI 2.4-7.9). This may be due to the fact that unbooked women may delay in presentation and their labour managed under unhygienic conditions and prolonged rupture of membranes which render their wounds potentially contaminated leading to wound infection.²

The incidence of urinary tract infection found in this study was lower than 10.6% reported by Ezechi et al¹³. Nevertheless, this may be an under estimation of the real incidence because of asymptomatic urinary tract infection.

The frequency of post-operative fever of 29.2% was higher than 15.3% reported by Guldholt et al.¹⁶ The same study by Guldholt et al demonstrated a significantly higher post-operative fever in emergency caesarean delivery than elective caesarean delivery similar to findings from this study. The risk of developing post-operative fever

was increased by more than 3 times in referred cases when adjustment was made for the potential confounders (OR 3.6; 95% CI 2.3-5.7). This was collaborated in another study by Hawrylyshyn et al.¹⁷

Twenty six per cent of the cohort stayed longer following caesarean delivery in this study, much higher than 7.5% reported by Hebert et al¹⁸.

The incidence rate of blood transfusion of 20.6% was higher than 5.6% reported by Imarengiaye et al¹⁹ but slightly lower than 25.2% reported by Ozumba and Ezegwu.²⁰

In conclusion, this study demonstrated that post-operative morbidities (wound infection, post-operative fever, prolonged hospital stay and blood transfusion) were significantly higher in emergency than elective caesarean delivery. The most important predictor of post-operative morbidity was lack of antenatal care.

There are some limitations in this study. The incidence of urinary tract infection may be an under estimation of the real incidence because of asymptomatic urinary tract infection. Screening for asymptomatic urinary tract infection before and after the caesarean section for the entire cohort was not feasible because of logistic reasons. This study did not address adequately determinants of post-operative morbidity among these groups of patients. For example, duration of membrane rupture for post-operative wound infection; therefore, it may be worth considering further research which overcomes these limitations would be useful in developing a better understanding of post caesarean morbidities.

It is recommended that efforts should be made to reduce caesarean section rate and our pregnant women should utilized antenatal services in order to reduce post-operative morbidities.

TABLE 1: SOCIODEMOGRAPHIC CHARACTERISTIC OF WOMEN IN ELECTIVE VERSUS EMERGENCY CAESAREAN SECTION

Maternal age (Years)	Elective C S		Emergency C S		P – value
	No	(%)	No	(%)	
<20	4	(2.9)	8	(2.9)	0.98
20-34	99	(72.8)	200	(73.5)	
>34	33	(24.3)	64	(23.5)	
Total	136	(100.0)	272	(100.0)	
Parity					
Nullipara	35	(25.7)	89	(32.7)	0.10
1-4	89	(65.4)	171	(62.9)	
>4	12	(8.8)	12	(4.4)	
Total	136	(100.0)	272	(100.0)	
Level of Education					
None	8	(5.9)	14	(5.2)	0.83
Primary	22	(16.2)	48	(17.7)	
Secondary	71	(52.2)	150	(55.1)	
Tertiary	35	(25.7)	60	(22.0)	
Total	136	(100.0)	272	(100.0)	

TABLE 2: BOOKING STATUS OF WOMEN IN ELECTIVE VERSUS EMERGENCY CAESAREAN SECTION

Booking status	Elective C S	Emergency C S	
Unbooked	118 (86.8)	100 (36.8)	<0.0001*
Booked	18 (13.2)	172 (63.2)	
Total	136 (100.0)	272 (100.0)	

TABLE 3: SURGEONS CADRE THAT PERFORMED ELECTIVE VERSUS EMERGENCY CAESAREAN SECTION

Surgeon	Elective C S		Emergency C S		P – value
	No	(%)	No	(%)	
Registrar	29	(21.3)	88	(32.4)	<0.0001*
Senior Registrar	90	(61.2)	177	(65.0)	
Consultant	17	(12.5)	7	(2.6)	
Total	136	(100.0)	272	(100.0)	

TABLE 4: POSTOPERATIVE MORBIDITIES IN EMERGENCY VERSUS ELECTIVE CAESAREAN SECTION

Variable	Emergency CS N=272(66.7%)	Elective CS N=136(33.3%)	IR	P-value	O.R	95% CI
Wound infection	58 (21.3)	10 (7.4)	16.7	<0.0001	3.4	1.7-7.3*
Urinary tract infection	12 (4.4)	2 (1.5)	3.4	0.12	3.0	0.8-12.2
Postoperative fever	107 (39.3)	12 (8.8)	29.2	<0.0001	6.7	3.6-13*
Prolonged hospital stay	96 (35.3)	11 (8.1)	26.2	<0.0001	6.2	3.3-12*
Blood transfusion	75 (27.6)	9 (6.6)	20.6	<0.0001	5.4	2.7-8*

TABLE 5: LOGISTIC REGRESSION ANALYSIS OF INDEPENDENT RISK FACTOR ASSOCIATED WITH POST CAESAREAN MORBIDITIES

Maternal morbidity	Independent risk factor	Odds ratio	95% CI
Wound infection	Unbooked status	4.3	2.4-7.9*
	Registrar	1.1	0.3-3.7
Post operative fever	Unbooked status	3.6	2.3-5.7*
	Registrar	0.5	0.2-1.6
Prolonged hospital stay	Unbooked status	5.7	3.4-9.4*
	Registrar	0.4	0.1-1.5
Blood transfusion	Unbooked status	7.6	4.2-14.0*
	Registrar	0.7	0.2-2.6

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