Addis Ababa University,

College of Health Sciences,

School of Medicine,

Department of Obstetrics and Gynecology

POSTGRADUATE PROGRAM

Prevalence and Complications of elective myomectomy in three teaching hospitals in Addis Ababa, Ethiopia: A Retrospective Cross-Sectional Study

Thesis to be submitted to the Addis Ababa University, College of Health Sciences, School of Medicine, Department of Obstetrics and Gynecology in partial fulfillment for the requirement of a specialization certificate in Obstetrics and Gynecology.

Investigator: Dr. Siraj Awel (MD, Obstetrics and Gynecology Year 4 Resident)

Advisors: Dr. Abdu Mengesha (Assistant Professor of Obstetrics and Gynecology, REI Subspecialist)

Dr. Eskinder Kebede (Associate Professor of Obstetrics and Gynecology, REI Subspecialist)

SEPTEMBER, 2024

Addis Ababa, ETHIOPIA

Prevalence and complications of Elective Myomectomy in Three Teaching Hospitals in Addis Ababa, Ethiopia: A Cross Sectional Retrospective Study

Name of investigator	**Dr Siraj Awel**
Name of advisors	**Dr Abdu Mengesha and Dr Eskinder Kebede**
Full title of the research project	**Prevalence and Complications of elective myomectomy in three teaching hospitals in Addis Ababa, Ethiopia: A retrospective cross-sectional study**
Duration of project	**12 months**
Study area	**Tikur Anbesa Specialized Hospital, Ghandi Memorial Hospital, and Zewditu Memorial Hospital**
Total cost of the project	**31,375.00 Ethiopian Birr**
Address of the investigator	**Email sirajawel82@gmail.com** **Tel. No.: +251942045036**

Addis Ababa University,

College of Health Sciences, Department of Obstetrics and Gynecology

Research report attesting page

Student declaration

I declare that this work has not been previously submitted and approved for the Award of a degree by this or any other University. To the best of my knowledge and belief, the dissertation contains no material previously published or written by Another person except where due reference is made in the dissertation itself.

Name of student…….

Signature……

Date……./……/…….

Supervisors' Declaration

I have undersigned and certify that I have read and hereby recommend for Acceptance to the Addis Ababa University dissertation entitled "Prevalence and Complications of elective myomectomy in three teaching hospitals in Addis Ababa, Ethiopia: A Retrospective Cross Sectional Study."

Advisors:

Dr. Abdu Mengesha (Assistant Professor of Obstetrics and Gynecology, Reproductive Endocrinology, and Infertility Subspecialist, Addis Ababa University, College of Health Sciences)

Signature……..Date…../…..…/…..…….

Dr. Eskinder Kebede (Associate Professor of Obstetrics and Gynecology, Reproductive Endocrinology, and Infertility Subspecialist, Addis Ababa University, College of Health Sciences)

Signature……..Date…../…..…/…..…….

Acknowledgement

I would like to express my gratitude to my advisors, Dr. Abdu Mengesha and Dr. Eskinder Kebede, for their valuable advice, guidance, and undeniable efforts in selecting the topic, writing this proposal, data collection, and result analysis.

I also thank Addis Ababa University, College of Health Sciences, School of Medicine, Department of Obstetrics and Gynecology, for the cooperative support in supplying the necessary documents for the research proposal writing, data collection, and thesis writing.

Last but not least, my extended gratitude goes also to all my colleagues for their fruitful and constructive comments.

List of Abbreviations/ Acronyms

AAU:	Addis Ababa University
BMI:	Body Mass Index
CHS:	Collage of Health Sciences
DVT:	Deep Vein Thrombosis
EBL:	Estimated Blood Loss
ETB:	Ethiopian Birr
FIGO:	International Federation of Gynecology and Obstetrics
GnRH:	Gonadotropin Releasing Hormone
GMH:	Ghandi Memorial Hospital
HTN:	Hypertension
LNG-IUS:	Levonorgestrel releasing Intra-Uterine System
MRgFUS:	Magnetic Resonance guided Focused Ultrasound
NRS:	Numerical Rating Scale
OB/GYN:	Obstetrics and Gynecology
OCP:	Oral Contraceptive Pills
PCV:	Packed Cell Volume
QOL:	Quality Of Life
SD:	Standard Deviation
SPSS:	Statistical Package for Social Sciences
SSA:	Sub Saharan Africa
TASH:	Tikur Anbessa Specialized Hospital
UBP-WRS :	Uterine Bleeding and Pain Women's Research Study
UF:	Uterine Fibroids
UK:	United Kingdom
USA:	United States of America
UAE:	Uterine Artery Embolization
ZMH:	Zewditu Memorial Hospital

Table of Contents

List of tables

List of figures

Abstract

Background: –Myomectomy, which is a surgical removal of myoma (uterine fibroid), is one of the most commonly done gynecological procedures and the most common indication for hysterectomy worldwide. The procedure could be done for multiple indications, including abdominal pain, abnormal uterine bleeding and abdominal mass, infertility, and recurrent miscarriages. Even though the procedure is considered to be safe, complications still arise, including hemorrhage, infections, fever, conversion to hysterectomy, blood transfusion, venous thromboembolism, and organ injuries depending on the size, number, and location of myomas.

Objectives: The aim of this study is to analyze the prevalence and complications of elective myomectomies at three teaching hospitals in Addis Ababa, Ethiopia.

Methods: A hospital-based retrospective cross-sectional study was conducted at three teaching hospitals in Addis Ababa. All women who underwent elective myomectomy were eligible to participate in the study. Socio-demographic data, clinical factors, preoperative characteristics, and postoperative data associated with elective myomectomy were collected using a structured questionnaire from December 1, 2023, to February 28, 2024. Data obtained was cleaned and entered into the software Epi-Data. Cross-checking and data cleaning were made. Then, data was transferred to SPSS program version 25 for analysis. Descriptive statistic analysis explained in figures, tables, and charts was done. Determined variables were examined and were considered significant.

Results: In this study, the mean age of study participants having myomectomy was 33.1 years. 53.8% of the surgery indications were abnormal uterine bleeding, followed by abdominal swelling (26.4%), abdominal pain (21.7%), and infertility (14.4%). The overall myomectomy complications were 14%. Nine percent of the participants transfused perioperatively, and 2.5% of the participants who underwent the procedure had intraoperative organ injury. From those having organ injuries, five cases had the bladder and two cases had the bowel. 5.1% of the cases were converted to hysterectomy, and the

main indication for hysterectomy was the surgical difficulty of doing myomectomy (64.3%). Three percent of the study participants had postoperative fever, and the main cause of fever was UTI (50%) followed by SSI (25%) and pneumonia (25%). The determinant factors of myomectomy complications were uterine size of ≥20 cm (AOR=2.6, 95%CI=1.93, 7.27), having medical comorbidity (AOR=4.5, 95%CI=1.32, 15.25), having ≥10 myoma (AOR=2.8, 95%CI=1.08, 7.18), having an untended procedure (AOR=10.1, 95%CI=2.56, 39.92), and waiting ≥4 days in the hospital (AOR=3.9, 95%CI=1.74, 39.92) were the statistically significant factors.

Conclusion: The determinant factors of myomectomy complications were uterine size of ≥20, having medical comorbidity, having ≥10 myoma, duration of surgery, conversion of hysterectomy, adhesion, unintended procedure, and longer hospital stay were associated with myomectomy complications.

Key Words: myomectomy, prevalence, complications, teaching hospitals, Addis Ababa

1. Introduction

1.1 Back ground

Myomas or leiomaymas, often known as uterine fibroids (UF), are monoclonal, benign tumors of the smooth muscle cells that develop from the myometrium in the uterus of humans (12). Although the exact cause of fibroids is still unknown, there is a lot of evidence suggesting estrogens and progesterone encourage tumor growth because they hardly ever appear before menarche and usually shrink after menopause (1). Up to 80% of spontaneous fibroid tumors have been reported to have genetic alterations like Med-12. Additionally, other DNA variations have been linked to fibroid risk (3). By the age of 50, almost 70% of white women and more than 80% of black women overall have ultrasound-detected fibroids, and up to 35% of white women had ultrasound-detected leiomyomas in their thirties and forties. Symptoms of myomas will be present in 50% of black women (4).

The two main factors affecting the burden of fibroid are age and race. Women who are premenopausal and often between the ages of 35 and 45 are the most affected (4).
Additional epidemiological risk factors for the development of myoma exist. Age at menarche, low or nulliparity, family history, obesity, diet, physical activity, smoking, oral contraceptives, hormone replacement therapy, exposure to high estrogen and progesterone levels in the environment, and vitamin D deficiency are some of the factors associated with the development of myoma (5).
The clinical relevance of uterine myomas is typically correlated with their location, number, and size, with the vast majority of myomas being small, asymptomatic, and clinically insignificant (2). However, common issues brought on by myomas may significantly reduce Quality of Life (QOL). These issues include infertility, pregnancy loss and/or complications, irritation of the urinary bladder, abnormal uterine bleeding, bowel dysfunction, and pelvic and/or back pain (2). Medical therapy and/or surgical methods are available to treat these symptoms (1).
Myomectomy and hysterectomy (through open or minimally invasive techniques), uterine artery embolization (UAE), magnetic resonance guided focused ultrasound (MRgFUS),

and hysteroscopic myomectomy (for intra-cavity fibroids) are among the surgical procedures available for treatment (3). More hysterectomies are performed for leiomyoma than for all other gynecologic malignancies put together (4).

Historically, the first-line surgical procedure available to women with symptomatic uterine myomas has been hysterectomy. In contrast to the projected 30,000 myomectomies conducted each year in the US, 600,000 women are estimated to have hysterectomy each year, of which 200,000 are done to remove uterine myomas (6).

1.2 Statement of the Problem

Many women in Africa experience higher rates of morbidity and frequently higher rates of mortality from fibroid disease as a result of a lack of access to care and late presentation (3). Women with leiomyoma spend more on healthcare overall than women without the condition, and the majority of these expenses are attributable to inpatient care (4).
Furthermore, new research on the economic effects of UFs has been published in the United States, but there is relatively little data available for Sub-Saharan Africa (3). The cost of leiomyoma-related healthcare will rise with the growing population and shifting demographics until fibroid prevalence declines or outpatient, less invasive therapies become more widely available, efficient, and employed (4).

Due to cultural customs and beliefs, hysterectomy is the procedure that people in Africa accept the least. Due to the cultural notion that women require their uterus for childbearing in the hereafter, the majority of women would prefer to pass away and be buried with their uterus. However, myomectomy procedures, whether abdominal or laparoscopic, are linked to serious complications. Frequent complications include febrile morbidity, which may have an infection, hematoma, or other underlying cause (3, 7).

The majority of myomectomy procedures used to treat symptomatic UFs in Sub-Saharan Africa (SSA) are performed under suboptimal conditions, endangering patient safety, and have poor therapeutic effects. The majority of morbidity and mortality are caused by subpar preoperative evaluations and patient stabilization, intraoperative complications related to anesthesia, excessive blood loss, surgical injury to nearby organs, especially the

bowels, when the surgeon comes across dense pelvic adhesions, prolonged operating times, a lack of access to cross-specialty consultations, and a lack of adequate infrastructure such as reliable electricity. Hemorrhage, shock, fever, wound infection, and eventual wound dehiscence are some postoperative problems that could result in lengthy hospital stays (3).

Despite these consequences, robust epidemiological studies of the prevalence and complications of myomectomy in Ethiopia and especially in Addis Ababa are lacking. Understanding these complications makes it easier to spot high risk patients, optimize patients for surgery, and provide more focused counseling. The aim of this study is to update the data describing the current prevalence of myomectomy and patterns of perioperative complications and factors associated with developing complications in patients who underwent elective myomectomy at three teaching hospitals in Addis Ababa, Ethiopia.

1.3 Significance of the Study

Seventy to 80 percent of black women are predicted to have fibroids in their lifetime (3). Conservative surgical therapy, such as a myomectomy, is frequently chosen by fertile women with leiomyomas who want to maintain their fertility (7). Multiple bleeding and pain symptoms brought on by uterine fibroids may negatively affect a woman's sexual, social, and professional lives (1).

Myoma is the most common gynecological tumor in our population, and myomectomy is one of the most common gynecologic procedures, where it is associated with significant morbidity and perioperative complications (14).

It is disturbing that very little attention has been given to conducting research for uterine myoma and complications of myomectomy designed to meet the unique needs and challenges faced by Ethiopian women, particularly when they bear such a significant burden of uterine fibroid disease. Little to no data appears to be hailing in our region; however, perhaps this research could ameliorate this effort for the benefit of both the

health care provider and patients. And the findings from this study will be used to design a prospective study in the same facilities.

2. Literature Review

Myomas are very prevalent; it is believed that one in four to five women of reproductive age have myomas that are clinically evident (8, 2). Prevalence estimates for uterine fibroid tumors in women older than 30 years range from 20% to 40% in textbooks and most literature (9). Depending on the population investigated and the diagnostic technique employed, studies indicate that 5.4 to 77 percent of women have uterine fibroid tumors (10). African-American women had a 60% incidence of myomas by the age of 35; this incidence rose to almost 80% by the age of 50, according to a random sample of women aged 35 to 49 who were screened by self-report, medical record review, and sonography (8).

Case reports and clinical data indicate a high frequency of UF in black women residing in Africa, which is consistent with the high incidence and prevalence of myoma in African populations in developed nations. Contrary to wealthy nations, however, Africa has seen a shortage of systematic, adequately powered epidemiological studies of myoma (5). It is estimated that the yearly burden of myomas in the United States ranges from $6 to $34 billion, including direct and indirect healthcare costs (6). An analysis of patients who attended the gynecology clinic of a public tertiary health facility in Nigeria over a two-year period revealed that 30.7% (178/580) of all patients were diagnosed with UF(5). Many studies have been conducted in recent years to increase our understanding of the effectiveness and security of non-surgical and minimally invasive therapy for myoma (2).

Laparoscopic, vaginal, or open abdominal approaches to hysterectomy or myomectomy are among the surgical management options depending on the patient's desire to become pregnant and the severity of their symptoms (1,6). To relieve symptoms and enhance QOL, abdominal myomectomies can be done laparoscopically or openly (6). In the United States, uterine fibroids are the most prevalent benign tumors in women and the main reason for hysterectomies, and in 2010, 196,735 hysterectomies with myomas as the main indication were performed (1, 6). Symptoms related to leiomyoma are markedly detrimental to one's health and quality of life (4). Surprisingly, compared to women with chronic lung illness, hypertension, heart disease, or arthritis, women who undergo hysterectomies due to

myoma related symptoms score significantly lower on the Short Form General Health Survey (SF-36) for QOL (6).

The UBP-WRS is a cross-sectional examination the use of an online technique approach. The online poll was carried out in eight nations, including Brazil, Canada, France, Germany, Italy, South Korea, the UK, and the USA, between November and December 2009. When asked how their symptoms had affected their everyday lives in the previous 12 months, the women with identified uterine fibroids (n = 1,533) stated that 14.8% had experienced a severe negative impact, 18.3% had a moderate negative impact, and 20.6% had a mild negative impact. Women who reported symptoms having a slight to severe impact were further questioned about which activities were severely affected by their symptoms. The majority of women (42.9%) said that their sexual lives had been negatively impacted, followed by their work performance (27.7%), their relationships and families (27.2%), and housekeeping (25.9%) (1).

Hysterectomy for uterine fibroids accounts for up to 40% of all abdominal hysterectomies performed in the USA (11). There is disagreement over whether surgical procedures are required, particularly when fertility is desired, what kind of therapy is the safest or most effective, and which treatment option carries the least side effects (either systemic or local, such as adhesion formation) (2).

Myomectomy has traditionally been considered to carry an increased risk of complications relative to hysterectomy (11). A retrospective analysis of 969 elective hysterectomies performed at Tikur Anbessa teaching hospital from February 1992 to October 2000 is presented, and the commonest indication for hysterectomies was leiomyoma, which accounted for 41.1% (18).

In a retrospective comparative study done at New England Medical Center, Boston, Massachusetts, to compare the morbidity of total abdominal hysterectomy and abdominal myomectomy in the surgical management of uterine leiomyomas, there were significant differences between the two groups for average age (hysterectomy 39.2 years, myomectomy 34.4 years), uterine size (hysterectomy 15.2, myomectomy 11.5 weeks), and use of a GnRH agonist (hysterectomy 23.6%, myomectomy 55.3%). Myomectomy was associated with decreased estimated blood loss (hysterectomy 796 mL, myomectomy 464 mL) and febrile morbidity (risk of temperature 38C for 48 or more hours postoperatively:

for hysterectomy 49.4%, for myomectomy 32%). .After adjusting for uterine size using multivariate linear regression, the estimated blood loss was comparable between the groups. The rates of blood transfusions did not differ throughout the groups.
There were two ureteral, one bladder, one bowel, and one femoral nerve injury in the hysterectomy group, and there were no intraoperative visceral injuries in the myomectomy group. The conclusion was that myomectomy compares favorably to hysterectomy in the surgical management of leiomyomas, with a possible decreased risk for visceral injury and infection (12).

A retrospective cohort study of 394 women at the University of Pennsylvania, an academic medical center, was done to compare the perioperative morbidity associated with abdominal myomectomy with that of hysterectomy for women with uterine fibroids. In 39% of cases, myomectomy and, in 40% of cases, hysterectomy were linked to morbidity. With regard to hysterectomy, the crude odds ratio for myomectomy morbidity was 0.93. Women who underwent myomectomy were significantly younger, weighed less, and had a smaller preoperative uterine size (13).

In another cohort study done in London, UK, the overall rate of major complications after a myomectomy was 30%. Peri-operative bleeding necessitating blood transfusion occurred in 49 (24.5%) cases. During surgery, two patients had bowel injury, two had bladder injury, seven women returned to theater, and two (1%) had hysterectomy. Four patients were re-admitted within 14 days of surgery. Multivariable logistic regression analysis showed that the risk of major complications was significantly higher in cases with a uterine size of 20 gestational weeks or more, where 10 or more fibroids were removed and where a midline skin incision was required. On comparison of primary vs repeat abdominal myomectomy, there was significantly higher blood loss and risk of major complications in the repeat myomectomy group (40% vs 5%) (11).

There was another retrospective cohort study of 206 women undergoing abdominal myomectomy at a teaching hospital in the UK between 1999 and 2003. It was found that menorrhagia was the presenting symptom in 72% of the women. Estimated blood loss was significantly higher in multiple myomectomies compared with single myomectomies. Major complications were rare, and three patients needed a hysterectomy. There was no significant difference in hospital stay: 5.73 vs 5.98 days. It was concluded that

myomectomy is a relatively safe operation with a low incidence of serious morbidity. Hemorrhage is the commonest complication and is more likely during multiple myomectomies (19).

A retrospective analytical study was conducted at Maharaj Nakorn Chiang Mai University Hospital, Thailand, on 249 women undergoing myomectomy between January 2017 and June 2022. The mean age was 35.6 years. The majority of women had FIGO fibroid types 3–5 (58.2%) and type 6–8 (34.2%). Febrile morbidity was seen in 88 women (35.34%). Of them, 17.39% had a urinary tract infection and 4.34% had a surgical site infection, whereas the causes in the majority of cases (78.26%) could not be identified. The significant independent risk factors for febrile morbidity were abdominal myomectomy, overweight women, an operation time of more than 180 minutes, and postoperative anemia (7).

In another study done in Pakistan to compare clinically the presentation and morbidity of abdominal myomectomy and hysterectomy with myomectomy, both the estimated mean intraoperative blood loss and the risk of febrile morbidity were significantly lower than with hysterectomy. The risk of visceral injury, blood transfusion, mean duration of operating time, and mean duration of hospital stay did not differ significantly between the groups. The conclusion was that myomectomy can be considered a safe alternative to hysterectomy for the surgical management of uterine fibroids, with the added advantage of preserving women's sexual and reproductive functions (20).

In another retrospective review of myomectomy cases done in Ibadan, Nigeria, between July 2016 and June 2019, abdominal myomectomy accounted for 22.3% of major gynecologic surgeries. The uterine size ranged from 8 to 36 weeks, with a median uterine size of 22 weeks. Most (52.5%) patients had more than 10 fibroid nodules enucleated. The mean blood loss was 651.36mL ± 596.987mL, and one-quarter patients were transfused with blood. Most fibroid nodules were intra-mural (92.7%). About a quarter had previous pelvic surgeries like myomectomy, salpingectomy, cystectomy, and cesarean sections. There were intraoperative complications and postoperative complications in 25% and 29.3% of patients, respectively. The most common intraoperative complication was bleeding, requiring a blood transfusion, and women who had other intraoperative complications also required a blood transfusion. The notable post-operative complications were postoperative anemia not requiring blood transfusion, postoperative pyrexia, surgical

site infection, and postoperative anemia requiring blood transfusion, in decreasing order. General anesthesia, preoperative PCV less than 30%, the presence of pelvic adhesions, previous pelvic surgery, greater than 10 fibroid nodules, the size of the largest fibroid greater than 10 cm, and the duration of surgery greater than 90 minutes were significantly associated with intraoperative complications. While the presence of dense adhesions encountered at surgery, longer operating times greater than 90 minutes under general anesthesia, and pre-existing medical disorders were significantly associated with post-operative complications (14).

In a ten-year retrospective review of patients who had abdominal myomectomy from January 1999 to December 2008 at the University of Maiduguri Teaching Hospital, Nigeria, the rate of abdominal myomectomy was 3.34%. The majority of the patients (79.8%) were aged 30–49 years, and most (58.9%) were nulliparas. Abdominal mass (63.7%), menorrhagia (57.7%), and subfertility (55.2%) were the leading indications for abdominal myomectomy. Complications were seen in 10.9% of the cases, 55.5% of which were wound infections. Clinical and intraoperative factors associated with complications included menorrhagia (P = 0.003), estimated blood loss (EBL) ≥500mL (P = 0.005), and postoperative PCV of <30% (15).

In another study done at Olabisi Onabanjo University Teaching Hospital, Sagamu, Nigeria, between January 2000 and June 2009, a retrospective and comparative chart review of 224 women with uterine fibroids was done to see the relative morbidity of abdominal myomectomy for large myomas (> 20 weeks). Overall complications occurred in 31.7% of women, with hemorrhage (20.5%) and febrile morbidity (16.1%) being the major contributors. Unintended procedures (0.9%) and life-threatening events (1.8%) were rare, and no deaths were recorded. Forty women (17.9%) had blood loss, and 11.6% received homologous blood transfusion. Overall complications and all secondary morbidity outcomes (hemorrhage, fever, unintended major surgical procedures, life-threatening events, and rehospitalization) were comparable between women with very large uterine size and those with smaller uterus. And the conclusion was that large uterine size do not significantly affect clinically important complications, and women with very large uterine sizes should not be denied this procedure for safety concerns (16).

A retrospective analysis of 105 cases of uterine fibroids that were managed between January 1, 2003, and December 31, 2007 at the Aminu Kano Teaching Hospital, Kano, Nigeria. The period prevalence of uterine myomas was 24.7% of all major gynecological surgeries. The mean age was 35.8 ± 7.6, and the mean was parity 4.7 ± 2.8. Abdominal hysterectomy contributed to 58.1% of the cases and myomectomy for 41.9%. The odds of using abdominal hysterectomy were about twice that of myomectomy. Pelvic adhesions were found in 67.6% of the operations. Menorrhagia (86.7%) was the commonest presenting symptom, while postoperative anemia and fever showed significant associations with myomectomy. There was no maternal death (17).

A retrospective review of 588 patients with fibroids surgically treated at Tikur Anbessa Teaching Hospital, Addis Ababa, Ethiopia. The mean age of patients was 35.8 (SD 7.5) years, with a median parity of 1. The median uterine size was 16 weeks of gravid uterus. The number of myomas removed at myomectomy ranged from 1 to 50 (median 2). 98% of myomas were on the uterine body, and 2% were cervical. 40 (6.8%) of the fibroids were "delivered" myomas. The median duration of the presenting symptoms reported by the patients was 1 year. Abnormal bleeding was the major complaint (69.2%). In 101 (17.2%) of the patients, other pelvic pathologies were identified, the majority being ovarian tumors. Three hundred sixteen (53.7%) of the patients had an additional medical comorbidity encountered, mainly anemia and hypertension (21).

3. Objectives of the Study

3.1 General Objective

To assess the prevalence and perioperative complications of elective myomectomies at three teaching hospitals in Addis Ababa, Ethiopia.

3.2 Specific Objective

- ✓ To determine the prevalence of elective myomectomies at three teaching hospitals in Addis Ababa, Ethiopia.
- ✓ To identify the indications for elective myomectomies at three teaching hospitals in Addis Ababa, Ethiopia.
- ✓ To determine the complications of myomectomies and
- ✓ To identify factors associated with complications in elective myomectomies at three teaching hospitals in Addis Ababa, Ethiopia.

4. Methods and Materials

4.1 Study Design

A hospital based retrospective cross-sectional study design was used.

4.2 Study Area and Period

The study areas were gynecology wards at the three teaching hospitals in Addis Ababa, namely Tikur Anbessa Specialized Hospital (TASH), Zewditu Memorial Hospital (ZMH), and Ghandi Memorial Hospital (GMH). Addis Ababa is the capital city of Ethiopia, a country in the Horn of Africa. The capital city holds 527 kilometers of area and is at an elevation of 2,355 meters above sea level. Addis Ababa's 2020 population was estimated at 4,793,699 according to United Nations World Urbanization Prospects (22).

Regarding medical services, currently the city has more than 41 hospitals, 28 health centers, 35 health posts, and more than 500 clinics. There are more than 12 public and more than 25 private hospitals in the city. Of the total 12 public hospitals, 3 of them are selected by convenience and included in the study. TASH is the largest referral and teaching hospital in the country and is managed by Addis Ababa University, while ZMH and GMH are under the Addis Ababa City Administration Health Bureau. All of the selected hospitals give obstetrics and gynecologic care like major gynecologic surgeries, including hysterectomy service, for 24 hours a day, 5 days a week. The study will be conducted from December 1, 2023 to February 28, 2024.

4.3 Source Population

All patients who underwent major gynecologic surgeries between September 1, 2018--August 31, 2023 at the three teaching hospitals during the study period.

4.4 Study Population

All women who underwent elective myomectomies between September 1, 2018--August 31, 2023 at the three teaching hospitals during the study period.

4.5 Inclusion and Exclusion Criteria

4.5.1 Inclusion criteria

All women who underwent elective myomectomy at the three teaching hospitals.

4.5.2 Exclusion criteria

- ✓ Women for whom myomectomy was done on an emergency basis/indication, including cesarean myomectomies.
- ✓ If the patients medical record is incomplete for pertinent information, lost, or is not retrievable.

4.6 Sampling Technique and Sample Size Determination

A single population proportion formula is used with 95% confidence level, a margin of error of 5%, and a 75% medical card retrieval rate with complete data. Due to lack of previous similar studies in Ethiopia, a prevalence of 22.3% was taken from a similar study done in Ibadan, Nigeria.

The sample size is calculated as: - $n = \frac{(Z\alpha/2)^2 P(1-P)}{d^2}$

$$n = \frac{(1.96)^2 x (0.223(1-0.223)}{(0.05)^2} = 266$$

Where: n = the minimum sample size
Zα/2= value of standard normal distribution (SND) corresponding to a significance level of alpha at 95 % (1.96)
P =taken as 22.3% (0.223)
d=margin of error 5% (0.05)
25% of incomplete and non-retrievable medical cards: 266x0.25 = 67
The final sample size will be 266+67=**333**

4.7 Sampling procedure

Using the convenience method, all women who have undergone the surgery, i.e., elective myomectomy, during the study period were included in the study. The patient's medical record number was collected from both the gynecology ward admission registration books and the operation room registration books.

4.8 Study variables

4.8.1 Dependent variable

Postoperative complications like fever, wound infection, organ injury, blood transfusion, relaparotomy, length of hospital stays, and Deep Vein Thrombosis (DVT)

4.8.2 Independent Variables

- ✓ **Sociodemographic characteristics:** age, education level, occupation, religion, residence, marital status, and estimated average household monthly income.
- ✓ Parity, abortion, menopausal status
- ✓ Previous abdominal surgeries
- ✓ HTN, DM, BMI
- ✓ Pre-operative Hemoglobin
- ✓ Size of uterus, size, number, and location of myoma
- ✓ Route of myomectomy
- ✓ Type of anesthesia, EBL
- ✓ Duration of surgery,
- ✓ Level of qualification of the primary surgeon.

4.9 Operational definitions

Repeat laparotomy: is considered when re-laparotomy is done before discharge date

Previous surgeries: previous myomectomy, Cesarean section, appendectomy, tubal surgeries, or other abdominal surgeries.

Myoma: based on gross intraoperative diagnosis by the surgeon.

Peri-operative complications: one of the intra-op or post op events like, major blood loss, conversion to hysterectomy, bladder, ureteric, bowel or visceral injuries, post op fever, UTI, wound infection, blood transfusions, readmission, paralytic ileus, Relaparatomies, or DVT.

4.10 Data Collection

The data for the study was collected by a self-prepared structured questionnaire, which consisted of socio-demographic characteristics, reproductive and obstetric history, indications, and perioperative complications of myomectomy. The questionnaire was prepared in English. The questionnaire will be designed according to the research variables.

A letter was gained from the department of OBGYN and sent for medical directors of all three hospitals to get permission for accessing patients' medical records from the medical records units of the respective hospitals.

All medical records of patients who have undergone elective myomectomy were reviewed.

The data was collected by medical general practitioners and midwives who were trained for one day on the objectives, purpose of the study, logical order of the questionnaire, data collection procedures, and supervision techniques.

The information was collected from the admission charts, which consist of socio-demographic, patient presentation, physical, and laboratory findings. Operation notes and postoperative patient progress notes were also reviewed for intraoperative findings and postoperative findings.

4.11 Data quality control

After a pre-test was done on 5 cases who were not included in the study and modifications were made accordingly, training was provided for the 3 data collectors for data accuracy and completeness before starting the actual data collection process. Every day the filled questionnaires were checked before medical cards were returned to the medical card unit. The principal investigator controlled the data collection procedure, and close supervision,

honest communication, and on the spot decisions in the data collection phase were implemented.

4.12 Data processing and analysis

Collected data were checked for completeness, consistency, clarity, and if there were missed values, they were returned to the data collector for completion, which then were entered into EPI-Data version 4.6.0.0. Then data was exported to Statistical Package for Social Science (SPSS) version 25 data management for cleaning. After cleaning, descriptive analysis was done and explained in tables, graphs, texts, and charts. Statistical significance was assessed using OR and 95% confidence interval by binary logistic regression, and variables having a P value of <0.005 was considered significant. Those variables showing association were assessed by multivariate logistic regression to avoid confounding factors.

4.13 Ethical Considerations

The proposal was submitted to the Department of Obstetrics & Gynecology Research and Publication Committee (DRPC) for ethical approval. A letter of approval was obtained from the DRPC. An official letter of cooperation from the department of obstetrics and gynecology was given to the respective units, i.e. record offices of all three hospitals, through their medical directors. Since this is a retrospective study, there was no need to obtain consent from the patient. The information collected from the medical records were kept confidential and were used only for study purposes.

4.14 Dissemination plan and use of findings

The research paper will be presented to Addis Ababa University, College of Health Sciences, School of Medicine; Department of Obstetrics and Gynecology, as partial fulfillment of the Specialty certificate in Obstetrics and Gynecology. The findings of this study will be presented at the department. An attempt will be made for publication of the research in a reputable journal. Hard and soft copies will be made available in the library of AAU, CHS.

5. Result

5.1 Sociodemographic characteristics of the study participants

Over the 5-year study period 2,587 major gynecologic surgeries were performed at the three teaching hospitals, of which 373 myomectomies were done and accounted for 14.4% of surgeries. Two hundred and seventy-seven (277) patient record cards were adequate for analysis, giving a retrieval rate of 74.2%.

Two-thirds of the study participants (64.6%) were in the age group of 30-39 years with a mean and SD of 33.1±5.32 years, respectively. More than half of the study participants were married, and 7.2% of the participants had medical comorbidity, and of those with medical comorbidity, 80% of them had hypertension disease.

Table 1. Sociodemographic characteristics of the study participants among elective myomectomy in three teaching hospitals in Addis Ababa, Ethiopia.

variable	frequency	Percent
Age in years		
<30	68	24.5
30-39	179	64.6
40-49	30	10.8
Marital status		
Single	97	35.0
Married	149	53.8
Divorced	30	10.8
Widowed	1	.4
Meidal comorbidity		
Yes	20	7.2
no	257	92.8
If comorbidities		
Cardiac	2	10
hypertension	16	80

Hypertyroidism	1	5
Diabetes Melitus	1	5

5.2 Reproductive history related characteristics of the study participants

Two-thirds of the study participants were nulliparous, and 24.9% of the participants had a history of abortion. From those with a history of abortion, 65.2% were spontaneous and 2.9% had recurrent abortion. Almost thirty-three percent of the participants used oral contraceptive types of family planning.

Table 2. Reproductive history related characteristics of the study participants

Variable	Frequency	Percent
Parity		
Nulliparous	178	64.3
One	62	22.4
Two-four	37	13.4
History of abortion		
Yes	69	24.9
No	208	75.1
Types of abortion		
Induced	24	34.8
spontaneous	45	65.2
Have Recurrent Abortions		
Yes	8	2.9
No	269	97.1
Contraceptive use		
none	153	55.2
OCP	91	32.9
Injectables	15	5.4
Implant	8	2.9
IUCD	10	3.6

5.3 Surgery related characteristics of the study participants

Three percent of the study participants had a previous history of abdominal surgery, and of those having a history of surgery, 66.7% were for childbirth through a cesarean section. From all participants, 57.4%, 33.9%, 34.3%, 5.8%, and 5.1% of them had abnormal uterine bleeding, abdominal pain, abdominal swelling, urinary symptoms, and bowel symptoms, respectively. And 20.2% of the participants were infertile, and from those with a history of infertility, 57.9% were primary infertile.

More than half (52.7%) of the participants had 1-3 year duration of some symptom compliance. Sixty-four percent of the study participants had a uterine size of <20 weeks, with a median uterine size of 16 weeks, and 53.8% of the surgical indications were abnormal uterine bleeding, followed by abdominal swelling (26.4%), abdominal pain (21.7%), and infertility (14.4%).

Table 3. Surgery related characteristics of the study participants

Variable	frequency	Percent
Previous abdominal surgery		
Yes	9	3.2
No	268	96.8
Reason of abdominal surgery (n=9)		
CS	6	66.7
Previous myomectomy	3	33.3
Menopausal status		
premenopausal	267	96.4
post-menopausal	3	1.1
perimenopausal	7	2.5
Presented with AUB		
Yes	159	57.4
No	118	42.6
Presented with Infertility		
Yes	56	20.2
No	221	79.8

Type Of Infertility		
Primary	33	57.9
Secondary	24	42.1
Presented with abdominal pain		
yes	94	33.9
no	183	66.1
Presented with Urinary Symptoms		
Yes	16	5.8
No	261	94.2
Presented with Bowel Symptoms		
Yes	14	5.1
No	263	94.9
Presented with abdominal swelling		
yes	95	34.3
No	182	65.7
Duration of symptom (after presenting symptom) in month		
<12	93	33.6
12-36	146	52.7
37-60	15	5.4
>60	23	8.3
Uterine size in weeks		
<20	177	63.9
≥20	100	36.1
Indication for surgery		
Abdominal pain	60	21.7
Abdominal swelling	73	26.4
AUB	149	53.8
Infertility	40	14.4
type of infertility (n=40)		
primary	24	60
secondary	16	40
Recurrent abortion	9	3.2

Preoperative antibiotic given for patients		
Yes	277	100
No	0	0

5.4 The primary surgeon of the myomectomy

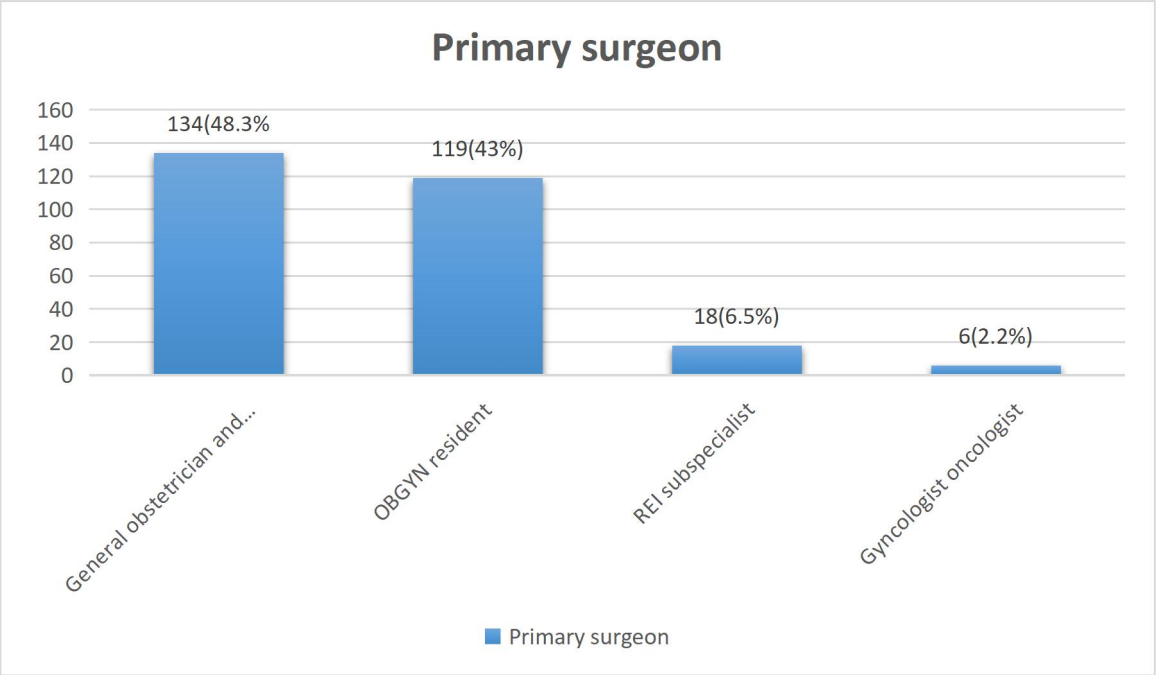


Figure 1. primary surgeon related characteristics of the study participants.

5.5 Intraoperative procedure related characteristics of the study participants

Almost all procedures were done abdominally, and 63.9% of the procedure takes 90-180 minutes, with the mean duration of abdominal myomectomy being 115.3 minutes and the mean duration of vaginal myomectomy for delivered myomas being 28.8 minutes.Ninety-two percent of the procedure was done by general anesthesia, and 76.2% of the procedures estimated bleeding were <500 ml. Five percent of the participants transfused intraoperatively, and 2.5% of the participants who underwent the procedure had an intraoperative organ injury. From those having organ injuries, 71.4% were the bladder (5 cases) and 28.6% were the bowel injury (2 cases).

Five percent of the participants had a conversion to hysterectomy, and the main reasons for conversion to hysterectomy were surgical difficulty to do myomectomy (64.3%), followed by difficulty in securing hemostasis (28.6%), and adenomyosis (7.1%). Almost 44 percent of the participants had an anterior uterine incision. 85.6% of the participants had <10 removed myoma. Fifty-two percent of the participant myoma size was ≥10 cm, and 87.4% of the procedure was done using a torniquet. Almost six percent of the procedure had adhesion, and 5.4% of the cases had an unintended procedure. From those of having unintended procedures, 33.3% of them had cystectomy and bladder repair (33.3%), followed by salpingectomy (13.3%) and bowel anastomosis (13.3%).

Table 4. Intraoperative procedure related characteristics of the study participants

variable	frequency	Percent
approach of myomectomy		
Vaginal	12	4.3
Abdominal	265	95.7
Duration surgery in minute		
<90	80	28.9
90-180	177	63.9
>180	20	7.2
Types of anesthesia used		
General anesthesia	255	92.1
Spinal anesthesia	22	7.9
Estimated blood loss		
<500	211	76.2
500-1000	50	18.1
1000-1500	7	2.5
>1500	9	3.2
patient transfused intraoperatively		
Yes	14	5.1
No	263	94.9
Unit of transfused (n=14)		
One	3	21.4

Two	11	78.6)
Intraoperative organ injury		
Yes	7	2.5
No	270	97.5
Types of injury(n=7)		
Bladder	5	71.4
Bowel	2	28.6
Conversion to hysterectomy		
Yes	14	5.1
No	263	94.9
Reason for conversion to hysterectomy (n=14)		
Difficulty in securing hemostasis	4	28.6
Surgical difficulty to do myomectomy	9	64.3
Adenomyosis	1	7.1
Types of uterine incision		
Anterior	121	43.7
Posterior	62	22.4
Both	94	33.9
Number of myomas removed		
<10	237	85.6
≥10	40	14.4
Myoma size in cm		
<10	133	48
≥10	144	52
Pelvic pathology		
Bilateral blocked tubes	1	.4
Hydrosalpinx	1	.4
Ovarian cyst	6	2.2
Para tubal cyst	2	.7
Use of torniquet		
Yes	242	87.4
No	35	12.6

Type of toniquet used		
Foley catheter	233	96.3
Stiches	9	3.7
any adhesion encountered		
Yes	16	5.8
No	261	94.2
Unintended procedure done		
Yes	15	5.4
No	262	94.6
Types of unintended procedure (n=15)		
Bladder repair	5	33.3
Bowel repair	2	13.3
BSO	1	6.7
Cystectomy	5	33.3
Salpingectomy	2	13.3
Endometrium breached		
Yes	116	41.9
No	161	58.1

5.6 The types of myoma related characteristics of the study participants.

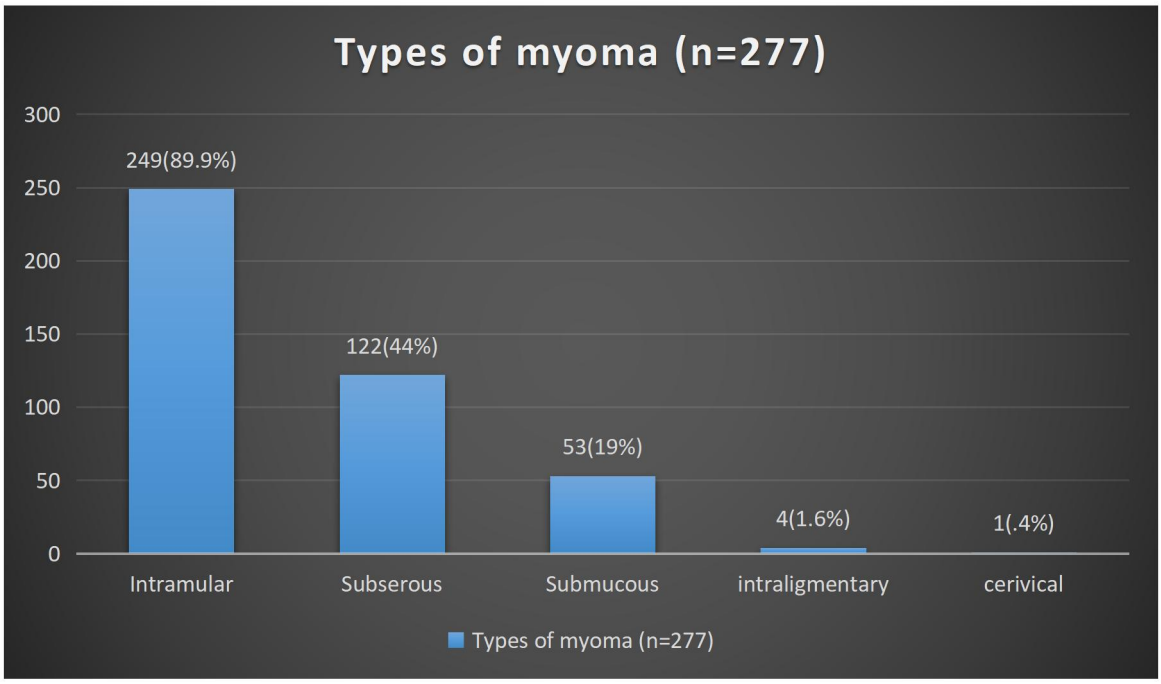


Figure 2. Types of myoma of the study participants.

5.7 The relation between endometrium breach and number of myoma

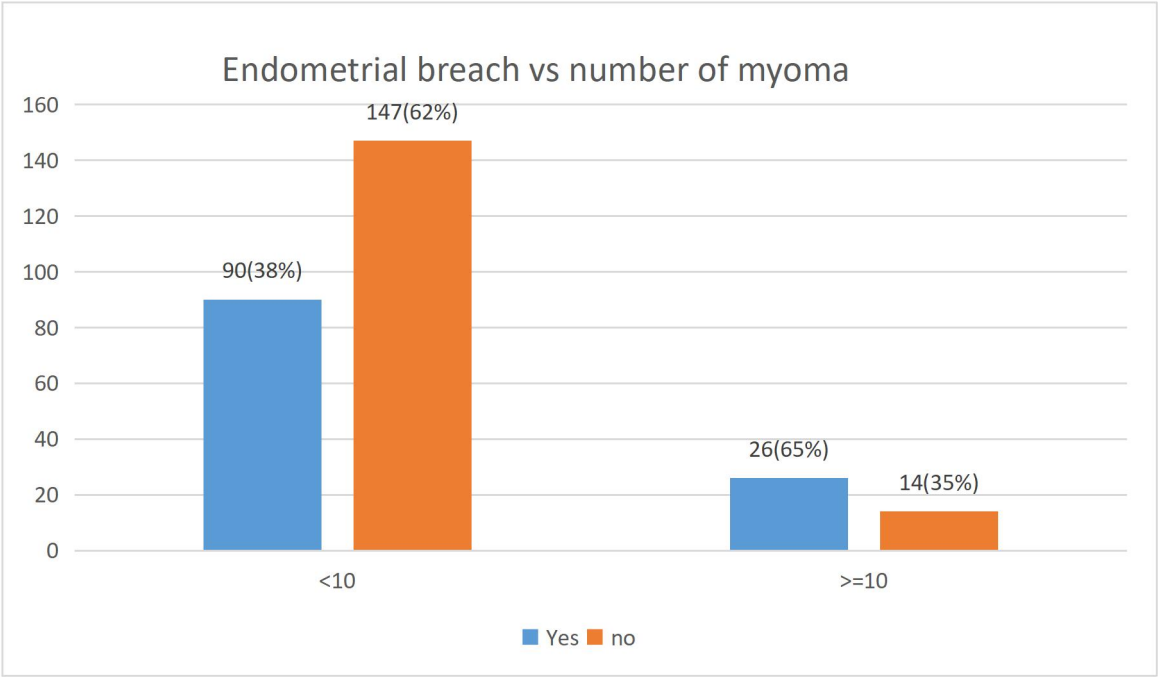


Figure 3. The relation between endometrium breach and number of myoma

5.8 The relation between endometrial breach and uterine incision

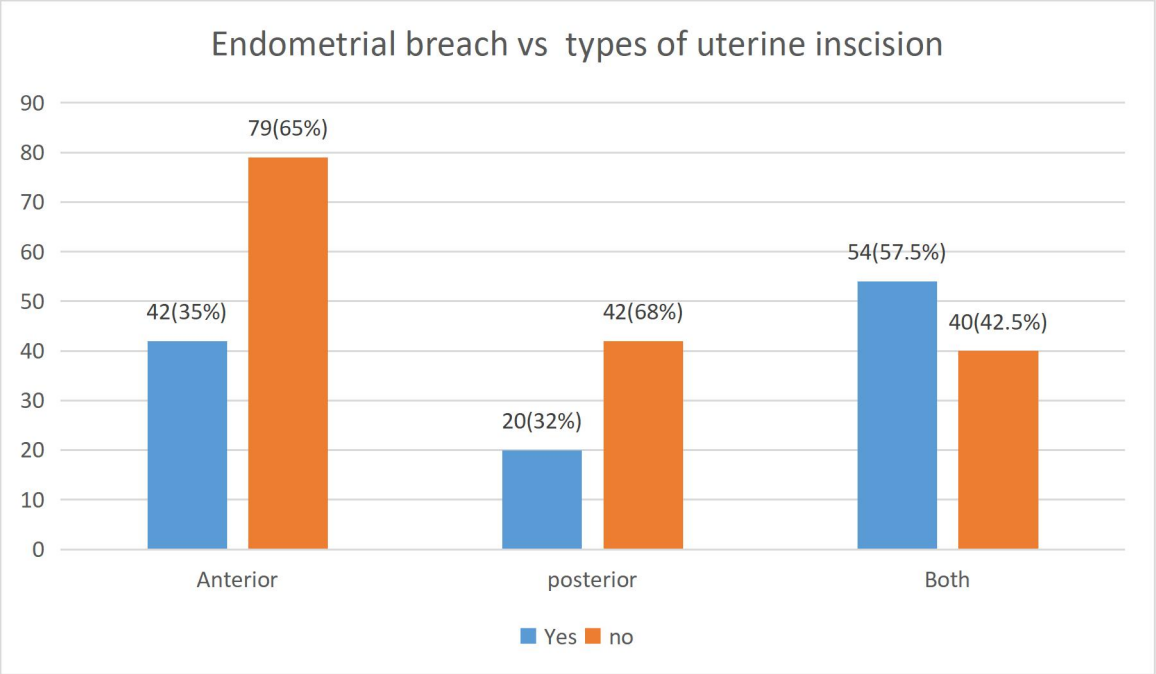


Figure 4. The relation between endometrial breach and uterine incision

5.9 Post operative related characteristics of the study participants

Almost three percent of the study participants had postoperative fever, and the main cause of fever was UTI (50%) followed by SSI (25%) and pneumonia (25%). Ninety-four percent of the study participants had postoperative pain, and of those having postoperative pain, 62.4% were mild. 6.5% of the study participants were transfused blood post-operatively, and 0.4% (n = 1) of the participants had postoperative bowel obstruction. Forty-two percent of the study participants had endometrial breaches, and 74% of the study participants stayed in the hospital for <4 days, with an average hospital stay of 3.1 days.

Table 5. Postoperative related characteristics of the study participants

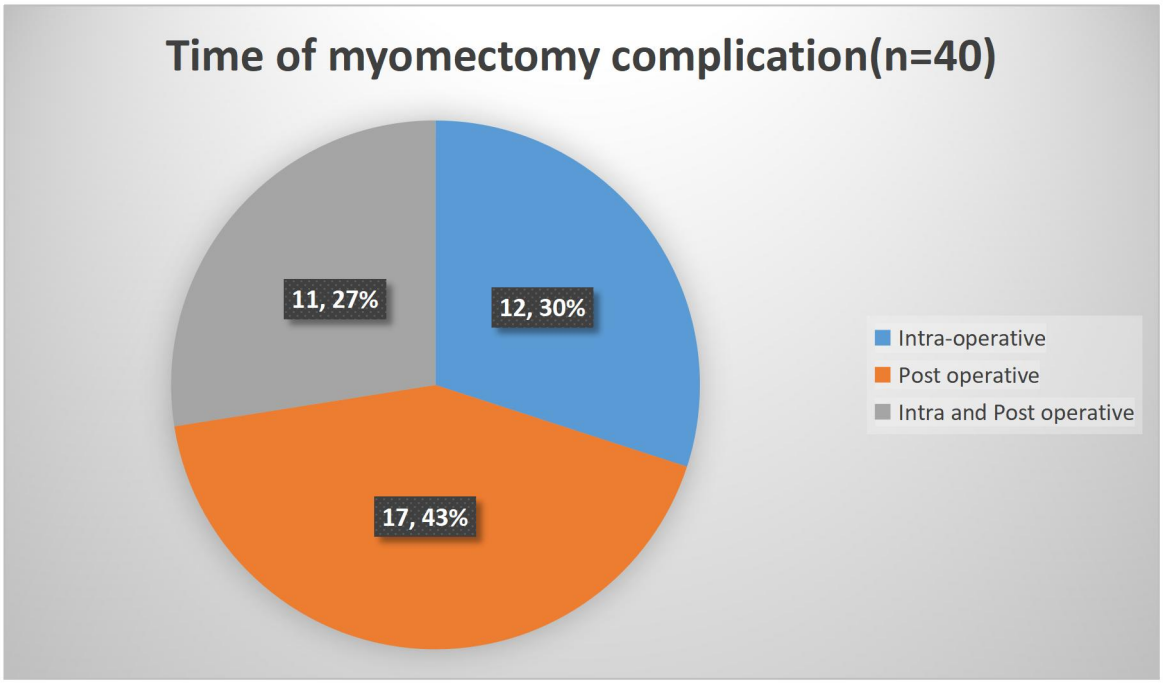
Variable	frequency	Percent
Post operative fever		
Yes	8	2.9
No	269	97.1
Cause of postoperative fever		

UTI	4	50
SSI	2	25
Pneumonia	2	25
Wound infection		
superficial	5	1.8
Deep	0	0
Postoperative blood transfusion		
Yes	18	6.5
No	259	93.5
Amount of postoperative blood transfusion in units(n=18)		
One	2	11.1
Two	10	55.6
Three	6	33.3
Overall blood transfusion(both intra op & post op)		
Yes	24	8.7
No	253	91.3
Post operative bowel obstruction		
Yes	1	0.4
No	276	99.6
Relaparotomy		
Yes	0	0
No	277	100
Readmission within 14 days		
Yes	4	1.4
No	273	98.6
Length of post op hospital stay in days		
<4	205	74
≥4	72	26

5.10 The magnitude of myomectomy complication

The findings of this study revealed that 14% (n = 40) of the study participants had developed myomectomy complications, while 86% of the participants did not develop any complications.

Figure 5. The overall magnitude of myomectomy complications



5.11 Type of complications faced

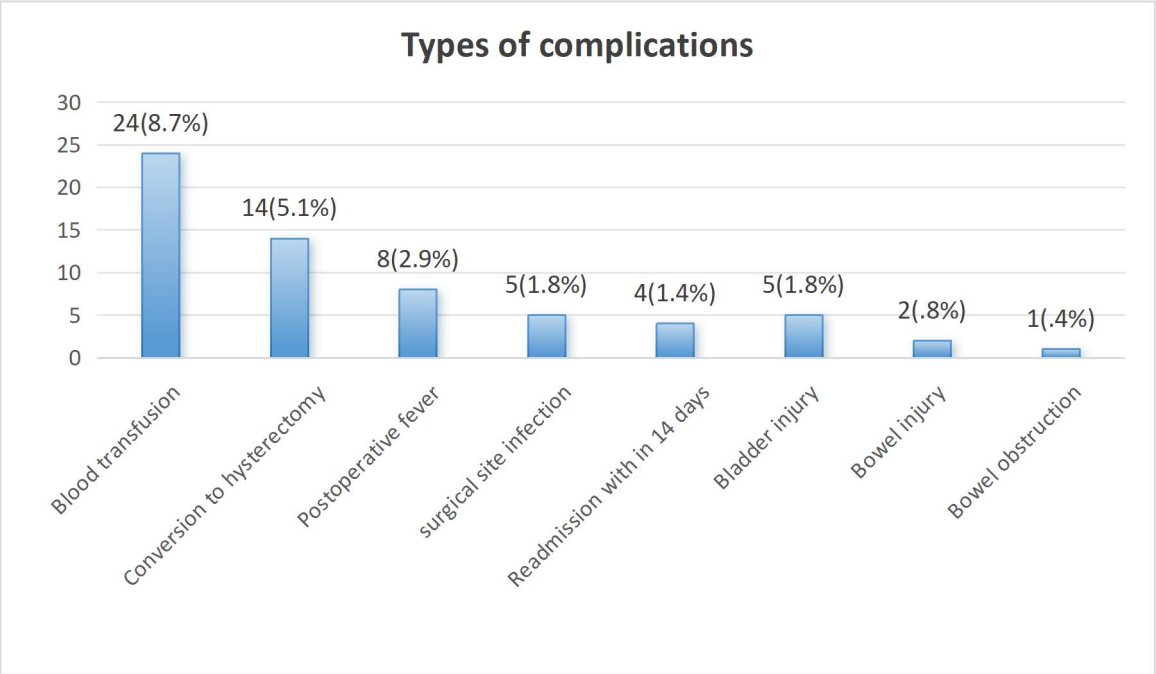


Figure 6. Type of complications faced

5.12 The determinant factors of elective myomectomy complication

In this study, the strength of association between myomectomy complications and independent variables was measured using an odd ratio and a 95% confidence interval. Accordingly, uterine size, number of myomas, size of myomas, duration of surgery, conversion of hysterectomy, adhesion, unintended procedure, and hospital stay were associated with myomectomy complications by bivariate logistic regression.

The multivariate logistic revealed that study participants having medical comorbidity had 4.5 folds increased their myomectomy complications compared to those of their opposite compartment (AOR=4.5, 95%CI=1.32, 15.25), and study participants whose uterine size was >=20 cm had 2.6 folds increased their myomectomy complications compared to those <20 cm (AOR=2.6, 95%CI=1.93, 7.27).

Participant having ≥10 myoma had 2.8 folds increase its myomectomy complication compared to those of number of myoma <10 (AOR=2.8, 95%CI=1.08, 7.18) and study participants having untended procedure had 10.1 folds increase its myomectomy complication compared to those of its opposite compartment (AOR=10.1, 95%CI=2.56, 39.92). Study participants who were waiting ≥4 days in the hospital were 3.9 folds more

likely to experience myomectomy complications compared to those waiting <4 days (AOR=3.9, 95%CI=1.74, 39.92).

Table 6. The bivariate and multivariate regression of association between myomectomy complications and independent variables among elective myomectomy in three teaching hospitals in Addis Ababa, Ethiopia.

Variable	Elective myomectomy complication		p-value	COR with 95%CI	P-value	AOR with 95%CI
	Yes	No				
Medical comorbidity						
Yes	5	15	0.171	2.1(0.72, 6.18)	0.016	**4.5(1.32, 15.25)**
no	35	222	1		1	
Abdominal swelling						
Yes	18	77	0.126	1.7(0.86, 3.36)	0.810	1.1(0.43, 2.94)
no	22	160	1		1	
Uterine size						
<20	16	161	1		1	
>20	24	76	0.001	3.2(1.59, 6.33)	0.048	**2.6(1.93, 7.27)**
Number of myoma						
<10	27	210	1		1	
≥10	13	27	0.001	3.7(1.73, 8.12)	0.034	**2.8(1.08, 7.18)**
Size myoma						
<10	16	117	1		1	
≥10	24	120	0.001	3.2(3.18, 6.33)	0.782	1.8(0.36, 2.18)
Duration surgery						
<90	5	75	1		1	
90-180	30	147	0.026	3.1(1.14, 8.21)	0.256	1.9(0.64, 5.53)
>180	5	15	0.020	5.0(1.29, 19.44)	0.592	0.61(0.10, 3.65)
Conversion to hysterectomy						
Yes	4	10	0.135	2.5(0.75, 8.47)	0.242	2.8(0.50, 15.25)
no	36	227	1			

Adhesion encountered						
Yes	7	9	0.002	5.4(1.87, 15.40)	0.667	1.4(0.32, 5.83)
No	33	228	1		1	
Un intended procedure						
Yes	9	6	0.000	11.2(3.73, 33.54)	0.001	**10.1(2.56, 39.92)**
No	31	231	1		1	
Hospital stays						
<4	17	188	1		1	
≥4	23	49	0.000	5.2(2.57, 10.47)	0.001	**3.9(1.74, 8.81)**

No clinically significant difference in myomectomy complications when we compare based on level of primary surgeon, presenting symptoms or indication for myomectomy, duration of surgery, type of anesthesia, or type of uterine incision.

6. Discussion

This finding of this study showed that the period prevalence of myomectomy in the study setting was 14.4%. This finding was lower than the study done in Ibadan, Nigeria, between July 2016 and June 2019 (22.3%), but it is higher than those reports from Aminu Kano Teaching Hospital, Nigeria (10.3%), and University of Maiduguri Teaching Hospital, Nigeria (3.34%) (14, 15, 17). This difference may be due to the site of myomectomy; it might also depend on the institution where the study is conducted. Some hospitals may have a preference for certain surgical techniques based on the availability of training and protocols.

In this study, the mean age of study participants having myomectomy was 33.2 years. This finding is comparable but slightly lower than studies done at Nigerian teaching hospitals (35.8 & 35 years) and the preceding study from Tikur Anbessa Teaching Hospital Ethiopia (35.8 years) and slightly higher than the study done at a teaching hospital in Pakistan (31.1) (16, 17, 20, 21). Most of the study participants ages ranged from 30-39 years old (64.6%), this is supported by studies from Ibadan, Nigeria (62.3%) (14).

From our finding, most of the study participants are married (53.8%), which is significantly lower than the study from Ibadan, Nigeria (64%), and this can be explained by early marriage in Nigeria due to cultural and religious reasons (14). The study also shows that 64.5% of patients are nulliparous women, which is higher than the study from Maiduguri Hospital, Nigeria (58.9%) and can be explained by increased parity associated with early marriage (15).

The most presenting symptom is abnormal uterine bleeding followed by abdominal swelling, pelvic pain, infertility, and urinary and bowel symptoms in a decreasing order, and this finding is consistent with findings from Nigeria, Pakistan, and Ethiopia, but subfertility accounts for 40.7% of the study from the United Kingdom, and this may show increased access to subfertility treatment and early treatment seeking from western countries (14, 17, 20, 21, 19).

The finding of the study showed that uterine size ranged from 10 to 36 weeks, with a median uterine size of 16 weeks, which is similar to the preceding study at Tikur Anbesa Hospital, and 36.1% of patients from our study have a uterine size >_20 weeks, but this proportion is very high when it compares to Maiduguri Hospital, Nigeria (8.9%), and this may show low health seeking behavior or health care access for a patient with abdominal swelling (21, 15).

The findings of the study also showed that 53.8% of the surgery indications were abnormal uterine bleeding, followed by abdominal swelling (26.4%), abdominal pain (21.7%), and infertility (14.4%). The finding was comparable to the study done in Tikur Anbessa Teaching Hospital, Ethiopa, Aminu Kano Teaching Hospital, Nigeria, and a teaching hospital in the UK (21, 15, 19,).

The mean blood loss was 434.95 ml, and 76% of patients had intraoperative blood loss less than 500 ml, which is higher than the study from Pakistan (386 ml) but much lower when compared to studies from New England Medical Center, USA (464 ml), Ibadan Hospital, Nigeria (651 ml), and Olabasi Onabanjo University Hospital, Nigeria (20, 12, 14, 16).

In this study the overall myomectomy complication was 14%. This finding was lower than the study done in Guy's and St. Thomas' hospital, a London teaching hospital, UK (30%), Olabisi Onabanjo University Teaching Hospital, Sagamu, Nigeria (31.7%), and the University of Pennsylvania Medical Center, USA (38.6%), but it is higher than the report from Maiduguri hospital, Nigeria (10.9%) (11, 13, 15, 16). This low rate of complication can be explained by factors like a lower rate of pelvic adhesion (5.8%), short mean operative time (115 minutes), and lower mean intraoperative blood loss, when we compare to other studies.

The finding also showed that 8.7 percent of the participants transfused perioperatively, which is comparable with the study in Pennsylvania, USA (9.1%), and Olabisi Onabanjo, Nigeria (11.6%), but it is much lower than when we compare it with Karachi, Pakistan (15.5%), and London, UK (24.5%) (13, 16, 20, 11). This may be most explained by the widespread use of torniquet application at uterine istmus before uterine incision during myomectomy, and this leads to decreased excessive intraoperative blood loss and subsequent blood transfusion.

We found that 2.5% of the procedure had intraoperative organ injury. From those having organ injuries, five cases had the bladder (1.8%) and two cases had the bowel (0.8). This finding is comparable with studies from London (2%) and Ibadan (3.6%) and lower than the study from Pakistan (4.4%) (11, 14, 20).
Five percent of the procedures were converted to hysterectomy. This finding was significantly higher than studies from London (1%) and Pennsylvania Medical Center, USA (0.5%) (11, 13). This may be due to inadequate preoperative patient selection and being unable to triage patients for elective hysterectomy. It highlights the necessity of getting consent for a hysterectomy in addition before commencing a myomectomy.

In 42% of procedures, endometrium was entered during the procedure, which is in line with a study from London, UK (22% for solitary myomas and 48% for multiple myomas) (19). Having greater than 10 myomas and doing both anterior and posterior uterine incisions are major risk factors to breach endometrium.

The findings of the study also showed that three percent of the study participants had postoperative fever, and the main cause of fever was UTI (50%) followed by SSI (25%) and pneumonia (25%). This finding was in line with the study in Pakistan (4.4%) but significantly lower than the study done in Nakorn Chiang Mai University Hospital, Thailand (35.5), New England Medical Center (32%), Ibadan, Nigeria (9.7%), and Olabisi Onabanjo, Nigeria (16.1%) (7, 12, 14, 16). This low rate of febrile morbidity can be explained by universal administration of preoperative broad-spectrum antibiotics, lower blood loss and shorter operating time in our study.

The study also revealed that 28% of the myomectomy complications occur during the intraoperative period and 42% of the myomectomy complications occur during the postoperative period. This finding was in line with the study done in Ibadan, Nigeria (14)
Study participants whose uterine size of ≥20cm had 2.6 folds increase its myomectomy complication compared to those uterine size <20cm (AOR=2.6, 95%CI=1.93, 7.27). The finding was in line with the study done in London, UK (11). A larger size of myoma has a more extensive blood supply, increasing the risk of significant blood loss during surgery. The larger the myoma, the more challenging it can be to control bleeding. The majority of intraoperative transfusions for larger size myomas in our study serve as evidence of it.

The study participants having medical comorbidity had 4.5 folds increased their myomectomy complications compared to those with no medical comorbidity (AOR=4.5, 95%CI=1.32, 15.25), and this finding is in line with the study for Ibadan, Nigeria(14). . Therefore, patients with comorbid conditions require careful preoperative evaluation and management to minimize the risk of complications during and after myomectomy surgery.

Participant having ≥10 myoma had 2.8 folds increase its myomectomy complications compared to those of number of myoma <10 (AOR=2.8, 95%CI=1.08, 7.18). Removing multiple myomas requires making several incisions in the uterus, which can increase the complexity of the surgery. This may lead to a longer surgery time and a higher risk of complications. The presence of multiple myomas, especially if they vary in size and location, makes it more difficult to navigate the surgical field. This increases the risk of incomplete removal or damage to healthy uterine tissue. Each myoma that is removed can contribute to blood loss.

Study participants having an unintended procedure had a 10.1-fold increase in their myomectomy complications (AOR = 10.1, 95%CI = 2.56, 39.92). This may be due to Sometimes, additional myoma is discovered during surgery that was not detected on preoperative imaging. The removal of these unexpected myomas can lead to more extensive surgery than initially planned, increasing the risk of complications. The surgeon may encounter unexpected conditions, such as ovarian cysts, endometriosis, or even malignancies, which may necessitate additional procedures that were not planned.

Study participants who were waiting ≥4 days in the hospital were 3.9 folds more likely to experience myomectomy complications compared to those waiting <4 days (AOR=3.9, 95%CI=1.74, 39.92). In this finding, the duration of waiting by itself was not a complication, but complications like having intraoperative bowel and bladder injury repair, postoperative fever, and developing surgical site infection were a cause for prolonging waiting in the health facility.

There are 5 cases of superficial SSI (1.8%), 3 cases were re-admitted, and 1 case developed postoperative functional bowel obstruction, not necessitating re-operation, but there were

no cases of re-laparatomy, complicated by DVT or pulmonary embolism, and no cases of death. These findings are comparable to or lower than reports from the UK, USA, and Nigeria (11, 13, 14).

7. Conclusion

In this study, the mean age of study participants having myomectomy was 33.1 years. 53.8% of the surgery indications were abnormal uterine bleeding, followed by abdominal swelling (26.4%), abdominal pain (21.7%), and infertility (14.4%). The abdominal myomectomy accounts for 95.7%. The overall myomectomy complications were 14%. Nine percent of the participants transfused perioperatively, and 2.5% of the participants who underwent the procedure had intraoperative organ injury. From those having organ injuries, five cases had the bladder and two cases had the bowel. Five percent of the cases were converted to hysterectomy, and the main indication for hysterectomy was the surgical difficulty (64.3%). Three percent of the study participants had postoperative fever, and the main cause of fever was UTI (50%) followed by SSI (25%) and pneumonia (25%). Twenty-eight percent of the myomectomy complications occur during the intraoperative period, and 42% of the myomectomy complications occur during the postoperative period. The determinant factors of myomectomy complications were uterine size of ≥20 cm (AOR=2.6, 95%CI=1.93, 7.27), having medical comorbidity (AOR=4.5, 95%CI=1.32, 15.25), having ≥10 myoma (AOR=2.8, 95%CI=1.08, 7.18), having an untended procedure (AOR=10.1, 95%CI=2.56, 39.92), and waiting ≥4 days in the hospital (AOR=3.9, 95%CI=1.74, 39.92) were the statistically significant factors.

8. Limitations

The major limitation of this study was that it was a retrospective study, and it also did not address long-term complications of myomectomy, success in alleviating symptoms, or pregnancy outcomes following myomectomy.

9. Recommendations

From this study we can realize that myomectomy is associated with complications but with in acceptable range but to decrease this complications one must adhere to sound surgical techniques like proper patient selection, preoperative optimization of comorbid conditions, pre operative proyhylactic antbiotics administration, intaoperative torniquet use and other interventions to reduce intraopertaive blood loss and related morbidity.

Since the majority of the cases in our study are candidates for laparascopic myomectomy (based on size and number of myomas), we recommend using this minimally invasive technique in our setup because the advantages of the laparoscopic technique are widely recognized and have been demonstrated to be superior to the laparotomic myomectomy in terms of reduced blood loss, pain following surgery, fewer overall complications, quicker recovery, as well as a notable cosmetic benefit. Nonetheless, a laparoscopic myomectomy typically requires more time and demands additional expertise, surgical knowledge, as well as special equipment.

10. References.

1. Zimmermann A, Bernuit D, Gerlinger C, Schaefers M, Geppert K. Prevalence, symptoms and management of uterine fibroids: An international internet-based survey of 21,746 women. BMC Womens Health. 2012;12.
2. Frishman GN, Jurema MW. Myomas and myomectomy. J Minim Invasive Gynecol. 2005;12(5):443–56.
3. P I, W W, A M, A S, A AH. Burden of Uterine Fibroids: An African Perspective, A Call for Action and Opportunity for Intervention. Curr Opin Gynecol Obstet. 2019;2(1):287–94.
4. Wechter ME, Stewart EA, Myers ER, Kho RM, Wu JM. Leiomyoma-related hospitalization and surgery: Prevalence and predicted growth based on population trends. Am J Obstet Gynecol. 2011;205(5):492.e1-492.e5.
5. Morhason-Bello IO, Adebamowo CA. Epidemiology of uterine fibroid in black African women: a systematic scoping review. BMJ Open. 2022;12(8):1–8.
6. Rodriguez-Triana VM, Kwan L, Kelly M, Olson TH, Parker WH. Quality of Life after Laparoscopic and Open Abdominal Myomectomy. J Minim Invasive Gynecol. 2021;28(4):817–23.
7. Wattanasiri K, Lattiwongsakorn W, Sreshthaputra RA, Tongsong T. Incidence and Risk Factors of Postoperative Febrile Morbidity among Patients Undergoing Myomectomy. Medicina (Lithuania). 2023 May 1;59(5).
8. Parker WH. Etiology, symptomatology, and diagnosis of uterine myomas. Fertil Steril. 2007;87(4):725–36.
9. Kongnyuy EJ, Wiysonge CS. Interventions to reduce haemorrhage during myomectomy for fibroids. Cochrane Database of Systematic Reviews. 2014;2014(8).
10. Ababa A. Outcome of pregnancy with clinically visible / palpable myoma among women who undergo caesarian section in three teaching hospitals , Addis Ababa , Ethiopia : A prospective cross sectional study A thesis submitted to the department of Gynecology and Obste. 2014;(Md):1–31.
11. Pundir J, Krishnan N, Siozos A, Uwins C, Kopeika J, Khalaf Y. European Journal of Obstetrics & Gynecology and Reproductive Biology Peri-operative morbidity associated with abdominal myomectomy for very large fibroid uteri. Eur J Obstet Gynecol [Internet]. 2013;167(2):219–24. Available from: http://dx.doi.org/10.1016/j.ejogrb.2012.12.010
12. Iverson RE, Chelmow D, Strohbehn K, Waldman L, Evantash EG. Relative morbidity of abdominal hysterectomy and myomectomy for management of uterine leiomyomas. Obstetrics and Gynecology. 1996;88(3):415–9.
13. Sawin SW, Pilevsky ND, Berlin JA, Barnhart KT. Comparability of perioperative morbidity between abdominal myomectomy and hysterectomy for women with uterine leiomyomas. Am J Obstet Gynecol [Internet]. 2000 [cited 2023 Jul 14];183(6):1448–55. Available from: https://pubmed.ncbi.nlm.nih.gov/11120509/
14. Agboola AD, Bello OO. A clinical audit of the patterns of presentations and complications of abdominal myomectomy at the University College Hospital , Ibadan , Nigeria. J Obstet Gynaecol (Lahore) [Internet]. 2021;0(0):1–6. Available from: https://doi.org/10.1080/01443615.2020.1845632

15. Geidam A, Chama C, Lawan Z, Bako B. Indications and outcome of abdominal myomectomy in University of Maiduguri Teaching Hospital: Review of ten year. Nigerian Medical Journal. 2011;52(3):193.
16. Oladapo OT, Akinsanya AF. Relative morbidity of abdominal myomectomy for very large uterine fibroids in a developing country hospital. 2011;825–30.
17. Omole-Ohonsi A, Belga F. Surgical Management of Uterine Fibroids at Aminu Kano Teaching Hospital. Obstet Gynecol Int. 2012;2012:1–6.
18. Gaym A. Elective hysterectomy at Tikur Anbessa Teaching Hospital, Addis Ababa. Ethiop Med J. 2002 Jul;40(3):217-26. PMID: 12602245.
19. Kunde K, Cortes E, Seed P, Khalaf Y. Evaluation of perioperative morbidity associated with single and multiple myomectomy. J Obstet Gynaecol. 2009 Nov;29(8):737-41. doi: 10.3109/01443610903225307. PMID: 19821669.
20. Mohammed NB, NoorAli R, AnandaKumar C. Uterine fibroid: clinical presentation and relative morbidity of abdominal myomectomy and total abdominal hysterectomy, in a teaching hospital of Karachi, Pakistan. Singapore Med J. 2002 Jun;43(6):289-95. PMID: 12380725.
21. Gaym A. Leiomyoma uteri in Ethiopian women: a clinical study. Ethiop Med J. 2004 Jul;42(3):199-204. PMID: 16895038.
22. *1. Addis Ababa's 2020 population estimation; United Nations World Urbanization Prospects:* . 2020.

11. Annexes

Questionnaire/Data collection Tools Questionnaire Addis Ababa University, College of Health Sciences Department of Obstetrics and Gynecology

Questionnaire designed to assess Prevalence and Perioperative complications of elective myomectomy in three teaching hospitals in Addis Ababa.

Questionnaire

Questionnaire no…… Date of data collection …… Hospital ……..

Data collector name ……. Signature ……..

Supervisor Name …….. Signature …….

Hospital: Tikur Anbesa ☐ Ghandi ☐ Zewditu ☐

Part I: Maternal Pre-operative characteristics

1. Maternal age in years _____
2. Marital status: A) single B) married C) divorced D) separated E) widowed
3. Any medical comorbidity A) Yes B) No
4. If yes for Q-5. specify A) Hypertension B) DM C) Cardiac D) Pulmonary E) Epilepsy F) Other, specify ----------
5. Parity A)0 B)1 C)2 D)3 E) 4 F) 5 G) >5
6. Abortion A) Yes B) No
7. If yes specify type and number A) Induced B) spontaneous
8. Contraceptive use A) None B) OCP C) Injectables D) Implant
   a. E) IUCD F) Others, specify _____
9. Previous abdominal surgery A) Yes, specify_____ B) No
10. Menopausal status A)Pre menopausal B) post menopausa
11. Presenting main complaint(more than one option is possible) A) Abdominal pain B) Abdominal swelling C) Abnormal uterine bleeding D) Infertility(specify primary or secondary E) Recurrent abortions F) Urinary symptoms
12. Duration of presenting symptom in years_____
13. Preoperative uterine size in weeks_____
14. Indication for the surgery A) Abdominal pain B) Abdominal swelling C) Abnormal uterine bleeding D) Infertility(specify primary or secondary E) Recurrent abortions F) Others, specify_____
15. Preoperative antibiotics A) Yes B) No

16. Preoperative Hemoglobin and/or Hematocrit Hemoglobin_____ Hematocrit___

Part II Intraoperative data

17. Approach myomectomy A) Vaginal B)Abdominal
18. Duration of surgery in minutes _____
19. Type of anethesia A) General anesthesia B) Regional anethesia
20. Estimated intra-operative blood loss in milli litre_____
21. Intraoperative blood transfusion A) Yes(how many units___) B) No
22. Organ injury A) Yes B) No
23. If yes for Q 30, specify A) Bladder B) Bowel C) Ureter D) Fallopian tube E) Visceral injury G) Others specify_____
24. Primary surgean A) OBGYN Resident B) General obstetrician and gynecologist C) Gynecologic oncologist D) Other, specify_____
25. Conversion to hysterectomy A) Yes B) No
26. If yes for Q 24; reason for conversion to hysterectomy A) Difficulty in securing hemostasis B) Surgical difficulty to do myomectomy C) Post operative bleeding D) Other, specify____
27. Type of uterine incision A) Anterior B) Posterior C) Both
28. Number of myomas _____
29. Size of the largest myoma _____

30. Location of myomas (can be more than one location) A) Sub serous B) Intramural C) Sub mucous D) others, specify _____

31. Other pelvic pathologies identified A) Yes, specify _____ B) No

32. Use of tourniquet A) Yes B) No

33. Any adhesion encountered A) Yes B) No

34. Unintended procedure A) Yes, specify _____ B) No

35. Endometrium breached A) Yes B) No

Part-III Post operative data

36. Post operative fever A) Yes B) No

37. If yes for Q 42, specify cause A) UTI B) SSI C) Pneumonia D) Other, specify _____ E) Unknown

38. Post operative pain A) None B) Mild C) Moderate D) Severe

39. Post operative hemoglobin _____ , hematocrit

40. Wound infection A) No B) Superficial C) Deep D) organ specific

41. Post op blood transfusion A) Yes, amount in unit_____ B) No

42. Bowel obstruction A) Yes B) No

43. Relaparatomy A) Yes, specify reason B) No

44. Re admission with in 14 days A) Yes B) No

45. Other complications A) AKI B) DVT or PE C) Urinary retention D) others, specify _____

46. Length of hospital stay in days _____

47. Death A) Yes, specify cause _____ B) No