

Original Research Article

The effect of anaesthesia and antenatal care on foeto-maternal outcome after caesarean section in a developing country

Fidelis A. Onyekwulu^{1*}, Friday G. Okonna¹, Tochukwu C. Okeke², Israel O. Okwor¹

¹Department of Anaesthesia, ²Department of Obstetrics and Gynaecology, University of Nigeria Teaching Hospital, Ituku Ozalla, Enugu state, Nigeria

Received: 26 July 2020

Accepted: 01 September 2020

***Correspondence:**

Dr. Fidelis A. Onyekwulu,

E-mail: faonyekwulu@yahoo.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: The foeto-maternal outcome after delivery is precarious in developing country. The anaesthetic technique and antenatal care as it affect this outcome is assessed.

Methods: This is a 5-year retrospective study carried out at the University of Nigeria Teaching Hospital Enugu. Obstetric theatre records of patients who had caesarean section between January 1st 2011 and December 31st 2015 were reviewed. Data extracted from the records using a proformer included socio-demographic characteristics, indications for surgery, maternal and neonatal outcome, and anaesthetic technique. The data were analyzed using SPSS Version 17 [SPSS Inc., Chicago, IL, USA].

Results: A total of 1574 patients had caesarean section within the study period and 1158 (73.6%) of the patients were booked, while 416 (26.4%) were unbooked. The total number of deliveries during this period was 6235 giving a caesarean section rate of 39.6%. More deaths on the operating table were recorded in the unbooked patients as compared to booked parturient ($\chi^2=20.013$, $p<0.001$). More babies of the unbooked patients died perioperatively (17.3%) when compared to booked parturient (3.4%) $p<0.001$.

Conclusions: The commonest anaesthesia administered was subarachnoid block. Maternal and neonatal mortality was significantly higher in parturient who did not attend antenatal care compared to those who attended.

Keywords: Parturient, Neonatal mortality, Prenatal care, Anaesthesia

INTRODUCTION

Maternal health is a topical issue worldwide, particularly in developing countries, where the incidence of maternal morbidity and mortality is high. Caesarean section for delivery of baby is an alternative when spontaneous vaginal delivery is not safe for the parturient or the baby. This form of delivery is quite safe in the hands of an expert obstetrician. The rate of caesarean section in developing countries is increasing steadily and the anaesthetic technique deployed during the operation is an important factor in determining the outcome.¹ Caesarean section is not without its own risks with respect to maternal and neonatal morbidity and mortality.

Antenatal care is an integral part of obstetric practice and has been shown to be one of the factors responsible for good outcome in obstetrics. Besides routine health evaluations, it provides education and counseling, as well as any necessary treatment.²

An audit of the obstetric anaesthesia practice is undertaken to determine the anaesthetic technique of choice for caesarean section; to evaluate how maternal and neonatal outcome is affected by antenatal care; and to determine common causes of obstetric intensive care unit (ICU) admission following caesarean section.

METHODS

This is a 5-year retrospective study carried out at the University of Nigeria Teaching Hospital Enugu. Obstetric theatre records of patients who had caesarean section between 1st January 2011 and 31st December 2015 were retrieved and reviewed by trained staff using pre-established and pilot data extraction forms and data extracted. Study information sort from the records using a proformer included socio-demographic characteristics (age, gestational age and antenatal care), parity, indications for surgery, maternal and neonatal outcome, and anaesthetic technique. Also collected was data concerning labour ward admissions and delivery. Neonates that died were resuscitated by neonatologist and the anaesthetist attended to parturient.

The data were analyzed by descriptive statistics using the statistical package for social science version 17 [SPSS Inc., Chicago, IL, USA]. Results were expressed by fractional percentages, tables and charts. Student t-test and chi square test were used for continuous and discrete variables respectively. p<0.05 is considered statistically significant.

RESULTS

A total of 1574 patients had caesarean section within the study period, 1210 (76.9%) patients had emergency caesarean section, while 364 (23.1%) patients had elective caesarean section. A total of 1158 (73.6%) of the patients were booked, while 416 (26.4%) were unbooked. The total number of deliveries during this period was 6235 giving a caesarean section rate of 39.6%.

Table 1: Socio-demographic characteristics.

Operation	Emergency elective		χ ²	P value
	Emergency	Elective		
Age group				
15–19	8 (0.7)	1 (0.3)	3.374	0.761
20–24	98 (8.1)	25 (6.9)		
25–29	340 (28.1)	92 (25.3)		
30–34	429 (35.5)	142 (39.0)		
35–39	264 (21.8)	81 (22.3)		
40–44	64 (5.3)	20 (5.5)		
≥45	7 (0.6)	3 (0.8)		
Gestational age				
<37	292 (24.1)	81 (22.3)	0.710	0.701
37–40	766 (63.3)	239 (65.7)		
>40	152 (12.6)	44 (12.1)		
ANC				
Booked	870 (71.9)	288 (79.1)	7.502	0.006
Unbooked	340 (28.1)	76 (20.9)		

n (%), ANC=Antenatal clinic.

Table 2: Maternal outcome.

Maternal outcome	Postnatal ICU DOT			χ ²	P value
	Emergency	Elective	ANC		
Operation					
Emergency	1192 (98.5)	12 (1.0)	6 (0.5)	1.84	0.398
Elective	360 (98.9)	4 (1.1)	0 (0.0)		
ANC					
Booked	1151 (99.4)	5 (0.4)	2 (0.2)	20.01	< 0.001
Unbooked	401 (96.4)	11 (2.6)	4 (1.0)		
Parity					
Primigravida	320 (99.1)	2 (0.6)	1 (0.3)	0.695	0.707
Multigravida	1232 (98.5)	14 (1.1)	5 (0.4)		

When the socio-demographics of the patients were classified into elective and emergency groups; the groups were similar in terms of maternal age and gestational age, but greater number of the booked patients had emergency and elective caesarean section when compared to unbooked patients p=0.006 (Table 1). Also in terms of parity (primigravida and multigravida) the difference between booked and unbooked patients was not statistically significant χ²=0.430, p=0.512 (Table 2).

The commonest indication for caesarean section amongst both primigravida and multigravida patients were obstructed labour 774 (49.2%) followed by intrauterine fetal death (IUFD)/fetal distress 302 (19.2%) and Eclampsia/ pre-eclampsia 184 (11.7%). Others include Antipartum haemorrhage 176 (11.2%), Previous Caesarean section (C/S) in labour 134 (8.5%), Metastatic thyroid 2 (0.1%) and Precious baby (term pregnancies following In vitro fertilization IVF) 2 (0.1%). The difference was statistically significant (χ²=20432, p=0.002). When the indications for caesarean section per year of study were tabulated and presented as a histogram in (Figure 1). The result also showed that obstructed labour followed by IUFD/fetal distress were the leading indications of caesarean section in our centre. This is followed by, eclampsia/ pre-eclampsia, and the least were metastatic thyroid and precious baby (IVF).

Concerning the maternal outcome of patients, 98.5% of the parturient after emergency caesarean section had no morbidity post operatively and were admitted into the postnatal ward, while 1.0% had severe morbidity that required intensive care unit (ICU) admission and 6 (0.5%) patients died on the operating table (Table 2). The outcomes were comparable among the emergency versus elective patients (χ²=1.841, p=0.398).

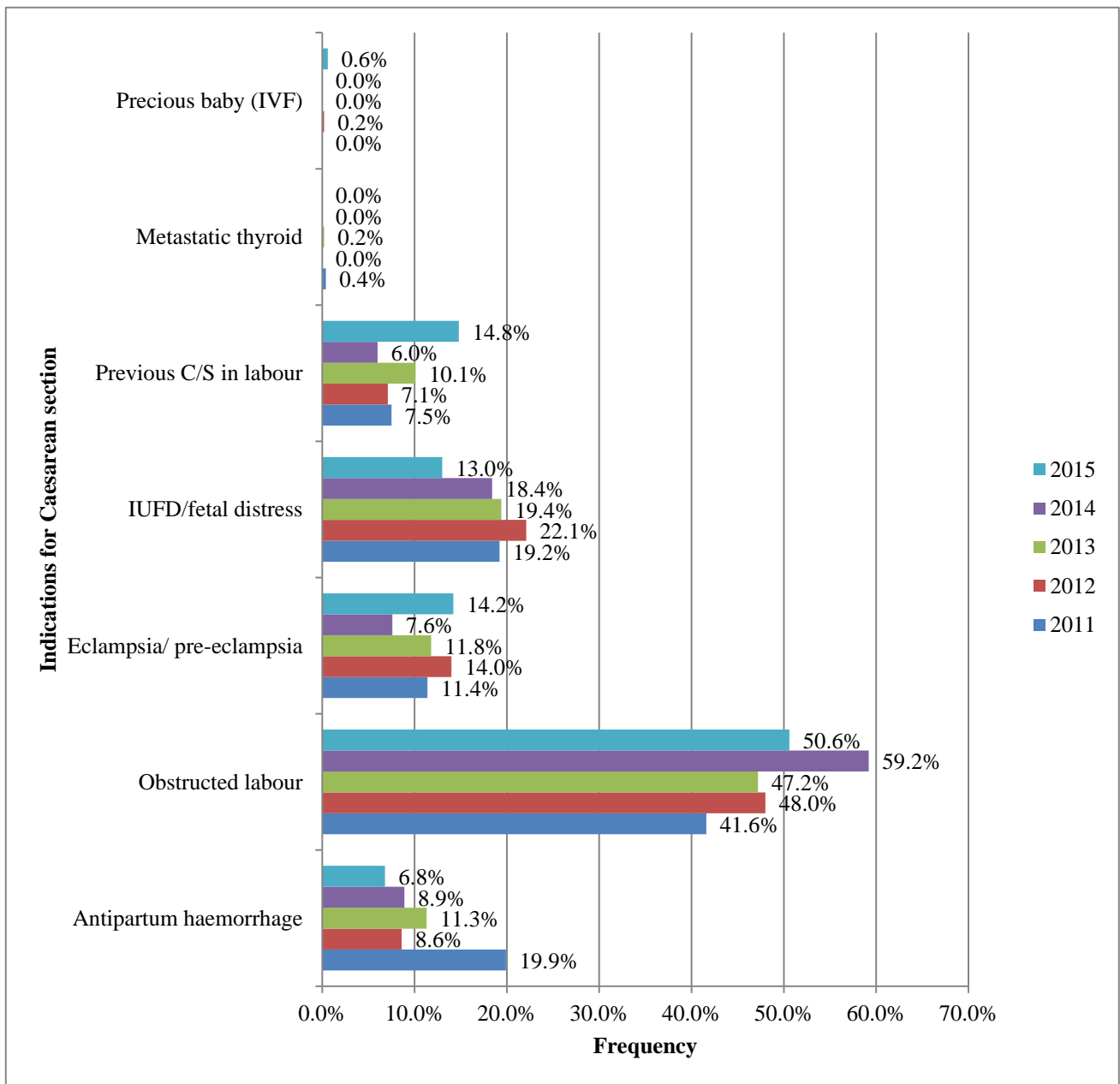


Figure 1: Yearly indications for caesarean section.

c/s= Caesarean section, ivf= in vitro fertilization, IUFD= Intrauterine fetal death.

Table 3: Relationship between booking, parity and neonatal outcome.

	ANC		χ^2	P value	OR	95% C.I for OR
	Booked	unbooked				
Parity						
Primigravida	233 (20.1)	90 (21.6)	0.430	0.512		
Multigravida	925 (79.9)	326 (78.4)				
Neonatal Outcome						
Alive	1119 (96.6)	344 (82.7)		<0.001	6.005	3.993–9.031
Dead	39 (3.4)	72 (17.3)				

n (%), ANC=Antenatal clinic.

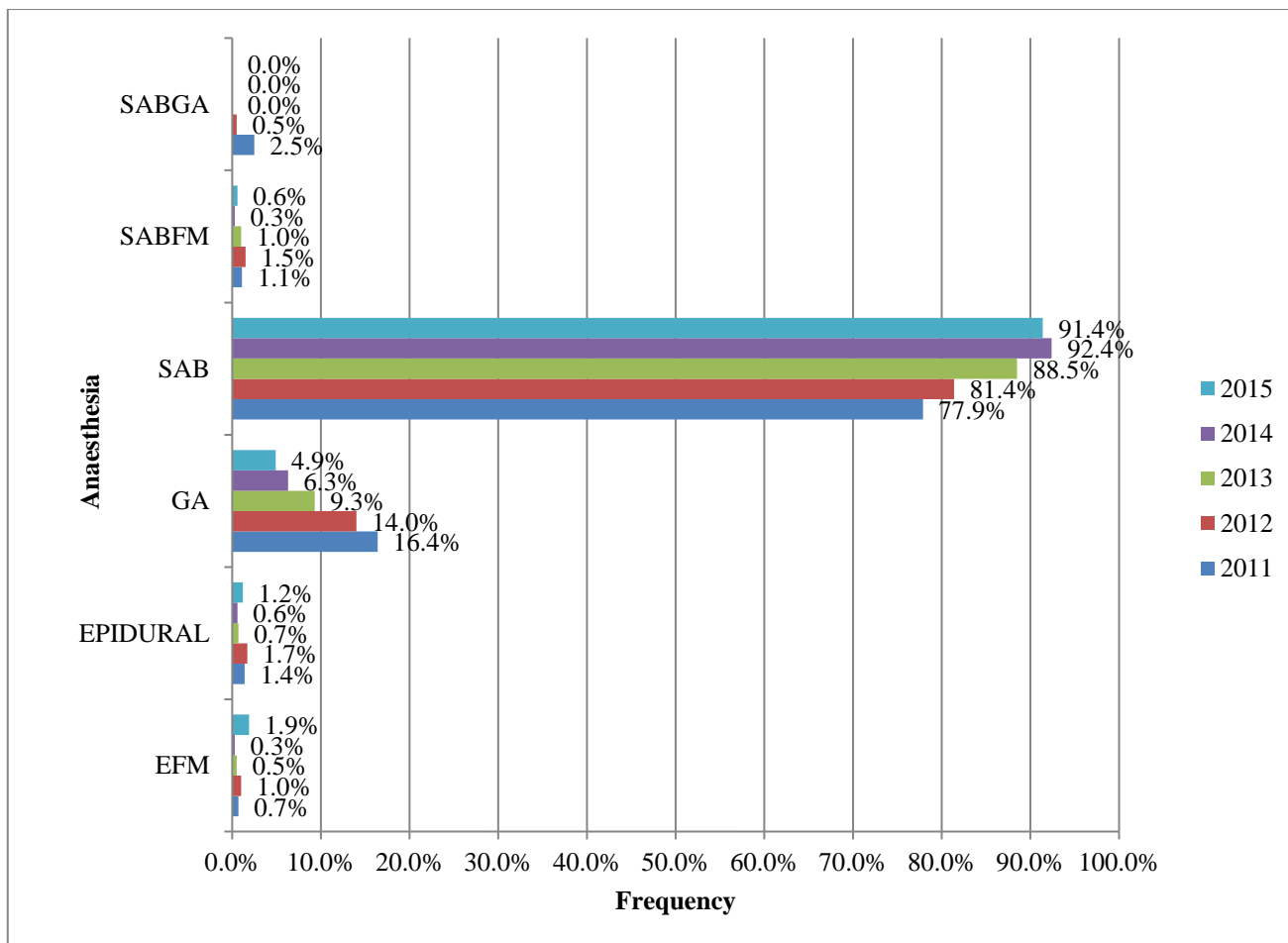


Figure 2: Type of anaesthesia conducted annually.

SAB-subarachnoid block; SABFM- subarachnoid block requiring oxygen administration by face mask; GA-general anaesthesia; SABGA-failed SAB converted to GA; EFM-epidural requiring oxygen administration by face mask.

Maternal outcome was compared among booked and unbooked patients (Table 2). It showed that greater number of parturient who did not attend the antenatal clinic (n=11, 2.6%) were admitted post operatively into the ICU following severe morbidity when compared to those who attended (n=5, 0.4%), and more death on the operating table (DOT) were recorded in the unbooked patients (n=4, 1.0%) as compared to booked parturient (n=2, 0.2%). The difference was statistically significant ($\chi^2=20.013$, $p<0.001$). Similarly the maternal outcome was compared among primigravida and multigravida parturient following caesarean section. The difference was not statistically significant ($\chi^2=0.695$, $p=0.707$).

Five of the DOT patients were cases of eclampsia while one was a case of placenta previa. All the cases were carried out under general anaesthesia. Six out of the 16 patients admitted to the ICU died. They were 4 cases of eclampsia, a case of obstructed labour and one case of placental previa. The commonest indication for ICU admission after caesarean section was eclampsia/ pre-eclampsia (n=11) followed by antepatum haemorrhage (n=3) and obstructed labour (n=2).

Neonatal outcome was compared among booked and unbooked patients. Table 3 showed that more babies of the unbooked patients died perioperatively (n=72, 17.3%) when compared to booked parturient (n=39, 3.4%) $p<0.001$.

The commonest type of anaesthesia administered for caesarean section was subarachnoid block (SAB), followed by general anaesthesia (GA) as shown in (Figure 2). The same trend was observed with emergency operations as shown in (Figure 3). There was a progressive increase in the use of SAB and a progressive decrease in the use of GA from 2011 to 2015 (Figure 2). In this study the failure rate of SAB was 0.6% and it was converted to GA (SABGA) and 0.7% in emergency operations (Figure 3). Patients who experienced pain and or difficulty in breathing under SAB were administered 100% oxygen via face mask and analgesia given, as appropriate (SABFM). (Figure 3) also showed that 0.8% of the patients under epidural anaesthesia required 100% oxygen via face mask (EFM).

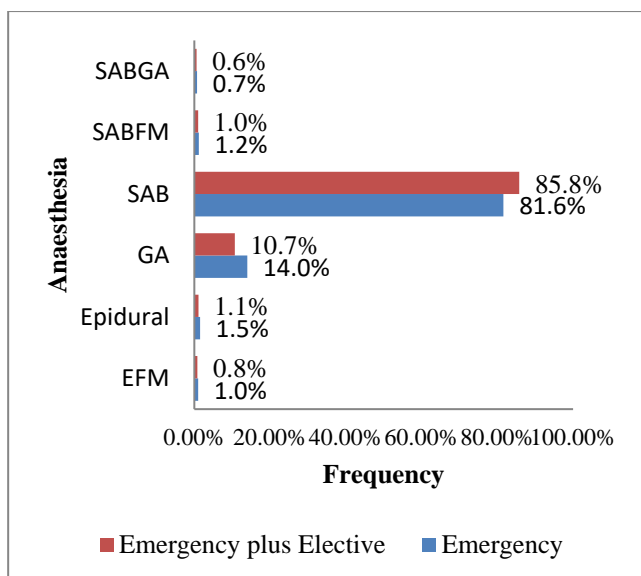


Figure 3: Type of anaesthesia conducted annually.

SAB-subarachnoid block; SABFM- subarachnoid block requiring oxygen administration by face mask; GA-general anaesthesia; SABGA-failed SAB converted to GA; EFM-epidural requiring oxygen administration by face mask.

DISCUSSION

Spinal anaesthesia is the commonest anaesthetics administered for caesarean section in this study. This type of anaesthesia is the technique of choice for caesarean section globally. Previous study by Okafor et al showed an increasing trend in the use of spinal anaesthesia in this center; this trend has also continued in the present study. The rate of spinal anaesthesia in this study (85.8%) is similar to studies by Imarengiaye et al 4 (85.9%) and higher than 72.6% reported by Okafor et al 3 in 2005.³

Spinal anaesthesia is not without its drawback. There are incidences of failure of spinal anaesthesia necessitating the conversion to general anaesthesia. Adenekan et al declared a failure rate of 6.0% in their study which is very high when compared to 0.6% in the index study. This result was attributed to the level of competence of the attending anaesthetist.⁵

A previous study done in this centre from 2001-2004 showed a CS rate of 25.3% as compared to 39.6% recorded in this study; and there was an increase in the number of booked patients from 64.8% to 73.6%. There is a global increase in the CS rate. The increase is thought to be due mainly to changed risk profiles both for expectant mothers and for their yet unborn children, as well as an increase in caesarean section by maternal request.^{6,7} Caesarean deliveries are currently one of the most common surgical procedures in the world.⁸ The CS rate recorded in this study is very high when compared to the world health organization (WHO) recommended rate of between 10 and 15% of total deliveries, regardless of the region or the country.⁹

The commonest indication for caesarean section in this study is obstructed labour. This is similar to report by Daniel and Singh in Sokoto.¹⁰ Eclampsia is the leading cause of maternal morbidity and mortality worldwide.¹¹ This was noticed in this study as majority of DOT and death in the ICU were recorded in this group of patients.

Antenatal care plays a major role in maternal and neonatal outcome following CS. More deaths were recorded amongst the unbooked patient when compared to booked patients ($p < 0.001$) and more neonatal deaths were recorded amongst unbooked compared to booked patients ($p < 0.001$). Early and good antenatal care would go a long way to reducing maternal and neonatal mortality. Previous studies showed that prenatal care is effective in reducing maternal mortality and serious morbidity.¹²

The limitations of this study are the retrospective nature of the study and poor documentation of vital information such as scanty data on management outcome.

CONCLUSION

Maternal morbidity and mortality were significantly higher in patient who did not attend antenatal care compared to those who attended. Neonatal mortality was also significantly higher amongst unbooked patients. Subarachnoid block is the anaesthetic technique of choice for caesarean section.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: Not required

REFERENCES

1. Ado DG, Bala MA, Bello MK, Jessy YO. Rising trend and indications of caesarean section at the university of Maiduguri teaching hospital, Nigeria. *Ann Afr Med.* 2009; 8(2):127-13.
2. Alexander GR, Kotelchuck M. Assessing the role and effectiveness of prenatal care: history, challenges, and directions for future research. *Public Health Rep.* 2001;116(4):306.
3. Okafor UV, Ezegwui HU, Ekwazi K. Trends of different forms of anaesthesia for caesarean section in South-eastern Nigeria. *J Obstet Gynaecol.* 2009; 29(5):392-5.
4. Imarengiaye C, Asudo F, Akinmola A, Lawal B. A snap-shot survey of spinal anaesthesia for caesarean section: The Nigeria experience. *J Clin Sci.* 2017;14:173-7.
5. Adenekan AT, Olateju SO. Failed spinal anaesthesia for caesarean section. *J West Afr Coll Surg.* 2011;1(4):1-17.
6. Okezie AO, Oyefara B, Chigbu CO. A 4-year analysis of caesarean delivery in a Nigerian teaching hospital: One-quarter of babies born surgically. *J Obstet Gynaecol.* 2007;27(5):470-4.

7. Mylonas I, Friese K. Indications for and Risks of Elective Cesarean Section. *Dtsch Arztebl Int.* 2015;112(29-30):489-95.
8. Milicent C, Zbiri S. Prenatal care and socioeconomic status: effect on cesarean delivery. *Health Econ Rev.* 2018;8:7.
9. Gibbons L, Belizan JM, Lauer JA, Betran AP, Merialdi M, Althabe F. Inequities in the use of cesarean section deliveries in the world. *Am J Obstet Gynecol.* 2012;206(4):331-11.
10. Daniel CN, Singh S. Cesarean delivery: An experience from a tertiary institution in north western Nigeria. *Niger J Clin Pract.* 2016;19(1): 18-24.
11. Zeeman GG. Obstetric critical care: a blueprint for improved outcomes. *Crit Care Med.* 2006;34(9):S208-14.
12. Carroli G, Rooney C, Villar J. How effective is antenatal care in preventing maternal mortality and serious morbidity? An overview of the evidence. *Paediatr Perinat Epidemiol.* 2001;15(s1):1-42.

Cite this article as: Onyekwulu FA, Okonna FG, Okeke TC, Okwor IO. The effect of anaesthesia and antenatal care on feto-maternal outcome after caesarean section in a developing country. *Int J Res Med Sci* 2020;8:3475-80.