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# Trends and Outcomes of Open Abdominal Myomectomy in the Management of Uterine Fibroid at a Tertiary Hospital in Port-Harcourt, Nigeria: A 5-year Review

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## Abstract

**Background:** Symptomatic uterine fibroids are frequently encountered in gynecological practice in black populations. Its removal is associated with some complications and to control the occurrence of these, requires an understanding of the associated factors.

**Objective:** This study sought to determine the rate and trend, indications, outcome and determinants of complications of open abdominal myomectomy in a tertiary hospital.

**Methodology:** This was a retrospective review of open abdominal myomectomies performed between April 2015 to March 2020. Data were obtained from operating theater and gynecological ward records. Continuous variables were analyzed using Student's t-test and categorical variables were analyzed with chi-square test or Fisher's exact test. Multiple regression was used to test for significant associations with $P < 0.05$ as significant.

**Results:** There were 1557 gynecological surgeries during the study period of which 374 (24%) were abdominal myomectomy, with an increasing trend from 20% in 2015 to 34.1% in 2019. Majority 219 (58.6%) were in the age category of 30-39 years and were nulliparous 298 (79.7%). The commonest indication was menorrhagia 294 (78.6%). Majority 286 (76.5%) had blood loss of < 500mls and 197 (52.7%) had duration of surgery of 120-180mins. The commonest complications were blood transfusion 88 (23.5%), Anemia 52 (13.9%) and wound sepsis 29 (7.8%). Hysterectomy for uncontrollable bleeding occurred in 8 (2.1%) of the women, there was no death recorded. Hemorrhage (blood loss), duration of surgery and indication for surgery were significantly related to the occurrence of complications on bivariate analysis, but following logistic regression, only hemorrhage remained significant.

**Conclusion:** About a quarter of all gynecological surgeries performed were open abdominal myomectomy, with a rising trend. The outcome in this study was generally favorable and hemorrhage (blood loss) was significantly associated with the occurrence of most complication. Measures should be taken to reduce blood loss at surgery and patients should be counseled preoperatively on the risk of blood loss and the possibility of blood transfusion.

***Keywords:*** *Abdominal Myomectomy; Uterine Fibroids; Trends; Outcome and Complications*

## Introduction

Uterine fibroids are composed of smooth muscle and connective tissues and are the most common benign tumors of the uterus in women of childbearing age [1]. It has an incidence rate of 30 - 40% in women above 40 years of age [2] and are also commoner in nulliparous and relatively infertile women [3,4]. It is seen more commonly in Negroid race than Caucasians, with an estimate of being 3 - 9 times more common [5,6]. It was found that by age 35 the incidence of uterine fibroid was 60% among African American women, increasing to over 80% by the age of 50 [5].

Uterine fibroids are mainly asymptomatic, particularly when small and sometimes even when they are of considerable size. Most symptomatic cases present with abdominal mass with or without discomfort, abnormal uterine bleeding (menorrhagia), pressures symptoms and infertility [3,7]. Diagnosis is mainly clinical, but ultrasonography is useful for confirmation. Often diagnosis is made incidentally during investigation for other illness, especially in asymptomatic cases [8].

Abdominal hysterectomy and myomectomy are the main traditional surgical options frequently employed to manage uterine fibroids in Nigeria. In one study of a 25-year duration, 9.3% of all cases were managed surgically [9]. Surgical rates as high as 70.4% and 86% have been reported for hysterectomy and myomectomy respectively [10]. Newer non-surgical or non-invasive modalities such as uterine artery embolization, temporary transvaginal occlusion of the uterine arteries, and magnetic resonance-focused ultrasound surgery, though now available, are not yet in widespread use in Nigeria [11]. Endoscopic surgery is also not yet available in our Center.

Abdominal myomectomy is the commonest surgical modality for treating uterine fibroids in Nigeria and has been reported to account for 60.4% of cases in Ilorin, Northcentral Nigeria [12] and 90% of cases in Southeast Nigeria [13]. Myomectomy is a conservative procedure offered to patients with symptomatic uterine fibroids who want to retain their childbearing capability and occasionally offered to asymptomatic patients with infertility, when no other cause for the subfertility is found [14,15]. Before the last decade, there was an increase in the number of abdominal myomectomies performed in the UK and USA [16], though this cannot be said today due to widespread use of laparoscopic technique. In Nigeria, the open abdominal myomectomy is still commonly used, especially for huge fibroids commonly seen in our environment [13] and hitherto is the only option in our center.

Myomectomy, like any other surgical procedure can result in intraoperative and postoperative complications, these include hemorrhage which may require blood transfusion, injury to bowel and viscera, anesthetic complications, sepsis and wound infection, and delayed complication like adhesion formation [15-17]. Blood loss intraoperatively is variable and depends on the number, size and location of the nodules. Unfortunately, some women wanting to conserve their uterus may end up having a hysterectomy for uncontrollable bleeding [18]. Abdominal myomectomy is now a safer operation due to advances in control of intraoperative bleeding, safer anesthesia and blood transfusion [19,20], but can still be fraught with complications.

This study therefore sought to determine the rates and trends of open abdominal myomectomy, the indications for surgery, complications and factors associated with development of complications in patients who underwent abdominal myomectomy at the Rivers State University Teaching Hospital (RSUTH), Port Harcourt, Nigeria. The findings of the study will help in patient counseling before surgery and prevention of complications through anticipatory preparedness before surgery.

## Materials and Methods

This was a descriptive, retrospective review of open abdominal myomectomies carried out at the Rivers State University Teaching Hospital (RSUTH) from April 2015 to March 2020. Data were retrieved from the gynecological ward and theater records, as well as the patients case files and Anesthetists operation charts. Information on age, parity, indication for surgery, duration of surgery, estimated blood loss (EBL), major complications from the surgery and need for blood transfusion were retrieved.

The department of Obstetrics and Gynecology at RSUTH runs gynecology clinic every weekday under the supervision of two consultant gynecologist each day. Patients for surgery are admitted into the ward two days prior to their surgery for preoperative care and anesthetic review. Operations are carried out in the gynecological suites of the main theater, and patients after one-hour observation in the recovery room are transferred back to the ward they came from, for postoperative care. Patients without complications are usually discharged home within 5 - 7 days and return 2 weeks after for follow-up. Thereafter they were seen, as necessary.

All abdominal myomectomies were open surgery and performed by consultants and/or senior registrars following standard operating techniques under regional (spinal) anesthesia in the dorsal position. The abdominal incision is either sub-umbilical midline or transverse suprapubic (Pfannensteil) depending on the size of the uterus and a tourniquet with Foleys catheter is often applied around the isthmus-cervix junction to reduce intraoperative blood loss. This was released periodically every 45 minutes to prevent ischemia. Blood loss from the surgery is estimated by summing up blood collected via suction, abdominal packs (150 ml when fully soaked) and absorbent gauze (15 ml). Intraoperatively blood may be transfused if the loss is undesirable (> 500 ml) or there are features of hypovolemia, while post-operatively blood is transfused when there is symptomatic anemia or hypovolemic shock. Duration of surgery is calculated from time between skin incision and skin closure.

Data were entered into Microsoft Excel sheet and exported to SPSS version 20 for analysis and presented as means, numbers and percentages, line graphs, frequency tables and charts. Student's t-test for continuous variables and chi-square test or Fisher's exact test for categorical variables was used for bivariate analysis and multiple logistic regression was applied to test for significant association with P-values of 0.05 or less taken as significant.

## Results

One thousand, five hundred and fifty-seven (1557) gynecological surgeries were carried out during the five-year study period, of which 374 (24%) were open abdominal myomectomies (Table 1). Figure 1 shows a line graph of the yearly rates of myomectomy, with an increasing trend from 20% in 2015 to 34.1% in 2019.

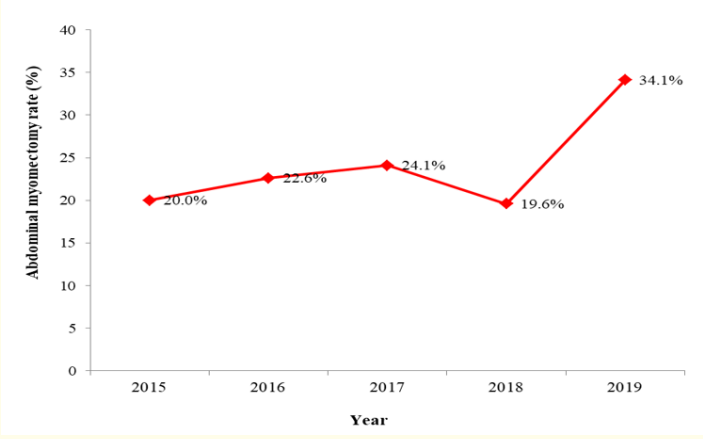


***Figure 1:*** *Line graph showing trends in abdominal myomectomy rate at the tertiary hospital over 5-years.*

| Time period | Total number of gynecological surgeries | Number of myomectomies | Percentage |
|---|---|---|---|
| 2015 | 315 | 63 | 20.0 |
| 2016 | 310 | 70 | 22.6 |
| 2017 | 290 | 70 | 24.1 |
| 2018 | 331 | 65 | 19.6 |
| 2019 | 311 | 106 | 34.1 |
| Total | 1557 | 374 | 24.0 |

***Table 1:*** *Rates of abdominal myomectomy at the tertiary hospital over a 5-year period.*

Majority of the women, 219 (58.6%), were within the 30-39 years age group and majority, 298 (79.7%), were nulliparous women. The mean age ± SD was 36.68 ± 5.66years; with median age of 36years and age range of 20 - 51 years. The median parity was Para 0, with a range of Para 0 - 9 (Table 2).

| Variables (N = 374) | Frequency | Percentage |
|---|---|---|
| **Age category** | | |
| 20 - 29 years | 31 | 8.3 |
| 30 - 39 years | 219 | 58.6 |
| 40 - 49 years | 120 | 32.1 |
| ≥50 years | 4 | 1.1 |
| Mean ± SD = 36.68 ± 5.66 years; Median = 36 years; Range = 20 - 51 years | | |
| **Parity** | | |
| Para 0 | 298 | 79.7 |
| Para 1 | 37 | 9.9 |
| Para 2 - 4 | 35 | 9.4 |
| Para ≥ 5 | 4 | 1.1 |
| Median = Para 0; Range = Para 0 - 9 | | |

***Table 2:*** *Distribution of age and parity of women who had Abdominal Myomectomy at the tertiary hospital.*

The reasons (indication) for having the myomectomy is as shown in figure 2. In majority of the women 294 (78.6%), it was for menorrhagia, while it was for subfertility in 71 (19%) of the women and for the sheer size in 9 (2.4%) of the women. Table 3 shows the relationship between their age category and parity with the indication for surgery (menorrhagia versus others) and reveals a significant relationship between age category and indication (P = 0.008), while the relationship with parity was not significant (P = 0.471).

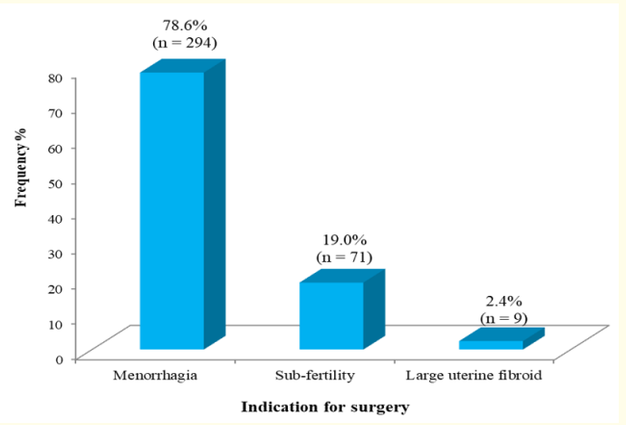


***Figure 2:*** *Indication for abdominal myomectomy among women at the tertiary hospital.*

| | Indication for surgery (abdominal myomectomy) | | |
|---|---|---|---|
| **Variables (N = 374)** | **Large fibroid/Sub-fertility n (%)** | **Menorrhagia n (%)** | **Total n (%)** |
| **Age category** | | | |
| 20 - 29 years | 3 (9.7) | 28 (90.3) | 31 (100.0) |
| 30 - 39 years | 60 (27.4) | 159 (72.6) | 219 (100.0) |
| 40 - 49 years | 17 (14.2) | 103 (85.8) | 120 (100.0) |
| ≥50 years | 0 (0.0) | 4 (100.0) | 4 (100.0) |
| | Fisher's exact test = 11.282; p-value = 0.008* | | |
| **Parity** | | | |
| Para 0 | 69 (23.2) | 229 (76.8) | 298 (100.0) |
| Para 1 | 6 (16.2) | 31 (83.6) | 37 (100.0) |
| Para 2 - 4 | 5 (14.3) | 30 (85.7) | 35 (100.0) |
| Para ≥ 5 | 0 (0.0) | 4 (100.0) | 4 (100.0) |
| | Fisher's exact test = 2.398; p-value = 0.471 | | |

***Table 3:*** *Relationship between age, parity and indication for surgery among women at the tertiary hospital. *Statistically significant (p < 0.05).*

Regarding the intraoperative findings of the women, majority 286 (76.5%) had estimated blood loss (EBL) < 500 mls and the duration of surgery (DoS) was 120 - 180 mins in majority 197 (52.7%) of the women (Figure 3). The mean EBL of the study population ± SD was 413.98 ± 174.39 mls, while the median was 350mls and the range was 200 - 1500 mls. The mean DoS of study population ± SD was 125.29 ± 53.14minutes, while the median was 120minutes and the range was 60 - 540 minutes. A comparison of the mean EBL and mean DoS across the age category, parity and indication for surgery, revealed a significant relationship between indication for surgery with EBL (P = 0.0001) and Dos (P = 0.0001). The relationship between age category with EBL (P = 0.240) and DoS (P = 0.753) were not significant, and so was parity with EBL (P = 0.423) and DoS (P = 0.199), see table 4.

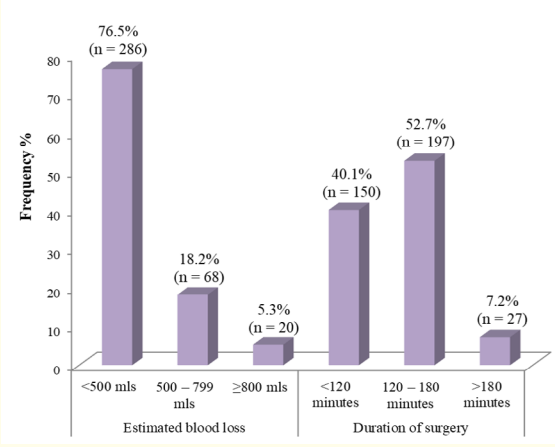


***Figure 3:*** *Intra-operative findings at open abdominal myomectomy among women at the tertiary hospital.*

| | Intra-operative findings | |
|---|---|---|
| **Variables (N = 374)** | **Estimated blood loss (ml) Mean ± SD** | **Duration of surgery (minutes) Mean ± SD** |
| **Age category** | | |
| 20 - 29 years | 370.97 ± 106.28 | 120.00 ± 46.48 |
| 30 - 39 years | 407.90 ± 175.81 | 124.25 ± 49.96 |
| 40 - 49 years | 436.67 ± 181.58 | 129.00 ± 58.55 |
| ≥ 50 years | 400.0 ± 267.71 | 112.50 ± 105.00 |
| | ANOVA = 1.407<br>p-value = 0.240 | ANOVA = 0.401<br>p-value = 0.753 |
| **Parity** | | |
| Para 0 | 407.48171.99 | 125.13 ± 53.61 |
| Para 1 | 439.19 ± 186.39 | 130.54 ± 57.10 |
| Para 2 - 4 | 431.43 ± 180.31 | 115.71 ± 40.60 |
| Para ≥ 5 | 512.50 ± 197.38 | 172.50 ± 66.52 |
| | ANOVA = 0.937<br>p-value = 0.423 | ANOVA = 1.559<br>p-value = 0.199 |
| **Indication for surgery** | | |
| Large uterine fibroid | 332.45 ± 56.33 | 106.26 ± 30.00 |
| Sub-fertility | 613.24 ± 86.65 | 168.97 ± 38.75 |
| Menorrhagia | 902.50 ± 172.04 | 249.00 ± 90.84 |
| | ANOVA = 882.792<br>p-value = 0.0001* | ANOVA = 194.707<br>p-value = 0.0001* |

***Table 4:*** *Comparison of mean estimated blood loss and duration of surgery by age, parity, indication for surgery among women at the tertiary hospital.*

**Statistically significant (p < 0.05).*

Regarding complications encountered postoperatively, 88 (23.5%) of the women required blood transfusion, 52 (13.9%) of the women developed anemia, 29 (7.8%) had wound sepsis, 4 (1.1%) developed intestinal obstruction, 8 (2.1) were taken back to the theater to have hysterectomy for uncontrollable hemorrhage and there was no death recorded (Figure 4). On bivariate analysis, a comparison between age category, parity, indication for surgery, EBL and DoS with blood transfusion (Table 5), Anemia (Table 6), wound sepsis (Table 7), intestinal obstruction (Table 8) and hysterectomy (Table 9), all revealed significant association of these complications with EBL and DoS. In addition, blood transfusion and anemia had significant relationship with indication for surgery, while hysterectomy had significant relationship with parity as well.

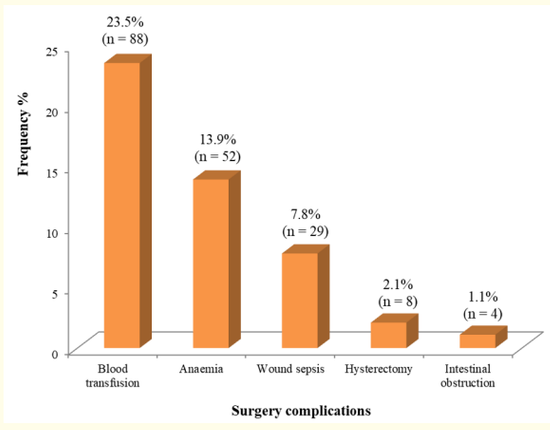


***Figure 4:*** *Complications following abdominal myomectomy among women at the tertiary hospital (n = 374).*

*#: Multiple response.*

| | Blood transfusion | | |
|---|---|---|---|
| **Variables (N = 374)** | **Yes n (%)** | **No n (%)** | **Total n (%)** |
| **Age category** | | | |
| 20 - 29 years | 3 (9.7) | 28 (90.3) | 31 (100.0) |
| 30 - 39 years | 49 (22.4) | 170 (77.6) | 219 (100.0) |
| 40 - 49 years | 35 (29.2) | 85 (70.8) | 120 (100.0) |
| ≥50 years | 1 (25.0) | 3 (75.0) | 4 (100.0) |
| | Fisher's exact test = 5.838; p-value = 0.104 | | |
| **Parity** | | | |
| Para 0 | 64 (21.5) | 234 (78.5) | 298 (100.0) |
| Para 1 | 12 (32.4) | 25 (67.6) | 37 (100.0) |
| Para 2 - 4 | 11 (31.4) | 24 (68.6) | 35 (100.0) |
| Para ≥5 | 1 (25.0) | 3 (75.0) | 4 (100.0) |
| | Fisher's exact test = 3.929; p-value = 0.243 | | |
| **Indication for surgery** | | | |
| Large uterine fibroid | 1 (11.1) | 8 (88.9) | 9 (100.0) |
| Sub-fertility | 7 (9.9) | 64 (90.1) | 71 (100.0) |
| Menorrhagia | 80 (27.2) | 214 (72.8) | 294 (100.0) |
| | Chi Square = 10.360; p-value = 0.006* | | |
| **Estimated blood loss** | | | |
| <500 ml | 5 (1.7) | 281 (98.3) | 286 (100.0) |
| 500 - 799 ml | 64 (94.1) | 4 (5.69) | 68 (100.0) |
| ≥800 ml | 19 (95.0) | 1 (5.0) | 20 (100.0) |
| | Chi Square = 320.494; p-value = 0.0001* | | |
| **Duration of surgery** | | | |
| < 120 minutes | 4 (2.7) | 146 (97.3) | 150 (100.0) |
| 120 - 180 minutes | 58 (29.4) | 139 (70.6) | 197 (100.0) |
| > 180 minutes | 26 (96.3) | 1 (3.7) | 27 (100.0) |
| | Chi Square = 119.568; p-value = 0.0001* | | |

***Table 5:*** *Relationship between age, parity, indication for surgery, intraoperative outcome and blood transfusion among women at the tertiary hospital.*

**Statistically significant (p < 0.05).*

| | Anemia | | |
|---|---|---|---|
| **Variables (N = 374)** | **Yes n (%)** | **No n (%)** | **Total n (%)** |
| **Age category** | | | |
| 20 - 29 years | 2 (6.5) | 29 (93.5) | 31 (100.0) |
| 30 - 39 years | 32 (14.6) | 187 (85.4) | 219 (100.0) |
| 40 - 49 years | 17 (14.2) | 103 (85.8) | 120 (100.0) |
| ≥50 years | 1 (25.0) | 3 (75.0) | 4 (100.0) |
| | Fisher's exact test = 2.278; p-value = 0.466 | | |

| | | | |
|---|---|---|---|
| **Parity** | | | |
| Para 0 | 39 (13.1) | 259 (86.9) | 298 (100.0) |
| Para 1 | 6 (16.2) | 31 (83.8) | 37 (100.0) |
| Para 2 - 4 | 6 (17.1) | 29 (82.9) | 35 (100.0) |
| Para ≥5 | 1 (25.0) | 3 (75.0) | 4 (100.0) |
| | Fisher's exact test = 1.891; p-value = 0.555 | | |
| **Indication for surgery** | | | |
| Large uterine fibroid | 1 (11.1) | 8 (88.9) | 9 (100.0) |
| Sub-fertility | 3 (4.2) | 68 (95.8) | 71 (100.0) |
| Menorrhagia | 48 (16.3) | 246 (83.7) | 294 (100.0) |
| | Chi Square = 7.056; p-value = 0.029* | | |
| **Estimated blood loss** | | | |
| <500 ml | 3 (1.0) | 283 (99.0) | 286 (100.0) |
| 500 - 799 ml | 31 (45.6) | 37 (54.4) | 68 (100.0) |
| ≥800 ml | 18 (90.0) | 2 (10.0) | 20 (100.0) |
| | Chi Square = 193.256; p-value = 0.0001* | | |
| **Duration of surgery** | | | |
| < 120 minutes | 3 (2.0) | 147 (98.0) | 150 (100.0) |
| 120 - 180 minutes | 26 (13.2) | 171 (86.8) | 197 (100.0) |
| > 180 minutes | 23 (85.2) | 4 (14.8) | 27 (100.0) |
| | Chi Square = 132.442; p-value = 0.0001* | | |

***Table 6:*** *Relationship between age, parity, indication for surgery, intraoperative outcome and anemia among women at the tertiary hospital.*

**Statistically significant (p < 0.05).*

| | **Wound sepsis** | | |
|---|---|---|---|
| **Variables (N = 374)** | **Yes n (%)** | **No n (%)** | **Total n (%)** |
| **Age category** | | | |
| 20 - 29 years | 2 (6.5) | 29 (93.5) | 31 (100.0) |
| 30 - 39 years | 17 (7.8) | 202 (92.2) | 219 (100.0) |
| 40 - 49 years | 9 (7.5) | 111 (92.5) | 120 (100.0) |
| ≥ 50 years | 1 (25.0) | 3 (75.0) | 4 (100.0) |
| | Fisher's exact test = 2.234; p-value = 0.510 | | |
| **Parity** | | | |
| Para 0 | 24 (8.1) | 274 (91.9) | 298 (100.0) |
| Para 1 | 3 (8.1) | 34 (91.9) | 37 (100.0) |
| Para 2 - 4 | 1 (2.9) | 34 (97.1) | 35 (100.0) |
| Para ≥ 5 | 1 (25.0) | 3 (75.0) | 4 (100.0) |
| | Fisher's exact test = 3.151; p-value = 0.369 | | |
| **Indication for surgery** | | | |
| Large uterine fibroid | 0 (0.0) | 9 (100.0) | 9 (100.0) |
| Sub-fertility | 3 (4.2) | 68 (95.8) | 71 (100.0) |
| Menorrhagia | 26 (8.8) | 268 (91.2) | 294 (100.0) |
| | Chi Square = 2.480; p-value = 0.289 | | |

| | | | |
|---|---|---|---|
| **Estimated blood loss** | | | |
| < 500 ml | 1 (0.3) | 285 (99.7) | 286 (100.0) |
| 500 - 799 ml | 14 (20.6) | 54 (79.4) | 68 (100.0) |
| ≥ 800 ml | 14 (70.0) | 6 (30.0) | 20 (100.0) |
| | Chi Square = 145.918; p-value = 0.0001* | | |
| **Duration of surgery** | | | |
| < 120 minutes | 1 (0.7) | 149 (99.3) | 150 (100.0) |
| 120 - 180 minutes | 12 (6.1) | 185 (93.9) | 197 (100.0) |
| > 180 minutes | 16 (59.3) | 11 (40.7) | 27 (100.0) |
| | Chi Square = 111.432; p-value = 0.0001* | | |

***Table 7:*** *Relationship between age, parity, indication for surgery, intraoperative outcome and wound sepsis among women at the tertiary hospital.*

**Statistically significant (p < 0.05).*

| | **Intestinal obstruction** | | |
|---|---|---|---|
| **Variables (N = 374)** | **Yes n (%)** | **No n (%)** | **Total n (%)** |
| **Age category** | | | |
| 20 - 29 years | 0 (0.0) | 31 (100.0) | 31 (100.0) |
| 30 - 39 years | 1 (0.5) | 218 (99.5) | 219 (100.0) |
| 40 - 49 years | 3 (2.5) | 117 (97.5) | 120 (100.0) |
| ≥ 50 years | 0 (0.0) | 4 (100.0) | 4 (100.0) |
| | Fisher's exact test = 4.196; p-value = 0.302 | | |
| **Parity** | | | |
| Para 0 | 4 (1.3) | 294 (98.7) | 298 (100.0) |
| Para 1 | 0 (0.0) | 37 (100.0) | 37 (100.0) |
| Para 2 - 4 | 0 (0.0) | 35 (100.0) | 35 (100.0) |
| Para ≥ 5 | 0 (0.0) | 4 (100.0) | 4 (100.0) |
| | Fisher's exact test = 1.633; p-value = 1.000 | | |
| **Indication for surgery** | | | |
| Large uterine fibroid | 0 (0.0) | 9 (100.0) | 9 (100.0) |
| Sub-fertility | 0 (0.0) | 71 (100.0) | 71 (100.0) |
| Menorrhagia | 4 (1.4) | 290 (98.6) | 294 (100.0) |
| | Chi Square = 1.137; p-value = 1.000 | | |
| **Estimated blood loss** | | | |
| < 500 ml | 1 (0.3) | 285 (99.7) | 286 (100.0) |
| 500 - 799 ml | 0 (0.0) | 68 (100.0) | 68 (100.0) |
| ≥ 800 ml | 3 (15.0) | 17 (85.0) | 20 (100.0) |
| | Fisher's exact test = 38.817; p-value = 0.0001* | | |
| **Duration of surgery** | | | |
| < 120 minutes | 1 (0.7) | 149 (99.3) | 150 (100.0) |
| 120 - 180 minutes | 0 (0.0) | 197 (100.0) | 197 (100.0) |
| > 180 minutes | 3 (11.1) | 24 (88.9) | 27 (100.0) |
| | Fisher's exact test = 12.779; p-value = 0.001* | | |

***Table 8:*** *Relationship between age, parity, indication for surgery, estimated blood loss, intraoperative outcome and intestinal obstruction among women at the tertiary hospital.*

**Statistically significant (p < 0.05).*

| | Hysterectomy | | |
|---|---|---|---|
| Variables (N = 374) | Yes n (%) | No n (%) | Total n (%) |
| **Age category** | | | |
| 20 - 29 years | 0 (0.0) | 31 (100.0) | 31 (100.0) |
| 30 - 39 years | 3 (1.4) | 216 (98.6) | 219 (100.0) |
| 40 - 49 years | 4 (3.3) | 116 (96.7) | 120 (100.0) |
| ≥50 years | 1 (25.0) | 3 (75.0) | 4 (100.0) |
| | Fisher's exact test = 7.102; p-value = 0.055 | | |
| **Parity** | | | |
| Para 0 | 2 (0.7) | 296 (99.3) | 298 (100.0) |
| Para 1 | 1 (2.7) | 36 (97.3) | 37 (100.0) |
| Para 2 - 4 | 3 (8.6) | 32 (91.4) | 35 (100.0) |
| Para ≥5 | 2 (50.0) | 2 (50.0) | 4 (100.0) |
| | Fisher's exact test = 21.415; p-value = 0.0001* | | |
| **Indication for surgery** | | | |
| Large uterine fibroid | 0 (0.0) | 9 (100.0) | 9 (100.0) |
| Sub-fertility | 0 (0.0) | 71 (100.0) | 71 (100.0) |
| Menorrhagia | 8 (2.7) | 286 (97.3) | 294 (100.0) |
| | Fisher's exact test = 1.730; p-value = 0.477 | | |
| **Estimated blood loss** | | | |
| < 500 ml | 2 (0.7) | 284 (99.3) | 286 (100.0) |
| 500 - 799 ml | 2 (2.9) | 66 (97.1) | 68 (100.0) |
| ≥ 800 ml | 4 (20.0) | 16 (80.0) | 20 (100.0) |
| | Fisher's exact test = 16.874; p-value = 0.0001* | | |
| **Duration of surgery** | | | |
| < 120 minutes | 0 (0.0) | 150 (100.0) | 150 (100.0) |
| 120 - 180 minutes | 4 (2.0) | 193 (98.0) | 197 (100.0) |
| > 180 minutes | 4 (14.8) | 23 (85.2) | 27 (100.0) |
| | Fisher's exact test = 14.426; p-value = 0.0001* | | |

***Table 9:*** *Relationship between age, parity, indication for surgery, intraoperative outcome and hysterectomy among women at the tertiary hospital.*

**Statistically significant (p < 0.05).*

Overall, the incidence of complication in the study population was 91 (24.3%) while 283 (75.7%) had no complication (Figure 5). Table 10 relates to a bivariate analysis between presence or absence of complication and Age category, parity, indication for surgery, EBL and DoS. There was significant association of presence or absence of complications with age category (P = 0.041), indication for surgery (P = 0.003), EBL (P = 0.0001) and DoS (P = 0.0001), but not with parity (P = 0.129). However, on multiple logistic regression analysis (Table 11), only EBL remained a statistically significant association with the occurrence of complications (P = 0.0001).

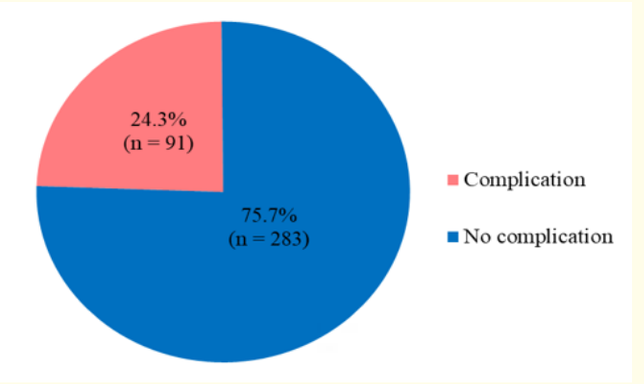


***Figure 5:*** *Incidence of complication at abdominal myomectomy among women at the tertiary hospital.*

| | Complication | | |
|---|---|---|---|
| **Variables (N = 374)** | **Yes n (%)** | **No n (%)** | **Total n (%)** |
| **Age category** | | | |
| 20 - 29 years | 3 (9.7) | 28 (90.3) | 31 (100.0) |
| 30 - 39 years | 49 (22.4) | 170 (77.6) | 219 (100.0) |
| 40 - 49 years | 38 (31.7) | 82 (68.3) | 120 (100.0) |
| ≥ 50 years | 1 (25.0) | 3 (75.0) | 4 (100.0) |
| | Fisher's exact test = 7.765; p-value = 0.041* | | |
| **Parity** | | | |
| Para 0 | 65 (21.8) | 233 (78.2) | 298 (100.0) |
| Para 1 | 12 (32.4) | 25 (67.6) | 37 (100.0) |
| Para 2 - 4 | 12 (34.3) | 23 (65.7) | 35 (100.0) |
| Para ≥ 5 | 2 (50.0) | 2 (50.0) | 4 (100.0) |
| | Fisher's exact test = 5.661; p-value = 0.129 | | |
| **Indication for surgery** | | | |
| Large uterine fibroid | 1 (11.1) | 8 (88.9) | 9 (100.0) |
| Sub-fertility | 7 (9.9) | 64 (90.1) | 71 (100.0) |
| Menorrhagia | 83 (28.2) | 211 (71.8) | 294 (100.0) |
| | Chi Square = 11.360; p-value = 0.003* | | |
| **Estimated blood loss** | | | |
| <500 ml | 7 (2.4) | 279 (97.6) | 286 (100.0) |
| 500 - 799 ml | 64 (94.1) | 4 (5.9) | 68 (100.0) |
| ≥800 ml | 20 (100.0) | 0 (0.0) | 20 (100.0) |
| | Chi Square = 316.463; p-value = 0.0001* | | |
| **Duration of surgery** | | | |
| < 120 minutes | 5 (3.3) | 145 (96.7) | 150 (100.0) |
| 120 - 180 minutes | 60 (30.5) | 137 (69.5) | 197 (100.0) |
| > 180 minutes | 26 (96.3) | 1 (3.7) | 27 (100.0) |
| | Chi Square = 115.886; p-value = 0.0001* | | |

***Table 10:*** *Relationship between age, parity, indication for surgery, intraoperative outcome and incidence of complication among women at the tertiary hospital.*

**Statistically significant (p < 0.05).*

| Factors | Coefficient (B) | Odds ratio (OR) | 95% CI | p value |
|---|---|---|---|---|
| **Age category** | | | | |
| ≥ 40 years | 0.191 | 1.211 | 0.34 - 4.32 | 0.7688 |
| < 40 years [R] | | 1 | | |
| **Indication for surgery** | | | | |
| Menorrhagia | 0.916 | 2.500 | 0.43 - 14.66 | 0.310 |
| Sub-fertility/Large uterine fibroid [R] | | 1 | | |
| **Estimated blood loss** | | | | |
| ≥ 500 mls | 6.389 | 595.129 | 157.75 - 2245.16 | 0.0001* |
| < 500 mls [R] | | 1 | | |
| **Duration of surgery** | | | | |
| ≥ 120 minutes | 0.780 | 2.182 | 0.48 - 9.88 | 0.311 |
| < 120 minutes [R] | | 1 | | |

***Table 11:*** *Multiple logistic regression showing factors associated with incidence of complication among women at the tertiary hospital. *Statistically significant ($p < 0.05$).*

## Discussion

This study revealed that about a quarter (24%) of all gynecological surgeries in this center were open abdominal myomectomy. This rate is higher than those reported at Maiduguri in northern Nigeria of 3.34% [21] and Ile-Ife in southwest Nigeria of 1.55% [22]. The difference might be attributed to the period of these studies which were carried out over a decade earlier and because, recently there has been an increase in number of patients requiring myomectomy in our center, as was evident in the trend reported by this study from 20% to 34%.

Over three-quarters (79.7%) of the study population were nulliparous women and majority were in the age category of 30 - 39 years. This was expected as uterine fibroids are known to be commoner in nulliparous and relatively infertile women [3,4], and this was also supported by the findings of Geidam., *et al* [21]. There is evidence of an inverse relationship between the incidence of uterine fibroids and parity of women and pregnancy has been known to be protective against developing fibroids. Ischemia of the uterus during parturition and selective apoptosis of small lesions during postpartum uterine remodeling are possible explanation why pregnancy is protective against fibroids [23].

More than three-quarters (78.6%) of our study population had menorrhagia as the indication for surgery, with the rest requiring surgery for infertility and size of tumor. Menorrhagia was also the commonest indication for surgery in the studies by Geidam., *et al*. [21], Komolafe., *et al*. [22] and Mohammed., *et al* [24]. The high proportion of women with menorrhagia might be responsible for most of the complications seen in this study. This could be explained as increased pre- and intra- operative blood loss leading to anemia and requiring blood transfusion, and the anemia leading to wound infection and poor wound healing. The single most significant associated factor for the occurrence of complication in this study was blood loss. One study reported abdominal swelling as the commonest indication for myomectomy, over and above menorrhagia and infertility [25]. This study, while being retrospective, applied a sampling technique that resulted in only a small proportion of the study group being analyzed.

The overall rate of complication occurring in this study population was 24.3%. This is like the findings of 23.7% by Ikpese., *et al*. [26], but higher than the 10.9% reported by Geidam., *et al*. [21] and 14.6% reported by Komolafe., *et al* [22]. The difference may not be connected to the competence of the surgeon as one might expect, as in all studies, most of the cases were done by consultants. An interesting observation, that might be responsible for the higher complication rate in our study, is the proportion of women who needed the surgery on account of menorrhagia (78.6%), this was lower in the study by Geidam., *et al*. 57.3% [21] and Komolafe., *et al*. 52.2% [22]. Also, the volume of surgery carried out was much higher in our study than the others and might explain the higher complication rate.

In terms of blood loss, the findings in this study of 76.5% having blood loss < 500 mls was like the 79% in the study by Geidam., *et al*. [21], but the mean blood loss of 413 in our study was higher than theirs of 313. The use of intraoperative hemostatic technique (tourniquet) in both studies was responsible for the majority having blood loss < 500 mls. Komolafe., *et al*. [22] reported an average blood loss of 480 mls and Adesina., *et al*. [25] reported a mean of 630 mls. The differences in the mean and average blood losses reported may be the result of the proportion of patients with huge fibroids in the study population.

Though myomectomy is feasible and relatively safe, with large fibroids there is increased risk of severe hemorrhage that might necessitate conversion to hysterectomy. This occurred in 8 (2.1%) cases in this study and in a study population where almost 80% are nulliparous and in an environment with a high premium for having children, the possibility of progression from myomectomy to hysterectomy and obtaining a double-consent should be taken seriously. This is considered a pertinent part of pre-operative management in our center, to guide against medico-legal issues that are becoming common in our environment.

This was a retrospective review of cases of open abdominal myomectomy. Patient follow-up was limited to four weeks after surgery, making it difficult to determine long-term complications. However, the myomectomies were performed by surgeons of comparable expertise, all under spinal anesthesia and using tourniquet for hemostatic control, so blood loss at surgery was not significantly impacted by these factors. However, it might be necessary to consider prospective randomized designs, with explicit criteria to eliminate confounders, to validate the findings in this study.

## Conclusion

About a quarter of all gynecological surgeries performed in the five-year study period were open abdominal myomectomy, and there was a rising trend. The outcome in this study was generally favorable and intraoperative hemorrhage (blood loss) was significantly associated with the occurrence of most complications. It is recommended that cases of uterine fibroid with menorrhagia should be optimized before surgery and measures should be taken to reduce blood loss at surgery to prevent development of complications. Patients should be counseled preoperatively on the risk of blood loss and the possibility of blood transfusion. Use of intraoperative hemostatic techniques (tourniquet) in combination with myometrial injection of vasopressin should be considered in patients with huge multiple fibroids especially causing menorrhagia.

## Conflict of Interest

All the authors declare no conflict of interest.

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