



Permanent method of postpartum contraception (Bilateral tubal ligation): Experience at the Rivers State University Teaching Hospital

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Abstract

Background: Bilateral tubal ligation is the most common method of permanent contraception in women. It is an effective method of contraception with a failure rate of 1 in 200 women. Objectives: To determine the rate, five-year trend, indications, complications and outcome of bilateral tubal ligation (BTL) at the Rivers State University Teaching Hospital (RSUTH).

Methods: This was a cross-sectional study of all cases of bilateral tubal ligation done at the RUTH from 1st January 2016 to 31st December 2020. Descriptive and inferential statistics were derived using IBM, Statistical Product and Service Solution (SPSS), version 25.0 (Armonk, NY).

Result: There were 12,406 deliveries and 153 cases of BTL; giving the prevalence of BTL as 1.23% or 12.3 per 1000 deliveries or 1 in 81 deliveries with a decreasing pattern of use. Of the 153 cases of BTL, 148 were performed during a caesarean section while 5 with the repair of uterine rupture. Most of the cases were performed electively and modified Pomeroy's method was the commonest technique used by Obstetricians & Gynaecologists. The mean \pm SD age and gestational age of the women at delivery were 35.0 ± 3.6 years, 95% CI 34.8, 35.6 and 37.4 ± 1.5 (95% CI 37.2, 37.6) respectively. Majority were booked [145(94.8%)], multipara [138(90.2%)], Christians [147(96.1)] and had tertiary level education [84(54.9)]. Parity was significantly associated with BTL [$X^2 = 11.203$, $p = 0.004$, (95% CI 0.0441, 0.052)] while the association with other sociodemographic variables did not attain significance. The mean \pm SD foetal weight was 3.05 ± 0.57 kg, (95% CI 2.92, 3.18). There were no maternal or foetal complications from the procedure during the period of review.

Conclusion: The prevalence of BTL in RSUTH was low and demonstrated a decreasing trend. The procedure was carried out mostly during caesarean section. However, other forms such as mini-laparotomy and laparoscopic surgery should be encouraged to create high uptake of the permanent method of contraception among women.

Keywords: Postpartum contraception, Bilateral tubal ligation, Female sterilization, RSUTH

Introduction

Bilateral tubal ligation (BTL) is the commonest method of surgical female sterilization worldwide [1-4]. It is safe, simple to perform, and very effective in the prevention of pregnancy [5]. It can be carried out during or outside the postpartum period, by laparoscopy, open surgery (laparotomy, mini-laparotomy) or hysteroscopy. Postpartum sterilization is commoner than those carried out, outside the postpartum period. Those carried out from 6 weeks postpartum is referred to as interval BTL. BTL performed during caesarean section is becoming commoner compared to other timings perhaps to reduce the unmet need for postpartum contraception.

In the United States of America (USA) about 50% of sterilization is performed during the first 48 hours post-delivery yearly [6]. It can be done through the anterior abdominal wall by mini-laparotomy, laparotomy and laparoscopy; transcervical approach either blindly or by hysteroscopy; and vaginal approach through the posterior vaginal fornix [7].

Over 190 million couples have chosen female sterilization as their preferred method of contraception [2, 8]. It is a popular method of permanent contraception in the USA [9] and accounts for 72% of all sterilization in the US [8]. The annual incidence of female sterilization in the United Kingdom (UK) is 4.75 per 1000 person-years. However, it is yet to gain wide acceptance in Nigeria due to cultural, religious factors as well as an aversion to caesarean section in our environment [4, 10].

Recent National Demographic and Health Survey (NDHS) report, revealed that contraceptive prevalence rate (CPR) among married women varies with age, rising from 3% among the age group 15-19 to peak of 23% in age

group 35-39 and declining to 13% in women aged 45-49 [11]. The unmet need for modern methods is 25.3% in Nigeria [12]. A prospective study of 256 post-partum women in Western Nigeria revealed a high unmet need for family planning of 59.4% [13]. Female sterilization as an effective method of contraception would help to reduce the morbidity and mortality associated with unintended and /or unwanted pregnancies as well as complications of unsafe abortions.

The indications for female sterilization may include family planning for those couples that have completed their family size and therapeutic for mothers with medical conditions such as heart diseases, diabetes, chronic renal diseases that are not compatible with pregnancy.

There is no study on the permanent method of contraception in Port Harcourt, Nigeria. Therefore, this study reviews records of female sterilization (BTL) performed at the RSUTH over a five -year period, to determine its prevalence, trend, indications, associated sociodemographic factors, maternal and foetal outcomes.

Methods

The Rivers State University Teaching Hospital (RSUTH) is a tertiary level facility and the Teaching Hospital of Rivers State University and Pamo Medical University. It is situated in the heart of Port Harcourt, the capital of Rivers State, which has a population of 5,198,716 from the last national census figure [14]. The hospital receives referrals from both private and other government hospitals within and outside Rivers State [15,16].

A cross-sectional study was conducted involving the review of all recorded cases of female sterilization (bilateral tubal ligation) managed at the RSUTH, from 1st January 2016 to 31st December 2020. All cases of BTL done in the hospital were collated from the labour ward, post-natal, family planning clinic and the theatre records. The total number of deliveries during the review period was obtained from the labour ward and theatre records/register. A study proforma was used to record the variables of interest from the patients' hospital folders or files. The variables included, were patient's age, parity, gestational age at delivery, level of education, religion, indication for the procedure, type of procedure, maternal and foetal outcome (alive or dead), foetal sex and weight. Low birth weight was defined as birth weight of 1.5 to less than 2.5 kg; normal birth weight (2.5 to < 4kg); and macrosomia (foetal weight greater than or equal to 4 kg).

The data collected were entered into Microsoft Excel office 2019 and transferred to IBM Statistical product and service solution formerly, known as Statistical Package for Social Sciences (SPSS), version 25.0 (Armonk, NY) for analysis. Categorical variables were summarized using frequencies and percentages, while symmetrical continuous variables were summarized using mean, standard deviation and confidence interval. Results were presented in charts and tables as appropriate for the data. Ethical approval for the study was given by the University of Port Harcourt Research and Ethics Committee. Permission was obtained from the Head, Department of Obstetrics and Gynaecology, RSUTH to access the records for the study.

Results

There were 12,406 deliveries and 153 cases of bilateral tubal ligation over the period reviewed, giving the prevalence of bilateral tubal ligation at the Rivers State University Teaching Hospital as 1.23% or 12.3 per 1000 deliveries or 1 in 81 deliveries. Table 1 shows the yearly trend in uptake of bilateral tubal ligation in RSUTH. The rate per 1000 deliveries increased from 10.0 in 2016 to 15.6 in 2017 and then decreased to 9.9 in 2020 (Table1).

Table 1: Annual uptake of Bilateral tubal ligation (BTL) in Rivers State University Teaching Hospital

Year	Cases of BTL (%)	Total number of deliveries	Percentage of total deliveries	Rate of BTL/1000 deliveries
2016	35 (22.9)	3495	28.2	10.0
2017	43 (28.1)	2747	22.1	15.6
2018	27 (17.6)	2294	18.5	11.8
2019	29 (19.0)	1960	15.8	14.8
2020	19 (12.4)	1910	15.4	9.9
Total	153	12,406	100	12.3

The mean \pm SD age of the participants was 35.04 \pm 3.57 years, 95% CI 34.47, 35.61 (Table 2). The modal parity was para 3, accounting for 54.2% of cases. Eighty-four (54.9%) had tertiary education, while [53 (34.6%)] and [14(9.2%)] had secondary and primary level education respectively. Most of the patients (82.4%) had term delivery and 17.6% had preterm delivery. The majority (94.8%) of the patients were booked while 5.2% were unbooked (Figure 1). The mean \pm SD gestational age at delivery was 37.43 \pm 1.28 weeks, 95% CI 37.23, 37.64. The majority of the patients were multiparas (90.2%), Christians (96.1%) and had tertiary level education (54.9%) [Table 2].

Table 2: Socio-demographic characteristics of patients

Variable	Number (n = 153)	Percentage
Age group (years)		
25-29	7	4.6
30-34	60	39.2

35-39	71	46.4
≥40	15	9.8
Mean age (Years)	SD	95% CI
35.0	3.6	34.5,35.6
Parity		
1	3	2
2	37	24.2
3	83	54.2
4	18	11.8
5	5	3.3
6	4	2.6
7	3	2.0
Gestational age at delivery (weeks)		
<37	27	17.6
>37	126	82.4
Mean GA	SD	95% CI
37.4	1.3	37.2,37.6
Educational status		
Non-formal	2	1.3
Primary	14	9.2
Secondary	53	34.6
Tertiary	84	54.9
Religion		
Christianity	147	96.1
Islam	6	3.9

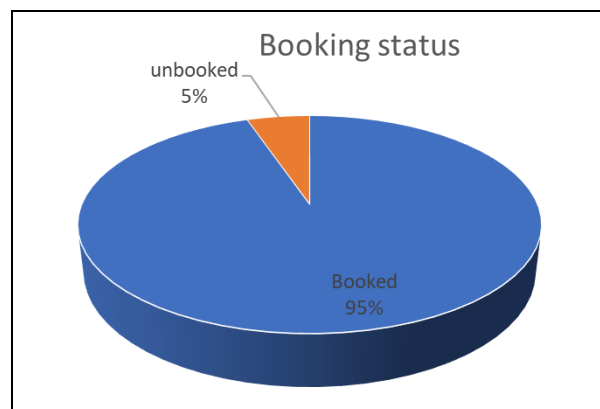
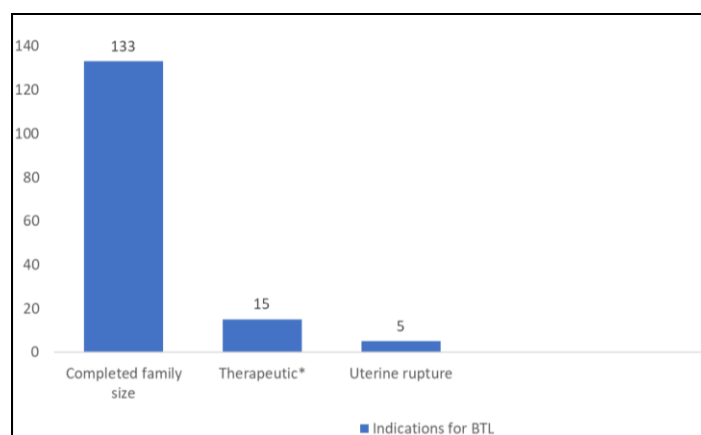


Fig 1: Booking status of the participants

One hundred and forty-eight cases of BTL were performed following caesarean section, while 5 cases during emergency exploratory laparotomy and repair of uterine rupture. The indications for BTL are as shown in Figure 2. Most (86.9%) of the patients had a permanent method of contraception (BTL) for completed family size, while 9.8% and 3.3% were for maternal medical complications in pregnancy, and uterine rupture respectively.



*Medical conditions not compatible with subsequent pregnancy

Fig 2: Indications for female sterilization

The commonest technique of BTL used by the surgeons was modified Pomeroy's. Of the 153 cases of BTL performed throughout the review, 143 (93.5%) were elective cases and 10 (6.5%) were emergency cases. One hundred and thirty-eight patients had a history of previous caesarean section (CS). Of this, 79 (51.6%) had a history of 3 previous caesarean section, followed by the history of 2 previous CS 43 (28.1) (Table 3).

Table 4 shows the association between sociodemographic factors and indications for BTL. Parity was the only variable that was statistically significantly associated with the indications for BTL [$X^2 = 11.203$, $p = 0.004$, (95% CI: 0.0441, 0.052)]. Other parameters did not achieve any significant association with indications for BTL.

Table 3: Techniques of BTL, timing of the operation, and maternal history of the previous caesarean. Section

Variable	Number (n=153)	Percentage
Techniques of BTL (n=153)		
Modified Pomeroy	147	96.1
Pomeroy	6	3.9
Timing of operation (n=153)		
Emergency	10	6.5
Elective	143	93.5
No. of previous caesarean section (n=139)		
1	12	8.6
2	43	31.0
3	79	56.8
4	5	3.6

Table 4: Association between sociodemographic characteristics and indications for BTL

Variables	Indications for Bilateral Tubal Ligation			Total	X^2 (d.f) *	P-value (95% CI) +
	CFS++	Therapeutic	Uterine rupture			
Age group (years)						
25-29	5(71.4)	2(78.6)	0	7	5.005(6)	0.524 (0.514,0.534)
30-34	53(88.3)	6	1(1.7)	60		
35-39	63(88.7)	5(7)	3(4.2)	71		
≥40	12(80)	2(13.3)	1(6.7)	15		
Total	133(86.9)	15(9.8)	5(3.3)	153		
Parity						
Primipara	1(33.3)	2(66.7)	0	3	11.203(2)	0.004# (0.039,0.047)
Grand/Multipara	132(88.6)	13(8.7)	5(3.3)	150		
Total	133(86.9)	15(9.8)	5(3.3)	153		
Gestational age at delivery (weeks)						
<37	22(81.5)	4(14.8)	1(3.7)	27	0.971(2)	0.780 (0.773,0.789)
>37	111(88.1)	11(8.7)	4(3.2)	126		
Total	133(86.9)	15(9.8)	5(3.3)	153		
Educational status						
Non-formal	2(100)	0	0	2	7.704 (6)	0.237 (0.228,0.245)
Primary	10(71.4)	4(28.6)	0	14		
Secondary	47(88.7)	5(9.4)	1(1.9)	53		
Tertiary	74(88.1)	6(7.1)	4(4.8)	84		
Total	133(86.9)	15(9.8)	5(3.3)	153		
Religion						
Christianity	128(87.1)	14(9.5)	5(3.4)	147	0.513(2)	0.560 (0.566,0.585)
Islam	5(83.3)	1(16.7)	0	6		

*Degree of freedom

+Confidence Interval

++ Completed family size

#Significant

Figures 3 and 4 show the sex and weight distribution of the foetuses delivered by women that had BTL.

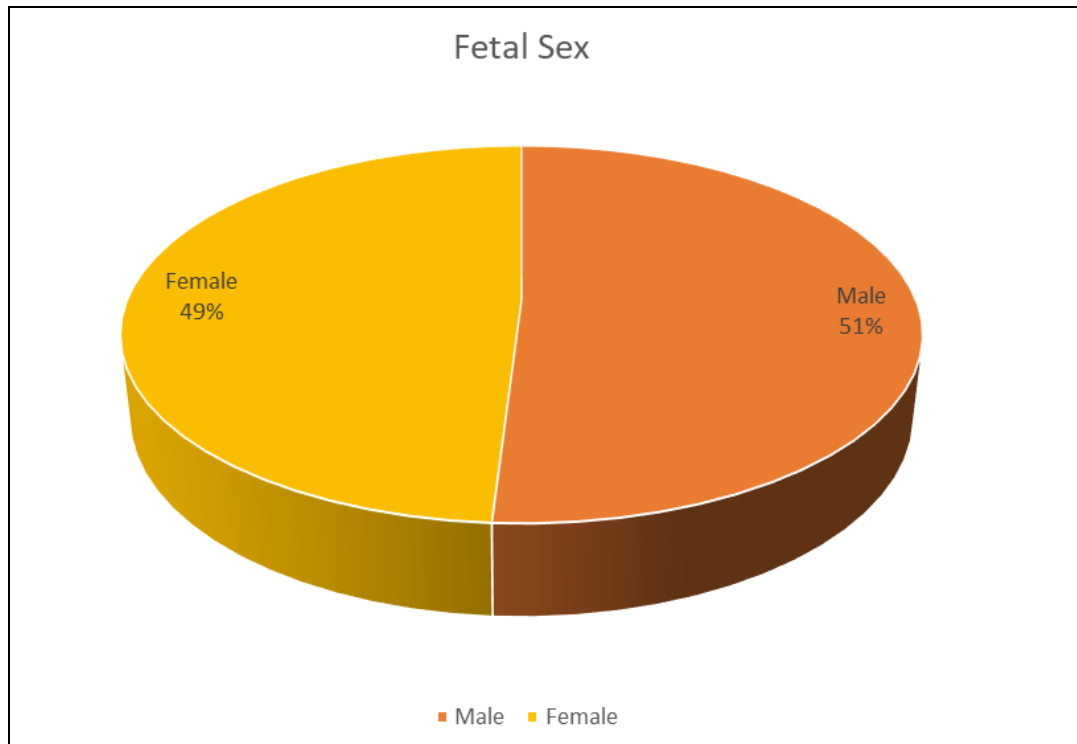


Fig 3: Foetal sex distribution

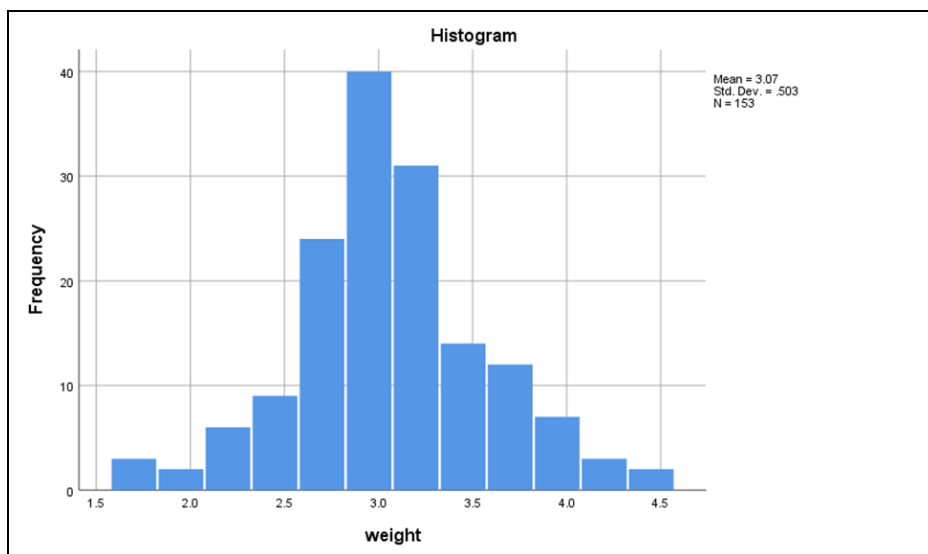


Fig 4: Foetal weight distribution

Table 5 shows the classification of birth weights. The majority 128 (83.7%) of the foetus had normal birth weight. There was no case of maternal or foetal death.

Table 5: Classification of foetal birth weight

Variable	Number	Percentage
Classification of foetal weight		
Low birth weight	15	9.3
Normal birth weight	128	83.7
Macrosomia	10	6.5
Total	153	100

Discussion

Female sterilization is an effective method of permanent postpartum contraception. The rate of female sterilization (bilateral tubal ligation) at the Rivers State University Teaching Hospital is 1.23% or 12.3 per 1000

deliveries or 1 in 81 deliveries. This is similar to the findings of the previous study conducted in Western Nigeria^[3] but higher than 0.44 per 1000 deliveries reported from a previous study in the Delta state of Nigeria^[4] and lower than 2.7% and 31.5% reported in Makurdi^[2] and Enugu^[17] States of Nigeria respectively. Religious and sociocultural beliefs as well as differences in the methodology could account for the variation in the rate of BTL across studies. Generally, a decreasing trend in the rate of female sterilization was observed during the review period. This may be due to the availability and uptake of long-acting contraceptive methods by women in our setting. Also, a high aversion to surgery (caesarean section) in our setting could have accounted for the decreasing rate of the permanent method of contraception observed. The finding of a declining trend in female sterilization is in keeping with those of previous studies within and outside Nigeria^[18-20].

All the cases of BTL in this study were performed during the caesarean section. Performing tubal ligation during caesarean section is known to be cost-effective^[2], with the patient not paying any other fee for the procedure, other than, the fee for caesarean section. Although mini-laparotomy, can be done for women who choose BTL as a method of permanent contraception, no case was identified during the period of review. Also, there was no case of BTL done laparoscopically but the hospital has just commenced laparoscopic procedures. Subsequent studies may reveal cases of BTL done laparoscopically.

Modified Pomeroy's method was the commonest technique used for tubal ligation during the study period. This corroborates the finding of Swende *et al.*, in Makurdi in Nigeria^[2]. This technique is preferred to other techniques, by most surgeons (Obstetrician and Gynaecologists) because it is easier to perform, and it is one of the techniques with the lowest failure rate.

The mean \pm SD age of the patients was 35.0 ± 3.6 years, 95% CI 34.5,35.6. This finding is in keeping with that of the previous study conducted in Makurdi, Nigeria^[2]. However, the inclusion of a confidence interval around the estimate in the current study was helpful for interpretation and buttresses the fact that the study population comprised women of reproductive age.

The majority of the women were multipara, unlike the finding of Swende *et al.*, in Makurdi^[2] where grand multiparous women accounted for the highest proportion of cases of sterilization. The modal parity of the women before undergoing sterilization was para 3. This is not surprising because multiparous women have a high chance of choosing a permanent method of contraception than women of lower parity due to completed family size.

Over 95% of the women had a formal education; this might have influenced their choice of bilateral tubal ligation as a form of contraception. This corroborates the finding of another study carried out in Western Nigeria^[3]. Study has shown that education has a negative correlation with fertility and a positive correlation with the choice of contraception^[21]. Although it stands to reason that, women with formal education might have a higher chance of making decisions easily about their family planning methods compared to those with non-formal education, there was no statistically significant association between the educational status of participants and indication for BTL in this study [$X^2=7.7$, $P=0.24$ (95% CI 0.23,0.25)].

Although, most of the study population had a history of previous caesarean section, the commonest indication for BTL in this study was 'completed family size', followed by maternal medical conditions with the least indication being uterine rupture. This finding is in keeping with that of a previous study in Nigeria^[3]. However, it is contrary to the finding of Swende *et al.*, in Northern Nigeria, where previous caesarean section was the commonest indication for tubal ligation. About the relationship between the indications of BTL and sociodemographic factors, parity was found to be statistically associated [$X^2 = 11.203$, $p=0.004$, (95% CI 0.0441,0.052)], while other variables did not achieve any significance.

Over 90% of the sterilization was performed electively. As such, the procedures were planned and couples gave consent at least 2 weeks before the procedure. Previous studies have shown a higher rate of BTL 'regret' (situation in which a client that had BTL regrets choosing such method of contraception and may request for reversal of the procedure) especially those performed during emergency caesarean section^[3]. No case of BTL regret was observed in the present study.

The mean (SD) foetal birth weight was 3.05 ± 0.57 kg, 95% CI 2.92 to 3.18. This birth weight is within the normal limit for babies in our setting. At the time of writing and based on the awareness of the authors, this is one of primal studies in the setting that has assessed the birth weight of the foetus(es) of mothers who had BTL. The mean foetal weight is normal and significant as evidenced by the narrow confidence interval. This is not surprising since the majority of the women delivered at term and had their pregnancies supervised in the hospital. A failure rate of about 0.5% after female sterilization has been reported^[22], but in the present study, there was no case of pregnancy resulting from the failure of the procedure. There was no case of maternal or fetal death from the procedure.

The retrospective nature of the design could have affected complete data on other variables about the use of the postpartum contraception method. However, a subsequent report of the findings of a prospective study on this subject has the potential of revealing further variables addressing postpartum contraception. As a facility-based study, the findings of the present study may not be representative of those of other health facilities, however, our findings fill the gap in knowledge of BTL in RSUTH and contributes to the body of literature on contraception.

Conclusion

Female sterilization (bilateral tubal ligation) is a safe and effective method of contraception, but its rate of uptake is low in this facility-based survey. It is mostly performed during the caesarean section for completed family size

and medical conditions not compatible with pregnancy. Women should be counseled adequately to avoid post-procedure regret. With the high rate of aversion to caesarean section in Nigeria, training, and retraining of personnel on laparoscopic and hysteroscopic methods should be encouraged in order to increase the uptake of sterilization in our environment.

Acknowledgement

We thank the staff of Obstetrics and Gynaecology, RSUTH for their support during this study. We further acknowledge with gratitude all the study participants.

Funding

No funding was received for the study.

Competing interest

Authors have no competing interest to declare

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