Erratum
Omissions in the Tables and texts have been corrected.

AFRICAN JOURNAL OF FETOMATERNAL MEDICINE

Original Article

Outcome of Caesarean Delivery in Adeoyo Maternity Teaching Hospital Ibadan

Obilade A.O, Abdus-Salam R.A, Aremu O.O.

Adeoyo Maternity Teaching Hospital Ibadan

Abstract

Background: Caesarean section is the second commonest surgical procedure performed in obstetrics after episiotomy and it is being performed with increasing frequency and safety. However, the procedure is not without complications. **Objectives:** To determine the caesarean section rate and describe the complications associated with caesarean sections in Adeoyo Maternity Teaching Hospital. **Methods:** this is a retrospective study of the caesarean sections performed in Adeoyo Maternity Teaching Hospital, Ibadan, from January 2012 to December 2016. **Results:** During the study period, there were 17,339 deliveries and 1306 caesarean sections, giving a caesarean section rate of 7.5%. Nine hundred and forty-five (945) case files were available for analysis. The major indications were previous caesarean section (26.1%), cephalo-pelvic disproportion (15.7%) and malpresentation (11.0%). There were maternal complications in 167(17.7%) of cases and fetal complications in 177(18.7%) of cases. Complications were more common among the unbooked cases. There were 4(0.4%) maternal deaths, giving a Maternal Mortality Ratio of 434/100,000 livebirth. Also, there were 24(2.5%) stillbirths and 12(1.3%) early neonatal deaths; the perinatal mortality rate was 38.1 per 1000 births. Postpartum haemorrhage requiring blood transfusion (11.7%) was the most common maternal complication while birth asphyxia (3.3%) was the most common fetal complication. **Conclusion:** There were more complications when patients were unbooked and when general anaesthesia was used.

Keywords: Caesarean Section, Elective, Emergency, Booked, Unbooked.

Corresponding Author: Obilade A.O
Contact: 08039706833; drkunleobilade@yahoo.com

Introduction

Caesarean section is the delivery of the fetus, placenta, and membranes after the age of viability through an abdominal and uterine incision.[1] It is the commonest obstetric procedure after episiotomy.[1,2] It is being performed all over the world with increasing incidence because of improved method of infection control, anaesthesia and blood banking system.[3,4] Other reasons for this increase in the incidence include widening list of indication, improved patient education which leads to better acceptance of the procedure particularly in this environment, increased safety of the procedure adjudged by the maternal and fetal outcome and fear of litigation on the part of the obstetricians.[5,6]

The general incidence of Caesarean delivery ranges from 5% to 25% with a continued rise in developed countries while in developing countries the rate is relatively low.[1] In Nigeria, the rate of caesarean section varies from one center to the other; 9.9% was reported in Sokoto[7], 10.3% in Enugu[8], 20.3% in Birnin-Kebbi[9], and 22% in Ibadan.[10]

Caesarean Section is an ancient operation whose origin is not clear having been lost in antiquity[11] but has evolved from a post-mortem procedure to a lifesaving one for both mothers and babies.[5]

Cesarean section is indicated where vaginal delivery is either not feasible or would impose undue risks to the mother or the baby. It is performed either as an elective or an emergency procedure. some of the indications include but not limited to previous caesarean section, cephalopelvic disproportion/obstructed labour, malposition and malpresentation, fetal distress, major placenta previa, preeclampsia/eclampsia, HIV infection in pregnancy, previous vesicovaginal fistula repair, intrauterine growth restriction, and poor obstetric history etc.[1,7]

Despite improvement in safety of caesarean section in modern obstetrics, caesarean section still carries higher risks both to the mother and her baby when compared with spontaneous vaginal delivery.[12] Paucity of data on the outcome of caesarean section in this center informed the need for this study.

The objective of this study was to determine the caesarean section rate and describe the complications associated with caesarean sections in Adeoyo Maternity Teaching Hospital.

Methods

This was a retrospective cross-sectional study. The study population consisted of women who had a caesarean section at the Adeoyo Maternity Teaching Hospital, Ibadan, Nigeria, from 1st January 2012 to 31st December 2016.

Relevant data on the patients who had caesarean section within the years of study were extracted from the case files, labour ward and operating theatre registers. Only case files of 945 patients out of 1306 were available for analysis giving a retrieval rate of 72%. The data were entered into Statistical Package for the Social Sciences, version 22, for analysis. The results were expressed in frequencies, means, percentages, tables, figures, and charts. Ethical approval was obtained from the Hospital Ethical Committee.

Definitions of Terms

- Booking Status. All patients who have no prior antenatal record were treated as unbooked while those with prior antenatal record were treated as booked.
- The caesarean section performed were divided into two groups on the basis of the following definitions which are endorsed by the Royal College of Obstetricians and Gynecologists. Elective, performed at a time to suit the patient and the managing team (obstetrician, anesthetist, neonatologist, and midwives); emergency, performed when there is immediate threat to the life of the woman or her fetus).
- A diagnosis of sepsis was made based on the presence of purulent discharge at the operation site, whether swab culture yielded bacterial growth and/or postoperative temperature of 38ºC or more with bacterial growth from endocervical swab.

Results

During the period under review, 1306 caesarean sections were performed out of 17,339 deliveries giving a caesarean section rate of 7.5%. Analysis was done on 945 cases that the folders were available for study. The sociodemographic characteristics of patients undergoing caesarean section and their booking status were shown in Table 1. The age range of the subjects was between 14 and 48 years and the modal age was within the 26-30 age brackets (figure 1). Majority of the patients were traders 439(46.5%), civil servants 247(26.1%) and artisan 135(14.3%).

Table 1: Socio-demographic Characteristics

Variables	Frequency	Percentage
Age		
<20	17	1.8
20-25	174	18.5
26-30	303	32.1
31-35	277	29.3
36-40	151	16.0
>40	22	2.3
Total	945	100.0
Occupation		
Artisan	135	14.3
Civil servant	247	26.1
House Wife.	18	1.9
Student	72	7.6
Trading	439	46.5
Unemployed	12	1.3
Others	22	2.3
Total	945	100.0
Marital Status		
Married	920	97.4
Single	25	2.6
Total	945	100.0
Religion		
Christianity	515	54.5
Islam	426	45.1
Others	4	0.4
Total	945	100.0
Tribe		
Edo	1	0.1
Gambian		
(Non-Nigerian).	2	0.2
Hausa	5	0.5
Igbo	12	1.3
Tiv	1	0.1
Yoruba	924	97.8
Total	945	100.0
Gravidity		
1	291	30.8
2	266	28.1
3	183	19.4
4	103	10.9
≥5	102	10.8
Total	945	100.0

Majority of the patients who had a caesarean section during the study period were carrying their first pregnancies, 291(30.8%), or second pregnancies, 266(28.1%). Seven hundred and thirty-seven (78%) of

the patients were booked while 208(22%) were unbooked.

Gestational age at booking (Table 5) ranged from 6 weeks to 42 weeks with mean booking gestational age of 23.9 ± 6.4 weeks. Six hundred and fifteen (615, 65.1%) of the caesarean sections were done as emergency while 322(34.9%) were elective.

The commonest indication for caesarean section was previous caesarean section which constitutes 247(26.1%), Table 2, this was followed by CDP/Obstructed labour 147(15.7%) and malpresentation 104(11.0%). Maternal request was the least and it constitutes 3(0.3%). Previous caesarean section was still the commonest indication among the booked cases where it constitutes 212(28.8%) while CPD/Obstructed labour was the commonest indication among the unbooked cases and it constitutes 37(17.9%). The commonest malpresentation encountered was breech presentation which constitutes 74(71.8%) while the least was compound presentation, constituting only 1 (0.97%) of malpresentation. Others were transverse lie 17(16.6%), oblique lie 5(4.9%), face presentation 3(2.9%) and unstable lie 3(2.9%).

The commonest antepartum haemorrhage (APH) encountered was placenta preview, 32 out of 52 (61.5%) while abruptio placenta and vasa previa were found in 7(13.5%) and 1(1.9%) cases, respectively. In 12 (23.1%) cases, the cause of antepartum haemorrhage was not known.

Table 3 described maternal and fetal complications encountered in the cases of caesarean sections that were done during the study period. One hundred and sixty-seven (167) out of the 945 (17.7%) cases developed maternal complications while 177(18.7%) had fetal complications. It was also discovered that many patients with complications had more than one complication. The commonest maternal complication was primary postpartum haemorrhage which required blood transfusion, 111 (11.7%), this was followed by sepsis, 17 (1.8%). There were 4(0.4%) maternal deaths, which were caused by complications of sickle cell crisis, primary postpartum haemorrhage, eclampsia and bowel injury. The Maternal Mortality Ratio was 434/100,000 livebirth.

Maternal complications occurred in 29.8% of unbooked cases compared to 14.2% of booked cases (Table 4). However, maternal complications occurred more in cases completed by the consultants.

Majority of the cases had general anaesthesia and all maternal complications occurred in the cases with general anaesthesia. Regional anaesthesia (spinal) was used only in 22 out of 945 cases (2.3%) and there were no complications.

Table 2: Indication for Caesarean Section

Indication	Frequency	Percentage
Fetal Macrosomia	96	10.2
APH	52	5.5
CPD/Obstructed Labour	147	15.6
Elderly Primigravida	14	1.5
Failed Induction	24	2.5
Fetal Distress	76	8.0
Malpresentation	104	11.0
Maternal Request	3	0.3
Oligohydramnios/ Anhydramnios/IUGR	32	3.4
PIH(PE/EC/CH)	89	9.4
Previous CS	247	26.1
Previous Myomectomy	8	0.8
Others	53	5.6
Total	945	100.0

Indication and Booking Status

Indication	Booked	Unbooked	Total
Fetal Macrosomia	81	15	96
APH	30	22	52
CPD/Obstructed Labour	110	37	147
Elderly Primigravida	13	1	14
Failed Induction	21	3	24
Fetal Distress	57	19	76
Malpresentation	77	27	104
Maternal Request	3	0	3
Oligo/Anhydramnios/ IUGR	22	10	32
Others	41	12	53
PIH(PE/EC/CH)	62	27	89
Previous CS	212	35	247
Previous Myomectomy	8	0	8
Total	737	208	945

APH: Antepartum Haemorrhage; CS: Caesarean Section; CPD: Cephalopelvic Disproportion; PIH: Hypertension in Pregnancy, PE: Preeclampsia, EC: Eclampsia, CH: Chronic Hypertension; IUGR: Intrauterine Growth Restriction

Table 5: Descriptive Statistics of Obstetrics Parameters of The Participants

	N	Range	Minimum	Maximum	Mean	Std. Deviation
EBL	871	1900	100	2000	465.45	227.63
Gravidity	945	4	1	5	2.43	1.32
Gestational Age at Booking	728	36	6	42	23.93	6.44
PCV1	861	32	14	46	31.86	3.71
PCV2	845	30	10	40	27.54	4.45
Birth Weight	753	5.90	1.00	6.80	3.216	0.59
Parity	942	4	0	4	1.05	1.16

PCV1: Preoperative Packed Cell Volume; PCV2: Postoperative Packed Cell Volume

The mean preoperative pack cell volume was 31.86 ±3.7% and the mean postoperative packed cell volume was 27.54±4.6%. Minimum estimated blood loss was 100 mls and maximum was 2000mls.

Average blood loss at caesarean section was 465.5 ±227.6 mls. (Table 5). Overall fetal complication was 18.7% (177 out of 945) of cases. Fetal complications were also more common in the unbooked cases, occurring in 26% compared to 16.7% of booked cases (Table 4).

Table 3: Outcome of Caesarean Section

Maternal Complications	Frequency	Percentage
Bladder Injury	2	0.2
Puerperal Psychosis	1	0.1
Bowel Injury and Prolonged Hospital Stay	4	0.4
Maternal Death	4	0.4
No Complication	778	82.3
PPH, Blood Transfusion, Sepsis, Prolonged Hosp Stay	8	0.8
PPH, Blood Transfusion	111	11.7
Prolonged Hospital Stay	12	1.3
Sepsis	7	1.8
Others	8	0.8
Total	945	100.0
Fetal Complications		
Birth Asphyxia and SCBU Admission	11	1.2
NEC	1	0.1
Asp Pneumonitis and SCBU Admission	8	0.8
Mild Birth Asphyxia	31	3.3
Birth Trauma	2	0.2
Early Neonatal Death	12	1.3
Mild Neonatal Jaundice	10	1.1
Neonatal Jaundice and SCBU Admission	15	1.6
No Complication	768	81.3
Ophthalmia Neonatorum	12	1.3
Preterm LBW and SCBU admission	4	0.4
Congenital Malaria and SCBU Admission,	10	1.0
Severe Birth Asphyxia and SCBU admission	4	0.4
Neonatal Sepsis and SCBU Admission	29	3.1
Still Births	24	2.5
Others	4	0.4
Total	945	100.0

PPH: Postpartum Haemorrhage; NEC: Necrotizing Enterocolitis; SCBU: Special Care Baby Unit; Asp: Aspiration

The commonest fetal complication was mild to moderate birth asphyxia [31(3.3%)] which did not require SCBU admission, this was followed by neonatal sepsis occurring in 29 (3.1%) of the cases. There were 24(2.5%) stillbirths, more than half of which were intrauterine fetal death which resulted in macerated stillbirth. There were 12(1.3%) early neonatal deaths. Fetal complications occurred more in cases operated by the residents (Table 4).

Table 4: Feto-maternal Outcome Cross-Tabulated

Maternal Complication	Booking Status.		Total
	Booked	Unbooked	
Complications	105(14.2%)	62(29.8%)	167(17.7%)
No Complications	632(85.8%)	146(70.2%)	778(82.3%)
Total	737(100%)	208(100%)	945(100%)
	Cadre Of Surgeon		
	Residents	Consultants	
Incomplete Data	-	-	12(1.3%)
Complications	131(15.8%)	28(27.7%)	159(16.8%)
No Complications	701(84.2%)	73(72.3%)	774(81.9%)
Total	832(100%)	101(100%)	945(100%)
	Type of Anaesthesia		
	General	Spinal	
Incomplete Data	-	-	8(0.9%)
Complications	159(17.4%)	0(0%)	159(16.8%)
No Complications	756(82.6%)	22(100%)	778(82.3%)
Total	915(100%)	22(100%)	945(100%)
Fetal Complication	**Booking Status**		**Total**
	Booked	Unbooked	
Complications	123(16.7%)	54(26.0%)	177(18.7%)
No Complications	614(83.3%)	154(74.0%)	768(81.3%)
Total	737(100%)	202(100%)	945(100%)
	Type Of Anaesthesia		
	General	Spinal	
Incomplete Data	-	-	4(0.4%)
Complications	173(18.8%)	0(0%)	173(18.3%)
No Complications	746(81.2%)	22(100%)	768(81.3%)
Total	919(100%)	22(100%)	945(100%)
	Cadre Of Anaesthetist		
	Medical Officers	Consultants	
Incomplete Data	-	-	15(1.6%)
Complications	72(21.9%)	100(16.6%)	172(18.2%)
No Complications	257(78.1%)	501(83.4%)	758(80.2%)
Total	329(100%)	601(100%)	945(100%)
	Cadre Of Surgeon		
	Residents	Consultants	
Incomplete Data	-	-	8(0.9%)
Complications	153(18.3%)	18(18%)	171(18.1%)
No Complications	684(81.7%)	82(82%)	766(81.0%)
Total	837(100%)	100	945(100%)

Table 6: Paired Sample T-Test, Comparing Pre and Post-Operative Packed Cell Volume of the Participants

	Paired Differences						
				95% Confidence Interval of the Difference			
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper	*t*	*P-value*
Pair PCV1 - PCV2	4.25	4.37	0.16	3.95	4.56	27.18	0.001

PCV1: Preoperative Packed Cell Volume; PCV2: Postoperative Packed Cell Volume.

Similar to maternal complications, all fetal complications occurred in cases that had general anaesthesia. No fetal complications in only 22 cases that had regional anaesthesia. Figure 2 shows the numbers of caesarean section done each year between 2012 and 2016.

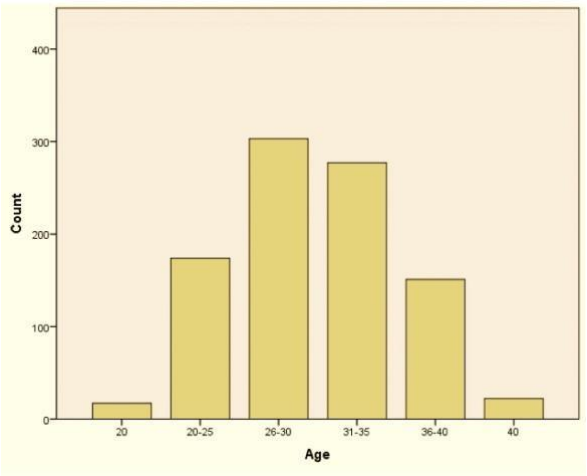

Figure 1: Age Distribution of the Participants

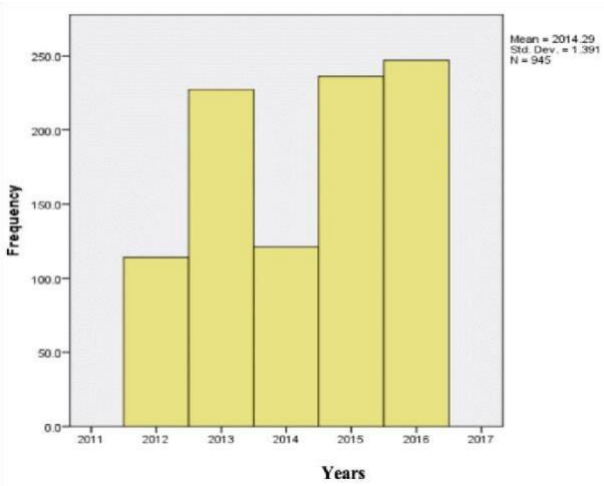

Figure 2: Numbers of Caesarean Sections Between 2012 and 2016

Discussion

The caesarean section rate of 7.5% found in this study is higher than previously reported rate of 5.39% in Calabar[13] but lower than 9.9% reported in Sokoto[7], 10.3% in Enugu[8], 20.3% in BirninKebbi[9], and 22% in Ibadan.[10] However, it is within the range of 6.4–33.2%[14-17] as reported from other centers in Nigeria and falls within the WHO acceptable limit of 15%.[18,19]

Similar to earlier studies from other parts of Nigeria, the majority of the caesarean sections were emergency cases despite the fact that the majority were booked because of a large number of 'defaulting' previous caesarean sections presenting in labour.[14,15] Majority of the caesarean sections were performed on primigravidae and those carrying their second pregnancy due to cephalo-pelvic disproportion and repeat caesarean section, thereafter, caesarean section decreased with increasing parity. The age and parity distribution, therefore, identified the young age group, primigravidae and primiparous women as the focus group for interventional measures aimed at reducing caesarean section rate.

The most common indication in this study was repeat caesarean section which has also been reported in previous studies.[7,12,20] Repeat caesarean section was still the most common indication among the booked patient while cephalopelvic disproportion and obstructed labour were the most common indications among the unbooked patients. Repeat caesarean section is undertaken in many women with one previous caesarean section when there is a recurrent indication such as cephalo-pelvic disproportion and in patients with two prior caesarean sections. Previous caesarean section was said to constitute the highest single indication for repeat section because obstetricians still regard vaginal birth after previous caesarean section as a high-risk option.[14] This finding is at variance with other studies where cephalopelvic disproportion and obstructed labour were the leading indication for caesarean section.[21-23] Caesarean section was performed mainly for obstetric reasons as there were only three cases of maternal requests.

Maternal complication rate of 17.7% in this study is higher than 13.3% reported from Sokoto[24] but lower compared to 20.4% reported from previous study in the same institution[12] and 39.3% reported from Maiduguri[19]. Maternal complication rate was higher among the unbooked cases compared to booked cases, 29.8% versus 14.2%, because most of the unbooked cases presented as emergencies with already compromised health status. The commonest maternal complication was postpartum haemorrhage requiring blood transfusion, this was followed by sepsis. This was similar to other studies in Nigeria[24,25] but at variance with the finding of sepsis as the most common complication in Sokoto.[12] There were 4(0.4%) maternal deaths, which were due to suspected bone marrow embolism in an unbooked sickle cell disease patient; postpartum haemorrhage in a booked patient with multiple huge uterine fibroids coexisting with pregnancy, eventually had caesarean hysterectomy and DIC; an unbooked patient with eclampsia which rapidly progressed to HELLP syndrome; and bowel injury in a booked patient with previous laparotomy, one previous myomectomy and one previous caesarean section. Contrary to another Sokoto study[24], maternal complications occurred more incases whose operations were completed by the consultants compared to those operated by the residents because of patient selection. Patients with multiple risk factors were usually operated by the consultants. Also, complications would have set-in in cases operated by residents before the help of a consultant is sought to complete the procedure.

Similar to the finding at Sokoto[24], the majority of the patients, 923 out of 945(97.7%) had general anaesthesia, only 22 patients had regional anaesthesia. All maternal complications occurred in the cases that had general anaesthesia, no complication was recorded in the 22 cases that had regional anaesthesia. Currently, there is a shift in favour of regional anaesthesia for lower segment caesarean section because of its higher safety profile.[26]

The finding of minimum estimated blood loss of 100mls might be an underestimation as visual estimation without actual measurement or weighing of gauze were done in most cases. There was significant change in the packed cell volume when mean preoperative packed cell volume was compared with mean post-operative packed cell volume using paired sample t-test, P value < 0.001.

The perinatal mortality rate in this study was 38.1 per 1000, it is lower than 154 per 1000, 72.2 per 1000 and 63.8 per 1000 reported in Sokoto[12], Maiduguri[14] and Anambra.[27] Overall fetal complication rate was 18.7% and there were 24(2.5%) stillbirth. Fetal complications were also more common in the unbooked cases. These findings were similar to the findings at Sokoto[12] and Obudu[21], Cross River state. Similar to the findings in the maternal outcome, no fetal complication occurred in the 22 cases that had regional anaesthesia.

The numbers of caesarean section done in 2012 and 2014 were fewer compared to the other years because of industrial actions undergone by health care workers in Oyo State Hospital Management Board in those years.

Conclusion

This study showed that the main indication for caesarean section is repeat caesarean section. The rate of caesarean section can be reduced by preventing the primary caesarean section as much as possible and encouraging trial of vaginal delivery after caesarean section. It also showed that there were more complications among the unbooked clients who usually present in emergency and it emphasized the safety profile of regional anaesthesia for caesarean section. Regional anaesthesia should be advocated to reduce feto-maternal morbidity and mortality.

Implication for Clinical Practice

Obstetrics interventions such as assisted vaginal delivery should be employed, where applicable, to reduce primary caesarean section.

Patients with one previous caesarean section who meet the criteria for vaginal birth after caesarean (VBAC) should be encouraged to have trial of labour after caesarean section (TOLAC).

Drilling of resident doctors on the prevention and management of postpartum haemorrhage during caesarean section is needed in order to reduce the morbidity and mortality associated with postpartum haemorrhage.

Acknowledgements

I give all glory to God for his help and his inspiration towards this research work. I also appreciate all my teachers for their counsel and tutelage, Dr Adeyanju A.O, Dr Olujimi P.O, Dr Olanlege O.S, Dr Adesanya O.A, Dr. Aremu O.O, Dr Aremu O.T, Dr Aremu A.O. I am eternally grateful for the opportunity given to me to be trained as a specialist.

References

1. Incerpi MH. Operative delivery. In: Decherney AH, Nathan L, Goodwin TM, Laufer N, editors. Current diagnosis and treatment obstetrics and gynaecology. New York: Mc Graw Hill; 2007. p. 461-76.
2. Ijaya MA and Aboyeji AP. In Caesarean Delivery: The Trend over a Ten-year period at Ilorin, Nigeria. Nig. J. Surg. Research: 2001: 3(1): 11-17
3. Scott JR. Caesarean Delivery. In: Danforth's Obstetrics and Gynaecology, 7th ed. Scott JR et al(edits). J. B. Lippincott Compant Ltd.(Pub). 1994; 563-576.
4. Abiodun OM, Balogun OR In: A Review of Caesarean Sections Associated with Perinatal Mortality at University of Ilorin Teaching Hospital, Ilorin, Nigeria. Nigerian Journal of Clinical Practice, Sept. 2009, Vol. 12(3) p: 248-251
5. C. Nwosu, K. Agumor, A.P. Aboyeji and M. A. Ijaiya In: Outcome of Caesarean Section in a Sub-urban Secondary Health Care Facility in Nigeria. Nigeria Medical Practitioner Vol. 46 No4. 2004(77-79) 6. Okonofua F.E., Makinde O.N. and Ayangade S.O. In: Present trends in Caesarean section and Caesarean mortality at Ile-Ife, Nigeria. Nig. Med. Pract. 1988; Vol. 16(1): 8-12
6. Nwobodo EI, Isah AY, Panti A. Elective caesarean section in a tertiary hospital in Sokoto, north western Nigeria. Niger Med J 2011;52:263-5.
7. Megafu U, Nweke PC. Maternal mortality from caesarean section. Trop J Obstet Gynaecol 1991;9:1-4
8. Nwobodo EI, Wara HL. High caesarean section rate at Federal Medical Centre Birnin-Kebbi: Real or apparent? Niger Med Pract 2004;46:39-40.
9. Arowojolu Akindele A O, Okewole I A, Omigbodun A O in: Multi Variate Analysis of Risk Factors for Caesarean Section in The University College Hospital Ibadan. Nigerian Journal of Clinical Practice Vol. 6(2)2003 p: 87-91
10. Myerscough PR. Caesarean section .in: Munro Kerr's Operative Obstetrics, 10th edn. Myerscough, PR(Edit). Bailliere Tindall, London(Pub), 1995; p. 295-313.
11. Panti A.A, Karima T. A, Nwobodo E.I, Yakubu A, Airede L, Egondu S.C. In: Caesarean morbidity and mortality in a tertiary health institution in Sokoto,
12. North-West Nigeria. Orient Journal of Medicine Jan-Jun 2012 Vol 24 (1-2)

13. Osonwa OK, Eko JE, Ekeng PE. Trends in caesarean section at Calabar general hospital, Cross River State, Nigeria. EJBR. 2016; 4(1):1-5.
14. Geidam AD, Audu BM, Kawuwa BM, Obed JY. Rising trend and indicationsof caesarean section at the university of Maiduguri teaching hospital, Nigeria. Ann
15. Afr Med 2009;8:127-32
16. Chama CM, El-Nafaty AU, Idrisa A. Caesarean morbidity and mortality at Maiduguri, Nigeria. J Obstet Gynaecol 2000;20:45-8.
17. Ugwu EO, Obioha KC, Okezie OE, Ugwu AO. A five-year survey of caesarean delivery at a Nigerian tertiary hospital. Ann Med Health Sci Res 2011;1:77-84.
18. Ojiyi EE, Dike EI, Anolue F, Chukwulebe A. Appraisal of caesarean section at the Imo State University Teaching Hospital, Orlu, South-Eastern Nigeria. Internet J Gynaecol Obstet 2012;16:DOI: 10. 5580/2bdf.
19. WHO. Appropriate technology for birth. Lancet 1985;2:436-7.
20. Gibbons L, Belizan JM, Lauer JA, Betran AP, Merialdi M, Althabe F. The Global Number and Costs of Additionally Needed and Unnecessary Caesarean Section Performed per Year: Overuse as a Barrier to Universal Coverage. World Health Report (2010) Background Paper, No 30; 2010
21. Swende TZ, Agida ET, Jogo AA. Elective caesarean section at the Federal Medical Centre Makurdi, northcentral Nigeria. Niger J Med 2007;16:372-4.
22. Maanongun MT, Ornguze AA, Ojabo AO, et al. Indications and the materno-foetal outcome of caesarean section in a secondary health facility in obudu, south-south Nigeria. Res Rep Gynaecol Obstet. 2017;1(3):4-9
23. Ayano M, Beyene WA, Geremew MA. Prevalence and outcome of Caesarean Section in Attat Hospital, Gurage Zone, SNNPR, Ethiopia. Archives of Medicine. 2015;7(48):1-6.
24. Fisseha N, Getachew A, Hailu M, et al. A National review of caesarean delivery in Ethiopia. Int J Gynaecol Obstet. 2011;115(1):106-11
25. Daniel CN, Singh S. Caesarean delivery: An experience from a tertiary institution in north western Nigeria. Niger J Clin Pract 2016;19:18-24..
26. Obiechina NJ, Ezeama CO, Ugboaja JO. A five-year review of Caesarean section in Nnamdi Azikiwe University Teaching Hospital, Nnewi Anambra State,
27. Nigeria (1st Jan, 2002-31st Dec, 2006. Trop J Med Res 2008;12:29-32
28. Yeoh SB, Leong SB, Heng AS. Anaesthesia for lower-segment caesarean section: Changing perspectives. Indian J Anaesth 2010;54:409-14.
29. Ikeako LC, Nwajiaku L, Ezegwui HU. Caesarean section in a Secondary Health Hospital in Akwa, Nigeria. Niger Med J, 2009; 50(3):44-67.