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## **A Six-Year Review of Uptake of Bilateral Tubal Ligation (BTL) at a Tertiary Health Institution in Calabar, Calabar, Nigeria**

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**Abstract**---Background: Bilateral tubal ligation is one of the most effective and permanent contraceptive methods. Being a permanent method of contraception, it is not readily accepted especially with the myths surrounding its use. The objective of this study is to document its incidence, sociodemographic characteristics, techniques, effectiveness and associated complications in the University of Calabar Teaching Hospital (UCTH), a tertiary health institution in Calabar Nigeria. Method: This is a retrospective analysis of 141 clients, who had bilateral tubal ligation at UCTH over a six-year period between January 1st 2016 and December 31st, 2021. Results: There were 141 bilateral tubal ligations done during the study period. 130 (92.2%) were done during Caesarean section, 7(5.0%) were done during repair of uterine rupture, 3(2.1%) had immediate postpartum BTL and 1(0.7%) had interval BTL. There were 4,549 Caesarean sections and 13,056 total deliveries during the period under review. Therefore, BTL was associated with 1.08% of the total deliveries. The mean age and parity of the clients were 35.9 years and 4.35 respectively. The commonest indication for BTL was previous caesarean section in 92(65.2%). Only one complication specific to tubal ligation was recorded during the study period.

**Keywords**---bilateral, tubal ligation, Calabar, Nigeria.

## **Introduction**

Bilateral tubal ligation, also known as tubal occlusion and female sterilization, is a surgical method of permanent contraception. It is the commonest method of permanent contraception worldwide <sup>1, 2</sup> with an estimated 180 – 190 million couples around the world choosing it. <sup>3, 4</sup> However, in Nigeria (and many developing countries), the uptake of bilateral ligation is still low due to several factors. These factors include the irreversibility of the method, ignorance, legal restrictions, requirements for operation, lack of skill availability, religious beliefs, superstitious beliefs and myths (related to incarnation and subsequent infertility in the after-life).<sup>2, 5</sup> This is further compounded by the aversion to caesarean section and surgery in general.<sup>6</sup>

The different surgical approaches to bilateral tubal ligation include laparotomy (during caesarean section), mini-laparotomy, and vaginal approaches (culdotomy, colposcopy).<sup>7, 8</sup> The different techniques of bilateral tubal ligation reported in literature include Pomeroy, modified Pomeroy, Uchida, Irving, Madlener, Aldridge, Kroener methods. It has been found that mini-laparotomy under local anaesthesia using the modified Pomeroy method is the commonest, effective, safe and affordable technique of bilateral tubal ligation.<sup>9</sup> Bilateral tubal ligation may be requested by a couple after completion of desired family size. It can also be indicated when future pregnancy is deemed to pose serious threat to life due to severe medical conditions (cardiac/liver/renal disease), multiple caesarean sections, grandmultiparity, following extensive uterine rupture.<sup>10</sup> Good and extensive counselling is necessary to reduce incidence of regret after bilateral tubal ligation. Reasons for regret following the procedure may be due to desire to have a child with a new partner, the desire to have a particular sex of a child and following the death of a child.<sup>11</sup> It has been shown by a systematic review that people who are 30 years old and younger are twice more likely to exhibit regret than those who are above 30 years old.<sup>12</sup>

Maternal mortality ratio is still very high in Nigeria.<sup>13</sup> It has been shown that contraception directly leads to reduction in maternal mortality which would have resulted from unplanned pregnancies.<sup>14, 15</sup> Bilateral tubal ligations is one of the most effective contraceptive methods. Its overall failure rate is 0.7 percent with the commonly used Pomeroy technique being the lowest at 0.1 to 0.5 percent.<sup>9</sup> The objective of this study is to determine the incidence, sociodemographic characteristics, techniques, effectiveness and complications associated with bilateral tubal ligation in University of Calabar Teaching Hospital, Calabar, Nigeria. Due to the fact that this is the first of this type of study in our Centre, it would enhance our knowledge and serve as a template for further research in this area.

## **Materials and Methods**

This was a retrospective analysis of 141 clients, who had bilateral tubal ligation at the University of Calabar Teaching Hospital, Calabar, Nigeria between January 2016 and December 2021. The clinical records of the clients were retrieved from the theatre, family planning unit and medical records of the hospital. Data extracted include age, parity, methods of anaesthesia used for the procedure,

indications for tubal ligation, surgical approach and complications. Clients who were offered bilateral tubal ligation at elective caesarean section had extensive counselling (usually at booking or at least a month before the procedure) along with their husbands by a senior member of the obstetric team. This included the advantages and disadvantages of the procedures, alternative methods of long term contraception and failure rates of each method. The modified Pomeroy technique is the method usually performed at our centre. Modified Pomeroy procedure involves clamping either of the fallopian tubes at its middle section with a pair of Babcock forceps and elevating a loop of the tube. The base of the loop of the tube was then transfixed and ligated with plain catgut or chronic catgut number I and the suture held long. A 2cm section of the tube in the ligated loop was then transected and removed with scissors. The cut ends of the tube were cleaned and inspected for any haemorrhage. The suture was cut short. A mirror procedure was performed on the contralateral tube. The data was analyzed using SPSS version 25.0 Simple descriptive statistics were produced.

## Results

There were a total of 141 cases of bilateral tubal ligations (BTL) during the period under review (2016 – 2021). 130 were done during caesarean sections. 7 cases of BTL were done with repair of uterine rupture; 3 were postpartum BTL done from mini laparotomy and 1 had interval BTL. There were 4,549 Caesarean sections and 13,056 total deliveries during the study period. BTL (141) therefore was associated with 1.08% of the total deliveries.

Table 1  
Age group distribution of patients

Age group (years)	N	%	Mean $\pm$ SEM
20-24	1	0.7	
25-29	5	3.6	
30-34	46	32.6	35.91 $\pm$ 0.34
35-39	53	37.6	
40-44	36	25.5	
Total	141	100	

Table 2  
Prior Number of children had by patients

Parity group	N	%	Mean $\pm$ SEM
1-3	44	31.2	
4-6	85	60.3	
7-9	10	7.1	4.35 $\pm$ 0.14
10-12	2	1.4	
Total	141	100	

Table 3  
Anaesthesia used during operation of patients

Anaesthesia	N	%
Epidural	3	2.1
GA	11	7.8
SAB	127	90.1
Total	141	100

Table 4  
Indicators for ruptured uterus and other symptoms

Indicators	N	%
1 Previous CS	19	13.5
2 Previous CS	36	25.5
3 Previous CS	33	23.4
4 Previous CS	4	2.8
Failed induction of labour	3	2.1
Ruptured uterus	3	2.1
Severe pre-eclampsia	9	6.4
Grand-multiparty	4	2.8
Others	30	21.3
Total	141	100

Table 5  
Types of operation conducted on patients

Operation	N	%
MINI LAPAROTOMY	3	2.1
ELLSCS	72	51.1
EMLSCS	58	41.1
INTERVAL BTL	1	0.7
EMERGENCY LAPAROTOMY	7	5.0
Total	141	100

Table 6  
Distribution of complication suffered by patients

Complication	n	%
Fallopian tube haematoma	1	0.71
NIL	140	99.29
Total	141	100

Table 7  
Total Deliveries and Caesarean Section/BTL Trend

Year	Bilateral Tubal Ligation	Total Deliveries	% Total Deliveries	Caesarean Sections	% Caesarean Sections
2016	27	3,106	0.87	959	2.82
2017	33	2,752	1.20	908	3.63
2018	21	1,505	1.40	521	4.03
2019	19	1,755	1.08	660	2.88
2020	12	1,995	0.60	739	1.62
2021	29	1,943	1.49	762	3.81
Total	141	13,056	1.08	4,549	3.10

### Discussion

Bilateral tubal ligation (BTL) is a modern and permanent contraceptive method that is suitable for all age groups provided they meet the criteria for its use and do not come up with any regrets in the future. The major reason for choosing this method of contraception is having the desired number of children or completion of family size. In Nigeria and other sub-Saharan African country, completion of family size implies 4-6 children, not until recently due to economic hardship, most families are now considering 2 children as completion of family size. Table 1 of this study shows that majority (37.6%) of clients that chose this method of contraceptive were in the 35 – 39 age group. The ages of clients accepting BTL ranged from 22 – 42 years with a mean age of  $35.9 \pm 0.34$ . Table 11 shows that majority (60.3%) had 4 – 6 children prior to uptake. The parity of clients ranged from 1 – 11 with mean parity of  $4.35 \pm 0.14$ .

It was noted that only one client had BTL in the 20 – 24 age group. This client was a 22-year-old lady who had extensive uterine rupture following prolonged obstructed labour with delivery at home which was unsupervised by a trained health provider or midwife. She had only one previous child alive. The index baby was already dead at presentation. She had emergency laparotomy with repair of uterine rupture and BTL. Table 11 shows that the commonest type of anaesthesia used during surgery was subarachnoid block (90.1%). This was followed by a far range by general anaesthesia (7.8%) and epidural anaesthesia (2.1%). The commonest indication for BTL during the study period was previous caesarean section(s), which had a total incidence of 65.2% (Table IV). Other indications include severe pre-eclampsia, grandmultiparity, ruptured uterus, failed induction of labour. Table V on the other hand shows that majority (130) had BTL during caesarean section (92.2%). This was followed by 7 (5.0%) during emergency laparotomy for ruptured uterus; 3 postpartum BTLs done using mini laparotomy and 1(0.7%) interval BTL.

A majority of the clients (51.1%) had sterilization at emergency caesarean section while 41.1% had sterilization at elective caesarean section. During the 6 – year study period, there was only one complication, which was specific for tubal ligation (0.71%). This was haematoma formation in the remaining portion of one of the ligated fallopian tubes (Table VI). The patient had laparotomy with evacuation of the haematoma. She was subsequently discharged in good

condition. There was no definite trend in the BTL cases over the 6 years under review. However, 2017 recorded the highest number of cases, as shown in (table VII), while the lowest number of BTL cases was done in 2020. This may not have been unconnected with the Covid-19 pandemic when there was lock-down and most health facilities were not operating in full capacity. There were lots of speculations and uncertainties during the Covid-19 lockdown of 2020. The expectations were that because many couples were not going to work and a good number were working from home, there would be increased number of pregnancies and deliveries during that period. This however not the case as people were more scared about the pandemic than becoming pregnant. Bilateral tubal ligation is the most commonly used method of permanent contraception worldwide<sup>1, 2</sup>. However in Nigeria, like many other developing countries, it's uptake is low and estimated to be < 0.5%.<sup>5</sup> The majority of the clients were 35 years and above being 89(63.1%). This could also be explained by the fact that majority of the clients had four children and above being 97(98.8%). This is similar to findings in other studies<sup>5, 8, 16, 17</sup>

The mean parity of the clients in our study was 4.35. This is lower than 6.4, 5.5 and 6.4 reported in similar studies done in other Nigerian cities such as, Benin<sup>5</sup>, Jos<sup>8</sup> and Makurdi<sup>16</sup> respectively. The reasons for high parity in Nigeria's clients having BTL could be explained by the high perinatal mortality and infant mortality rates in Nigeria which makes children survival uncertain. Many Nigerian ethnic groups also place a high preference on male sex to have security in marriage. This usually results in high parity as confirmed by our high Total Fertility Rate (TFR) of 5.<sup>17, 18</sup> The commonest indication for BTL in our study was previous Caesarean section in 92(65.2%). This was also the commonest indication for BTL in a study in Jos (55.5%) and Makurdi (51.4%). It was however, the second commonest indication in Abraka (39.7%) after grand multiparity (60.4%). Out of the 130 clients, who had BTL during Caesarean section, 72(55.4%) had emergency caesarean section and 58(44.6%) had elective caesarean section. There is believed to be a higher risk of regret observed in clients who had BTL during emergency caesarean sections than those done during elective/planned caesarean sections. There was however no incidence of regret reported during our study period; probably because it was a retrospective study. It is also reported that there is a potential increase in failure rate when the BTL is done during caesarean section<sup>19</sup>.

The technique of bilateral tubal ligation used in our centre is usually the modified Pomeroy technique, used both when during laparotomy and minilaparotomy. In the developed countries, laparoscopic sterilization is often done using clips and rings/leg, fischie clip, Hulka – Clemens clips, Falope rings and Yion rings. This is safer when done by well-trained hands both during the immediate postpartum period and as an interval procedure. During the postpartum period, a systematic review has reported that modified Pomeroy technique through minilaparotomy and Fischie clips (using laparoscopy) have comparable failure and complication rates. However, Fischie clips application is easier to perform and has better reversal rates<sup>20</sup>. None of the BTLs during our study period was done laparoscopically due to lack of endoscopic equipment and manpower training. During the study period, there was one case of failure of bilateral tubal ligation, who presented 2 years later for antenatal care after confirmation of normal

intrauterine pregnancy. She subsequently had repeat elective caesarean section. This gives a crude failure rate of 0.71%. This is comparable to 0.75%<sup>21</sup> reported as crude failure rate in Ile-Ife, Nigeria. Both are within the reported range of crude failure rate of 0.2% – 0.9%<sup>22</sup>.

In conclusion, majority of bilateral tubal ligations in UCTH, Calabar were done during caesarean section using the modified Pomeroy technique. This procedure has been found to be safe and effective. However, it is anticipated that the introduction of laparoscopic sterilization may further improve our uptake rate as well as safety and efficacy. This will ultimately lead to reduction of maternal mortality rate in Nigeria.<sup>23</sup> Laparoscopic procedures are however currently more expensive in our environment, though it has many advantages over laparotomy. Unless otherwise subsidized, laparotomy will continue to be the procedure of choice for BTL except those done during Caesarean sections.

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