

An Audit of Cesarean Sections in a rural private Hospital in Enugu, Nigeria.

Chukwuemeka Chijioke Nwangwu¹, Anthony Jude Edeh¹,
Wilfred Okwudili Okenwa¹.

¹ His Grace Medical Centre, Ogwuagor, Abakpa Nike, Enugu Nigeria.
Correspondence: Dr. Anthony Jude Edeh

Abstract: Nigeria is a major contributor to the global burden of maternal mortality. Many believe this is as a result of limited access to routine and emergency obstetric services especially among the rural poor. One of the important challenges in the effort to reduce both maternal and neonatal complications in rural areas still remains the ability to deliver promptly emergency C-section. Between October 2015 and April 2018 (30 months period) our rural private hospital performed 191 cesarean sections. The indications for C/S were: failure to progress in labour (41.88%) previous C/S (31.42%), abnormal presentations (9.42%) multiple pregnancies (4.7%), Uterine ruptures (4.19%), ante-partum hemorrhage (4.19%), pregnancy induced hypertension 4.19% and others.

Majority of the C/S were done in the age group 21-35 years (72.78%). The majority of were in un-booked multiparous patients referred from the traditional birth attendants (90.1%). Post-operative complications were noted in 13 patients (6.8%) and the commonest was surgical site infection (4.19%). There were 10 peri-natal deaths, which gave an uncorrected peri-natal mortality rate of 52.36 per 1000 C/S births. There were 2 maternal deaths in this series and two patients were referred to the specialist hospital because of acute renal failure due to severe hypertension and one referred for post-partum hemorrhage suspected to be due to disseminated intravascular coagulation. By this presentation we hope to encourage other private hospitals in other rural areas of resource-poor countries to take up this challenge of improving access to cesarean delivery in their localities so as to decrease both maternal and neonatal mortalities.

Key Words: Cesarean delivery, resource-poor country, rural community, private hospital, obstetric services, maternal and infant mortality.

Date of Submission: 23-08-2019

Date of Acceptance: 07-09-2019

I. Introduction

Cesarean section is a lifesaving surgical intervention which refers to the delivery of a fetus, placenta and membranes through an abdominal and uterine incisions after viability¹. It is the most commonly performed major surgical procedure in the female². The rate which is a very important indicator for measuring access to obstetric services has consistently increased globally in the last three decades with many developed countries overshooting the 10-15% threshold^{2,3,4}. The commonly cited justification for increased use of caesarean delivery is improving fetal and maternal outcome. In the developing countries however, there are delays to undertake timely cesarean delivery leading to increased maternal and neonatal complications^{5,6}. Despite the multitude of private hospitals in Nigeria available reports on CS are mainly from tertiary hospitals in Nigeria and indicate that prevalence of emergency cesarean delivery is very high and is impacting the rural areas^{7,9,10,11}.

However, more than 75% of all cesarean section in Nigeria are linked to obstetric emergencies that could have been prevented by earlier medical care¹². Many handi-caps compound the outcome of deliveries in Nigeria such that even with birth plans in place, many women opt to deliver with an unskilled birth attendant (Traditional Birth attendant) in a setting other than a hospital because of barriers in seeking treatment including cost, and the inability of many rural hospitals to perform cesarean section related to scarcity of skilled manpower and necessary equipment⁷. Some of these challenges have improved recently through education, sensitization, empowerment and establishment of referral linkages for TBAs to transfer possible obstetric emergencies to nearby health facilities with expertise to manage them^{8,9}. There are still challenges of offering prompt emergency cesarean section by private hospitals, in Enugu. Some of them include challenges of adequate medically qualified staff with skills for cesarean section, appropriate equipment and skill to administer and monitor spinal anaesthesia, facilities for blood banking¹² and ability of the patients to pay out of their pockets in rural hospitals, these cause significant delays and adversely affect outcome. Some of these challenges are examined and discussed in this paper.

Rural hospitals are either public or private health facilities located far away from the city with often bad road network or uneasy transportation access. Not many of them have medically qualified officer with skills for cesarean operation. There is usually no appropriate anaesthetic equipment and skills such as ability to administer and monitor spinal anaesthesia. Only few have facilities for blood banking services and good intravenous antibiotics use¹¹.

II. Method

Study Area

This retrospective study was done at a private hospital in Ogwuagor, Abakpa-Nike, Enugu State, Nigeria. Enugu is one of the oldest states in Nigeria. It has a geographic coordinates of 6 30N 7 30E / 6.500N 7.500E and population size of 3.3million people (2006 census).

Abakpa is a large town located in the neighborhood of Enugu city, central Nigeria. It is small settlement near Highway 343, with a few large commercial markets and harbours many rural areas which Ogwuagour is one of them. The population is exceeding 25,000 people.

Study Design

Prior to this study, a referral linkage was established the fourteen TBAs operating in our area, educating them and sensitizing them on obstetric emergencies and the importance of early patient referral. One of their major concerns was accepting referred patients without financial commitment since the majority of their patients are poor. They were assured that all payments can be made after the procedure. Prominent among the issues discussed include a mandatory obstetric scan before labour to identify abnormal position and placenta location, to refer before labor complicated cases such as previous CS, hypertension in pregnancy, multiple gestation etc.

This private hospital has 16 beds with 2 surgeons(in general and trauma surgery) and a senior medical officer who is resident. There are two nurse midwives, 15 nursing assistants but no anesthetic equipment and no blood banking facility. We invite anaesthetists from the state teaching hospital located 10 km away and private blood banking laboratories exist within 5km distance from our hospital whenever these are needed.

Anesthesia

Out of 191 CS done in our hospital in the period under review, 184 were done using general anesthesia with ketamine. Ketamine was administered intravenously in semi-titrated manner after pre-op medication with atropine, ceftriaxone, omeprazole and metronidazole and as soon as the surgeon is ready for skin incision. Per-medication is essential to decrease aspiration and post-operative wound infection.

Induction dose of 1-2mg per kg body weight of ketamine was administered slowly. That dose gave optimal sedation and relaxation adequate to commence the surgery. Top-up of 10mg was given every 15 minutes. This regimen was constituted by dilution with normal saline; 2ml of ketamine (50mg/ml) was diluted in 8ml of normal saline using 10ml syringe. Therefore 4ml is required to get 40mg for induction while 1ml is equivalent to 10mg required for maintenance.

Patients were given intramuscular pentazocin 30mg and intramuscular Diclofenac 75mg immediately after closing the skin. With this method 95% of our patients regained consciousness within 30 minutes after the last maintenance dose.

Apart from the above medications, at least 1L of normal saline was given before skin incision because most of them were dehydrated on presentation. The exceptions are hypertensive and non-dehydrated patients. The dose of atropine, ceftriaxone, omeprazole and metronidazole are 6ug, 1000mg, 20mg and 500mg respectively. We do not use any specific thrombo-prophylaxis before surgery.

Surgical procedure

The majority of the procedures were categorized as immediate (crash) CS, or urgent CS. Only few were scheduled or elective. All patients had indwelling bladder catheterization with size 14F Foley catheter. Upon observing routine aseptic procedure, skin incision was made. The Pfannenstiel skin incision or the Joel-Cohen incision was generally used except in patients with a previous sub-umbilical midline scar. Transverse incision decreases incisional hernia formation and has better cosmetic scars. The lower uterine segment section was used to reduce adhesion formation, blood loss and scar dehiscence in patients with uterine rupture whose fetus and placenta were usually expelled into the peritoneal cavity. In those cases and other cases of uterine rupture, the perforations were repaired in two to three layers using chromic catgut size 2. Meanwhile the lower segment incisions were repaired in two layers using same chromic catgut size 2. Upon uterine repair, the next was the rectus sheaths. They were closed continuously using nylon 2. The parietal peritoneum was not repaired. The skin was closed continuously using nylon 2/0. The average operation duration was 41.3minutes.

Post-op care

The patients are all placed on nil per mouth till the bowel sounds returned. Upon bowel sound return, they were commenced on graded oral sips. Bowel sound was picked in 93.6% of the patients at about 18-24 hours post-op. Before oral feeding patients were on IV fluids comprising normal saline and 5% dextrose in water. Systemic ceftriaxone and metronidazole were the routine antibiotics used during the period under review. The first dose was given pre-op as stated above. Ceftriaxone was repeated at 4 hours post-op and then 12 hourly for 48 hours. Metronidazole is given 8 hourly for 48 hours. Most patients did well with this regimen; however few needed extension of their antibiotics for more 48-72 hours. Intramuscular pentazocine 30mg 8 hourly or diclofenac sodium 75mg 12 hourly were given for 48 hours. Wound dressing was changed on the day 2 post op. Subsequent dressing was determined by the state of the wound. And sutures were removed on the day 14 post op. They are encouraged to ambulate from 24 hours post op. Stable patients were discharged on the day 3 post op.

Puerperal period

At six weeks post-op patients return to the hospital for puerperal examination, such as uterine involution, wound strength and scar complications. We also discuss family planning infant welfare including breast feeding, regular immunization and mother-child bonding. This retrospective study involved the case notes of 191 patients who were referred for cesarean deliveries from traditional birth attendants (TBAs) from October, 2015 to April 2018..

Statistical Analysis

Statistical analysis was performed using the software SPSS, version 15.0 (IBM corporation, Chicago, IL, USA). Simple proportion was used to summarize variables.

III. Results

During the period under review our hospital recorded 72 vaginal deliveries as against 191 cesarean deliveries under study. For the CS cases, the mean age of the women is 29 years. Thirty four percent of them were in the age range of 26 years to 30 years (Table 1). This is followed closely by 23% observed in the 31-35 years age group. Sixty six percent of the women completed secondary school education.

In the period under review, 90.2% (172/191) of the pregnant women were unbooked and therefore presented on emergency. All of them had their labour attempted in TBA homes prior to presentation. Twenty three percent of them had at least one previous CS and half of which presented with obstructed labour (Table 2).

General anesthesia with ketamine was used in 97.4% of the patients. This comprised of 172 patients who presented as emergency and 14 elective cases. Only 5 patients had spinal anesthesia, they were all booked and had elective surgery (Table 3). Among the patient who had general anesthesia, 171 regained consciousness within 30 minutes of skin closure.

Horizontal incisions 2-3cm above the ASIS (Anterior Superior Iliac Spine) were used except in 22 patients with previous midline scar and 2 patients with huge intra-uterine fibroids co-existing with the pregnancy.

Only three patient received blood transfusion intra-op. One was a case of sickle cell anemia in pregnancy while the other was severely pale on account of antepartum hemorrhage.

One hundred and one patients were strong enough to stand erect on the day one post op while on day 14 the clinical states of 189 patients were satisfactory. Three patients were referred to Teaching Hospital on account of renal complication associated with severe hypertension in pregnancy and post-partum hemorrhage due to disseminated intravascular coagulopathy (DIC) (Table 3)

Wound infection was the commonest complication recorded. Eight patients had wound infection that necessitated only wound dressing while one patient had wound breakdown which was managed by delayed primary closure (Table 4).

Table 1: Age distribution of the patients

Age (years)	Number of patients(191)	Percentages
<20	3	1.57
21-25	30	15.71
26-30	65	34.03
31-35	44	23.04
36-40	7	3.66
41-45	2	1.05
46-50	1	0.52
	191	100

Table 2: Indication for CS in the period under review

S/N	Indications	No of patients	Percentage
1	Prolonged labour without previous CS	31	16.23
2	Prolong Labour and previous CS	22	11.52
3	Obstructed Labour without previous CS	49	25.65
4	Obstructed Labour with previous CS	22	11.52
5	Abnormal presentation	18	9.42
6	Multiple pregnancy	9	4.71
7	>1Previous CS	16	8.38
8	Uterine rupture	8	4.19
9	Antepartum hemorrhage	8	4.19
10	Hypertension in Pregnancy	8	4.19
		191	100

Table 3: Antenatal booking status, nature of the CS and other parameters

Status	N(191)	% (100)
Booked	19	9.9
Unbooked	172	90.1
Nature of the CS		
Elective	19	9.9
Emergency	172	90.1
Anesthesia		
GA with ketamine	186	97.4
Spinal	5	2.6
Blood transfusion		
Yes	3	0.5
No	190	99.5
Incision		
Pfannistéal	169	88.0
Subumbilical	22	22.0
Awake from anesthesia		
1-30min	171	91.9
31-60min	13	7.0
>1hour	2	1.1
Standing erect		
Post-op day1	141	73.8
Post-op day2	43	22.5
Post-op day3	7	3.7
Two weeks post-op state		
Satisfactory	189	99.0
Referred	2	1.0

Table 4: post cesarean delivery complications

Post-op complications	N(191)	Percentages
Post op Anemia	2	1.05
Urinary tract infection	1	0.52
Wound infection	8	4.19
Partial wound dehiscence	1	0.52
Wound hematoma	1	0.52
Total	13	6.80

IV. Discussion

This study recorded high incidence of emergency cesarean delivery owing to the fact that the hospital is located in a rural area where many pregnant women appear to patronize the traditional birth attendants. Studies have shown that over 2/3 of deliveries occur outside the health facility in the developing countries with negative impact on maternal and child health. In Nigeria greatest proportion of those deliveries is estimated to take place in the TBA's homes. For instance, studies in Edo and Enugu, Nigeria observed that over 60% of births in rural areas were conducted in TBA homes^{13,14}. In 2011, only about 39% of all births in Nigeria are conducted by skilled birth attendants. This could explain why Nigeria with about 1% of the world population accounts for 10% of global maternal and under-five mortality rate^{15,16}. Factors such as low maternal education, poor family wealth index, traditional views, religious fallacy, poor road networks and unemployment have been reported as the major determinant of low hospital preference by pregnant women^{14,16}. Some studies however, have pointed out that many women are dreadful of cesarean section and there is increased chance of having a caesarean delivery at hospital¹⁴. There are many superstitions about cesarean delivery especially among religious rural dwellers¹⁶. In this our study the only real reason one can give for the increased patronage of TBA is low socio-economic status or simply put – poverty. There are many hospitals both private and public within 5-

20kilometers from our rural area with acceptable road network and competent staff but whose cost of care is above what the average rural pregnant woman can afford.

The referral practice of the TBAs has improved in recent years since most countries, where they operate, have prioritized their training and integration into existing maternal health-care delivery system instead of banning them. From this study, it may appear that their referral habit has improved but it seems they demonstrated lack of necessary skills for prompt detection of complication and therefore majority of the patients were referred late. All the patients they referred in the period under review required emergency CS to either salvage the mother, child or both. There were many cases of uterine rupture and fresh stillbirths recorded. According to a study done in Enugu, TBAs delay in referral practice is informed by their perception of the causes of maternal death. In that study majority hold that maternal death result from patient's sins, witchcraft or Gods wish etc¹⁷. Because of their low level of health training, little supervision and continuing education, the TBA can only continue to cause more harm than good in our goal to improve obstetric and perinatal indices in Nigeria. Therefore government must arise to their responsibility of providing acceptable and affordable health care to its citizens instead of relying on the TBAs. It is a fundamental right and the earlier is the better.

Majority of the women were between 25-35 years of age. Similar finding was reported by most studies in the state¹⁸. Only 3 patients were less than 20 years. This supports many reports that campaign against early marriage and unsafe sex among adolescents in Enugu are yielding the needed result¹⁹.

Obstructed labour was the commonest indication for emergency CS followed by prolonged labour. This finding agrees with most studies in the developing countries, where among the five major causes of maternal mortality, obstructed labour is leading with untold burden²⁰. It is reported to be common among unbooked, primigravidas, uneducated and low socio-economic status rural dwellers²¹. It causes uterine rupture and is one of the leading causes of vesicovaginal fistula (VVF)^{21,22}. In this study, there were 8 cases of ruptured uterus following obstructed labour but no reported case of VVF during follow-up. More worrisome is the finding that 22 patients with obstructed labour had previous scars. They were all unbooked and for successful trial of labour after CS, patient should have attended antenatal, reviewed by consultant obstetrician and adjudged fit for vaginal birth. Such patient is to be monitored closely for early detection of possible poor progress of labour²². In summary women with both previous CS and a previous vaginal birth are more likely to give birth vaginally. Vaginal birth after CS (VBAC) can increase uterine rupture (especially with induction of labour) and can increase intrapartum infant death.

The procedure for the surgeries was adopted to reduce delay and minimize complication. Since emergency CS is carried out when an immediate decision is made to deliver the woman and any delay may result in unwanted complication to the mother or child, the time interval from when the decision for operative delivery and delivery proper is essential^{23,24}. In the period under review the decision-to-delivery interval was less than 45 minutes. This gave outcome similar to findings in places where facilities are available to ensure shorter intervals²⁴: Fetal death (10/200) recorded were diagnosed before the surgery using fetoscope. There were two maternal mortality recorded, both occurred in the referre tertiary hospital.

The average duration of surgery as reported above was 45 minutes. The rate of wound infection and other surgical complication is widely reported to increase with duration of surgery²⁵. Such complications also increase hospital stay with serious economic consequence. Eight patients had wound infection for which their antibiotics were extended. The infection could have come as a result of septic practices of the TBAs or hospital acquired²⁶ and many of those with prolonged labour had premature of membranes many hours before onset of CS and delivery.

Spinal anaesthesia is commonly used in cesarean operations²⁷. Its advantage over general anaesthesia is that the patient will remain conscious thereby reducing the risk of aspiration²⁸. Notwithstanding, many studies comparing the outcome of the two methods showed no significant difference²⁷. In contrast, apart from anaesthesia failure, spinal is often associated with hypotension which could be detrimental in rural setting with suboptimal facility for monitoring and resuscitation. Furthermore, this side effect may be more pronounced in the background of dehydration or shock in which most patient for emergency CS present with. Again spinal anaesthesia is not executed by surgeons but by the anaesthetists and insisting on spinal in all our cases will significantly increase delay to perform the CS. In the period under review, general anaesthesia with ketamine was used with no observed side effect. Ketamine has been shown to be beneficial in shock because it increases cardiac activity²⁹. Its use in the rural setting reduces the absolute need for sophisticated equipment and minimizes delay and anesthetic failure associated with spinal. Ketamine is widely used by non anaesthetists because of its relative preservation of airway reflexes, and that is why many refer to it as anaesthetic for the single handed surgeon.

In resource-poor countries with few specialists, every doctor especially those working in rural areas should become proficient in procedure of C/S soon after full medical registration. All specialists are also encouraged to perform successful C/S from time to time. This maybe the spirit behind the insistence by the West African College of Surgeons (WACS) that all surgical residents aspiring for membership certification

must be proficient in C/S. This can help provide the needed manpower for those pregnant women who may need it.

V. Conclusion

Many pregnant women in the rural areas of Enugu Nigeria still prefer the traditional birth attendants to manage their labour and are at risk of delay referral to the hospital should there be complication. There is need for increased education and sensitization of the TBAs on warning signs and importance of early referral. The governments should equip the rural hospitals and assign qualified personnel to manage them for optimal delivery of emergency obstetric services. In the meantime, existing health facilities with capability for CS should establish referral linkage with nearby TBAs to maybe improve our maternal and perinatal indices.

References

- [1]. Betrán AP, Ye J, Moller AB, Zhang J, Gülmezoglu AM, Torloni MR. The increasing trend in caesarean section rates: global, regional and national estimates: 1990-2014. *PloS one*. 2016;11(2)
- [2]. UNICEF
The State of the World's Children 2013, UNICEF, New York (2013) <http://www.unicef.org/sowc2013/> (accessed December 3, 2018).
- [3]. Vogel JP, Betrán AP, Vindeoghel N, Souza JP, Torloni MR, Zhang J, Tunçalp Ö, Mori R, Morisaki N, Ortiz-Panozo E, Hernandez B. Use of the Robson classification to assess caesarean section trends in 21 countries: a secondary analysis of two WHO multicountry surveys. *The Lancet Global health*. 2015;3(5):260-70.
- [4]. Saeed KB, Greene RA, Corcoran P, O'Neill SM. Incidence of surgical site infection following caesarean section: a systematic review and meta-analysis protocol. *BMJ open*. 2017 Jan 1;7(1):e
- [5]. Molina G, Weiser TG, Lipsitz SR, Esquivel MM, Uribe-Leitz T, Azad T, Shah N, Semrau K, Berry WR, Gawande AA, Haynes AB. Relationship between cesarean delivery rate and maternal and neonatal mortality. *Jama*. 2015 Dec 1;314(21):2263-70.
- [6]. Nwobodo EI, Isah AY, Panti A. Elective caesarean section in a tertiary hospital in Sokoto, north western Nigeria. *Nigerian medical journal: journal of the Nigeria Medical Association*. 2011 Oct;52(4):263.
- [7]. Ugwu EO, Obioha KC, Okezie OA, Ugwu AO. A five-year survey of caesarean delivery at a Nigerian tertiary hospital. *Annals of medical and health sciences research*. 2011;1(1):77-84.
- [8]. Ugwu NU, de Kok B. Socio-cultural factors, gender roles and religious ideologies contributing to Caesarian-section refusal in Nigeria. *Reproductive health*. 2015 Dec;12(1):70.
- [9]. Sibley, L; Sipe T; Koblinsky M (2004). "Does traditional birth attendant training improve referral of women with obstetric complications: a review of the evidence". *Soc Sci Med*. 59 (8): 1757–68.
- [10]. Prata, N; Sreenivas A; Vahidnia F; Potts M. (2009). "Saving maternal lives in resource-poor settings: facing reality". *Health Policy*. 89 (2): 131–48.
- [11]. Imogie AO, Agwubike EO, Aluko K. Assessing the role of traditional birth attendants (TBAs) in health care delivery in Edo State, Nigeria. *African Journal of Reproductive Health*. 2002 Aug 1:94-100.
- [12]. Sarker BK, Rahman M, Rahman T, Hossain J, Reichenbach L, Mitra DK. Reasons for preference of home delivery with traditional birth attendants (TBAs) in rural Bangladesh: a qualitative exploration. *PloS one*. 2016 Jan 5;11(1):e0146161.
- [13]. Dumont A, Gaye A, Mahé P, Bouvier-Colle MH. Emergency obstetric care in developing countries: impact of guidelines implementation in a community hospital in Senegal. *BJOG: An International Journal of Obstetrics & Gynaecology*. 2005 Sep 1;112(9):1264-9.
- [14]. Okafor II, Obi SN, Ugwu EO. Impact of free maternal and child healthcare programme on maternal and neonatal healthcare outcome in Enugu state of Nigeria. *Niger J Med* 2011;20:441-3. Back to cited text no. 22
- [15]. Ugboaja JO, Oguejiofor CB, Oranu EO, Igwegbe AO. Factors associated with the use of traditional birth attendants in Nigeria: A secondary analysis of 2013 Nigeria national demography and health survey. *The Nig J of Gen Prac*. 2018 Jul 1;16(2):45.
- [16]. yoke CA, Ezugwu FO, Ezugwu EC, Ajah LO, Lawani LO. PERCEPTION OF MATERNAL DEATHS AND REFERRAL PRACTICES OF TRADITIONAL BIRTH ATTENDANTS IN ENUGU, NIGERIA: A CROSS-SECTIONAL STUDY. *International Journal of Medicine and Health Devel*. 2017 Jan;22.
- [17]. Igwebueze OI. Indications for Caesarean Delivery in a State University Teaching Hospital, Enugu, Southeast, Nigeria. *International Journal of Nursing and Healthcare*. 2015;1:16-21.
- [18]. Odo AN, Samuel ES, Nwagu EN, Nnamani PO, Atama CS. Sexual and reproductive health services (SRHS) for adolescents in Enugu state, Nigeria: a mixed methods approach. *BMC health services research*. 2018 Dec;18(1):92.
- [19]. Harrison MS, Ali S, Pasha O, Saleem S, Althabe F, Berrueta M, Mazzoni A, Chomba E, Carlo WA, Garces A, Krebs NF. A prospective population-based study of maternal, fetal, and neonatal outcomes in the setting of prolonged labor, obstructed labor and failure to progress in low-and middle-income countries. *Reproductive health*. 2015 Dec;12(2):S9.
- [20]. Sharma P, Kumari K, Kanti V, Seth S. Obstructed Labour: A Preventable Tragedy but Still a Long Way to Go In Developing Countries. *International Journal of Health Sciences and Research (IJHSR)*. 2015;5(9):99-104.
- [21]. Bako B, Barka E, Kullima AA. Prevalence, risk factors, and outcomes of obstructed labor at the University of Maiduguri Teaching Hospital, Maiduguri, Nigeria. *Sahel Medical Journal*. 2018 Jul 1;21(3):117.
- [22]. Griffiths M. What is the acceptable decision- to- delivery interval for an emergency caesarean section?. *BJOG: An International Journal of Obstetrics & Gynaecology*. 2016 Feb;123(3):476-.
- [23]. Weiner E, Bar J, Fainstein N, Ben-Haroush A, Sadan O, Golan A, Kovo M. The effect of a program to shorten the decision-to-delivery interval for emergent cesarean section on maternal and neonatal outcome. *American journal of obstetrics and gynecology*. 2014 Mar 1;210(3):224-e1.
- [24]. Nisale SS, Chawada M, Kharkate GK, Deshmukh SB. A study of preoperative, intra-operative and postoperative factors responsible for postoperative wound infection. *International Surgery Journal*. 2017 Apr 22;4(5):1569-74.
- [25]. Chi PC, Urdal H. The evolving role of traditional birth attendants in maternal health in post-conflict Africa: A qualitative study of Burundi and northern Uganda. *SAGE open medicine*. 2018 Jan 16;6:2050312117753631.
- [26]. Devroe S, Van de Velde M, Rex S. General anesthesia for caesarean section. *Current Opinion in Anesthesiology*. 2015 Jun 1;28(3):240-6.

- [27]. Páez L, Jairo J, Navarro V, Ricardo J. Regional versus general anesthesia for cesarean section delivery. *Revista Colombiana de Anestesiología*. 2012 Oct;40(3):203-6.
- [28]. JOHNSTONE M. The cardiovascular effects of ketamine in man. *Anaesthesia*. 1976 Sep;31(7):873-82.

Dr. Anthony Jude Edeh. "An Audit of Cesarean Sections in a Rural private Hospital In Enugu, Nigeria." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, vol. 18, no. 9, 2019, pp 38-44.