

# Gynecological Endoscopic Procedures in a Tertiary Hospital in South-West Nigeria: A Prospective Study

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## Abstract

**Background:** After several years of struggling due to many constraints, centers in Nigeria are now performing Gynecological Endoscopy (GE) procedures. This study describes the outcome of various GE procedures in patients with gynecological complaints in a tertiary hospital in South-West Nigeria. **Materials and Methods:** This study was a prospective longitudinal design. All eligible patients who had endoscopic procedures in the unit between May 2014 and April 2019 were recruited. Excluded were those who refused to take part in the study. The participants were followed up for a year. Data were collected during the preoperative, intraoperative, and postoperative periods. This data included the patient's sociodemographic characteristics, indications for the procedures, procedures carried out, and the procedures' outcome. **Results:** Of the 287 patients who had various procedures during this period, we recruited two hundred and seventy eligible patients (94.1%) for the study. We lost fourteen patients (5.2%) to follow up. One hundred and seventy-two (63.7%) had laparoscopy only. Eighty (29.6%) had hysteroscopy and laparoscopy, while the remaining 20 (6.7%) had hysteroscopy only. Thirty-eight (14.1%) were emergencies, while 125 (46.3%) were only diagnostic. Procedures carried out include hysteroscopic removal of missing intrauterine devices (6.3%) and laparoscopic tubal sterilization with Falope ring application (5.2%). We also carried out laparoscopic ovarian drilling for polycystic ovary syndrome (19.3%). Six patients (2.2%) had their surgery converted to laparotomy. We recorded no mortality. **Conclusion:** Our results showed the feasibility of GE surgery in Nigeria with an acceptable outcome. Local adaption and improvisation will ensure cost reduction and widespread use of these procedures in our setting.

**Keywords:** Diagnostic, gynecological endoscopy, indications, outcome

## INTRODUCTION

One of the most critical tools used over the years in diagnosing and treating most gynecological problems is hysterolaparoscopy, whose existence dates back to the 19<sup>th</sup> century when Kurt Semm introduced the concept of operative endoscopy.<sup>[1]</sup> During these periods, these procedures were purely diagnostic and carried a significant complication rate.<sup>[1]</sup> With further refinement and improvement in technology between 1920 and 1930, there was a reduction in the complication rate.<sup>[1]</sup>

Laparoscopy and hysteroscopy are essential tools for evaluating female reproductive organs. It also has therapeutic purposes. Diagnostic laparoscopy is a minimal access procedure performed for the diagnosis of an intra-abdominal and pelvic condition. Laparoscopy allows direct inspection of intra-abdominal and pelvic organs and documentation to

detect pathology, facilitating access to tissues and organs for biopsy and aspiration.<sup>[2]</sup> The hysteroscopy procedure involves introducing a small-caliber telescope, either flexible or rigid, through the cervical os to visualize the uterine cavity directly. We perform these endoscopic procedures traditionally in the operating theater under general anaesthesia.<sup>[2]</sup> However, we can also use local anaesthesia with sedation for office laparoscopy.<sup>[3]</sup>

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Laparoscopy has now become a standard tool in assessing patients in the field of gynaecology for some decades, even in developing countries.<sup>[2,3]</sup> “About half a million hysterectomies done in the United Kingdom”<sup>[4]</sup> are via laparoscopy. More than half of the residents having their gynaecology training in Canada are conversant with laparoscopic hysterectomy.<sup>[5]</sup> This procedure is well established in most developed countries due to the lower risk of complications, which is <10%.<sup>[6]</sup>

Tubal factor infertility is the most frequent indication of laparoscopy in most tertiary centers in Nigeria.<sup>[7]</sup> While the developed countries are advancing in minimal access surgery for cancer patients, the developing countries are still struggling with resources, expertise, and cost.<sup>[5]</sup> There are various indications for laparoscopy and hysteroscopy. One of the primary indications for these procedures in gynecological practice is in the investigation of infertility. This procedure has become one of the most important investigative tools for evaluating tubal disease in developed countries.<sup>[6]</sup>

Diagnostic laparoscopy is done in all bilateral tubal anomalies on hysterosalpingography (HSG). This is because the confirmation of bilateral anatomical tubal abnormality by diagnostic laparoscopy could allow *in vitro* fertilization treatment in these cases.<sup>[7]</sup> It is also beneficial in patients with unexplained infertility, even in a normal HSG result.<sup>[7]</sup> Diagnostic hysteroscopy is an essential additional procedure for evaluating uterine characteristics in infertile women.<sup>[8]</sup> Other indications for diagnostic endoscopy in gynaecology include chronic pelvic pain, amenorrhea, and Asherman's syndrome.

The contraindications to laparoscopy include bowel obstruction, generalized peritonitis, diaphragmatic hernia, and major intraperitoneal haemorrhage. Others are severe cardiorespiratory disease, morbid obesity, inflammatory bowel disease, large abdominal mass, advanced pregnancy, multiple abdominal incisions, and irreducible external hernia.<sup>[4]</sup>

Recent reports suggest that an open laparoscopy is an option in managing patients with previous abdominal surgeries. Therefore, it is not an absolute contraindication to laparoscopy.<sup>[2,3,7]</sup>

Laparoscopy complications are significantly lower compared to conventional surgery. We may not recognize some of the complications during laparoscopy since they are mainly entry-related. The reported rates of these include 1.012.5/1,000, 3.6/1,000, and 5.7/1,000 in the UK, Finland, and the Netherlands, respectively.<sup>[4-6]</sup> We can reduce these complications by modifying the entry methods, including open entry techniques like the Hasson or Fielding methods. Furthermore, insertion of the Veress needle at Palmer's point, especially in thin patients, and insertion of secondary ports under direct vision, are further precautionary measures.<sup>[9,10]</sup>

In general, there have been changes in the rate and indication of these procedures over time. Some indications, such as infertility and chronic pelvic pain, have remained stable over

time. However, there has been a decline in other indications, such as amenorrhea and anovulation.<sup>[11]</sup> The above observation is due to reliance on biochemical methods of diagnosis, making laparoscopy less necessary in such cases.

In industrialized countries, hysterolaparoscopy is often the first choice intervention when surgery is needed. However, there is still a major gap in the implementation of laparoscopic surgery in resource-limited settings often due to restricted availability or access to the equipment and lack of training.

The present study determined the feasibility of laparoscopy and hysteroscopy in our center. It also assessed the common indications and outcomes of these procedures in our setting. Our result will serve as a baseline for references and further research.

## MATERIALS AND METHODS

### Study setting

Patients who underwent hysteroscopy and laparoscopy were recruited at the gynecological endoscopy unit of the Department of Obstetrics and Gynaecology, Bowen University Teaching Hospital, Ogbomosho. The survey occurred between May 2014 and April 2019.

### Study design

This study is a prospective longitudinal design. A purposive sampling technique was used to select eligible participants from clients who presented for these procedures during the survey.

### Study objectives

The study was conducted to determine different indications for gynecological endoscopy procedures in our locality. The operations' findings, the procedures carried out, and the procedures' outcome was also documented.

### Ethical consideration

Individuals were given information on the purpose and procedure of the study, emphasizing their right to confidentiality as well as refusal to participate. They were also told that they could withdraw from the study at any time with no effect on their access to health services. Written informed consent was obtained from each participant.

### Inclusion/exclusion criteria

The exclusion criteria consisted of refusal to take part in the study, history of adhesive small bowel obstruction, features of carcinomatosis, ischemic necrosis, peritonitis, hemodynamic instability, and previous multiple laparotomies. To eliminate significant comorbidities, the researchers selected patients after clinical, laboratory, and radiological evaluation. Any patient with an American Society of Anaesthesiology class >2 was also excluded.

### Procedure and patients follow-up

A combination of hospital and privately sourced equipment was used. A nondedicated theater suite was used for the

procedures. The operating surgeons trained resident doctors in the unit on equipment handling and disinfection of laparoscopy instruments in the absence of a trained endoscopy nurse or technician.

All the procedures were done under general anaesthesia with endotracheal intubation. There was noninvasive monitoring of temperature, SpO<sub>2</sub>, blood pressure, respiration, pulse rate, and urinary output. There were manual ventilation and functional capnography.

The choice of either open or close entry technique with Verres needles or Hanson cannula was based on the surgeon's preference and the presence of a previous abdominal scar. Visibility was achieved with a zero-degree 10-mm laparoscope coupled to a Karl Storz (Germany) or Hawk (China) single-chip camera unit attached to a video monitor. The light source was A Karl Storz 175W Hawk Halogen light source. A Valley lab diathermy unit (India) was the energy source used. Surgeons achieve pneumoperitoneum with carbon dioxide at a pressure of 10–14 mmHg. We use two or three ports in the diagnostic laparoscopies and conventional 3-ports (10 mm optical and two 5 mm working ports) for operative procedures. Activities that were routinely carried out include tissue retrieval using the improvised "homemade" retrieval bags using a gloved finger, and occasionally, using the cannula method. We undertake initial diagnostic laparoscopy in all patients, followed by further procedures as indicated. We performed all diagnostic procedures as day cases, while the hospital stay duration was 1–2 days for the therapeutic procedures. Patients were followed up for a minimum of 1 year on a clinic basis and on the phone to ascertain the procedures' outcome.

### Data collection/analysis

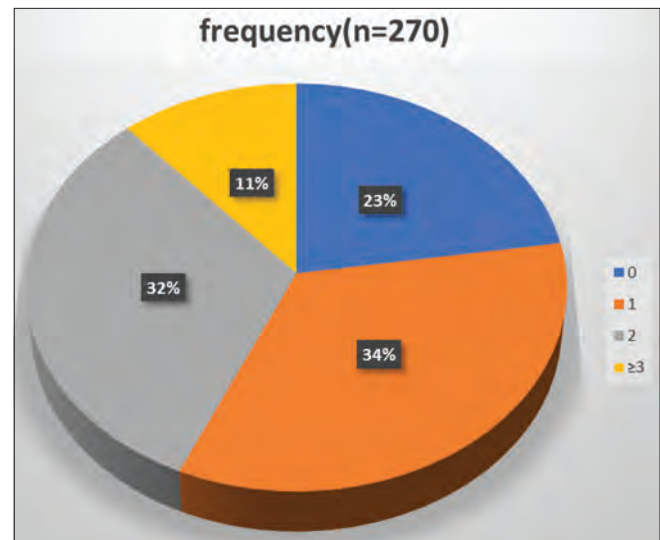
The team obtained sociodemographic data and other relevant information from the patient at presentation. Information on the patient's educational status and the husband's job description was also collected and used for socioeconomic stratification into classes 1–5.<sup>[6]</sup> We presented quantitative variables (e.g., patient's age, parity, etc.) in frequency and percentage. In this study, we grouped classes 1 and 2 as upper social class, class 3 as a middle social class, and grouped classes 4 and 5 as a lower social class to aid data analysis. We entered the data using the Statistical Package for the Social Sciences version 20 (IBM Corp. Released in 2011. IBM SPSS Statistics for Windows, Armonk, NY, USA). We used the same package for data cleaning to take care of missing data.

## RESULTS

During the study period, the surgeons performed 5125 surgeries, 2512 from the obstetrics and gynaecology unit. Among the latter, 987 were gynecologic, out of which 287 were gynecological endoscopies. Thus, GE constituted 5.6% of all surgeries in BUTH, 11.4% of all the department's surgical operations, and 29.2% of all gynecologic procedures. One hundred and seventy-two (63.7%) had laparoscopy only.

Eighty (29.6%) had hysteroscopy and laparoscopy, while the remaining 20 (6.7%) had hysteroscopy only. Of the 287 patients who had various GE procedures during this period, we recruited two hundred and seventy eligible patients (94.1%) for the study. Fourteen (5.2%) patients were lost to follow up. The patients were followed up for an average period of 18 months (Range 12–44 months).

Table 1 shows that the patients' ages ranged between 15 and 54 years (mean age = 32.6 ± 6.0 years). The majority of the patients had a tertiary level of education and belonged to the upper socioeconomic class. Figure 1 shows that most patients are low parous (i.e., para 1 and below). Infertility account for more than half of the GE procedures, followed by primary and secondary amenorrhea, as shown in Table 2.



**Figure 1:** Showing Parity distribution of patients that had GE during the period of study

**Table 1: Sociodemographic characteristics of the patients who had gynecological endoscopic (n=270)**

Variables	Frequency (%)
Age (years)	
15-24	53 (19.6)
25-34	100 (37.0)
35-44	84 (31.1)
45-54	33 (12.3)
Tribe	
Yoruba	93 (34.4)
Igbo	97 (35.9)
Hausa	80 (29.7)
Educational status: Primary/no formal	
Education	21 (7.8)
Secondary	82 (30.4)
Tertiary	167 (61.8)
Social class	
Upper	160 (59.3)
Middle	80 (29.6)
Lower	30 (11.1)

Tubal disease and oligoanovulation from polycystic ovaries were predominant findings (34.5% and 20.6%, respectively) at laparoscopy. Intrauterine adhesion (30%) was dominant at hysteroscopy, as shown in Table 3. About 46% of the respondents had diagnostic laparoscopy and dye test, while 19.3% had laparoscopic ovarian drilling (LOD) using monopolar diathermy. LOD was for clomiphene citrate resistance polycystic ovary syndrome (PCOS). We performed Peri-tubal adhesiolysis with neo-salpingostomy for tubal occlusion with hydrosalpinx in 11.1% of the respondents. Eleven percent had hysteroscopic adhesiolysis for Asherman's syndrome, as shown in Table 4.

Approximately 75% of patients with secondary amenorrhea from PCOS resumed spontaneous regular menses within six months of LOD. About 60% of 170 patients who had a laparoscopy ( $\pm$ hysteroscopy) for varying forms of female factor infertility achieved clinical pregnancy within a year of the procedure with a 71.6% live birth rate in Table 5.

During the procedures, challenges encountered included equipment failure due to electric power interruption in 30.8% and gas leak in 5.8%. Uncontrollable haemorrhage necessitating conversion to laparotomy occurred in six patients (2.2%). These cases were emergencies.

Postprocedure complications included upper abdominal/flank pain in 4.8%, chest pain in 2.7%, and left shoulder tip pain in 15.4% of patients before discharge and the immediate postoperative period. The surgery duration ranged between 45 and 150 min, with a mean of 77 ( $\pm$ 8.6) minutes. The length of hospital stay ranged between 6 and 36 h with a mean of 11( $\pm$ 5.7) hours. We recorded no mortality during the period of the study.

## DISCUSSION

The subject of GE continues to be a recurring issue in the discourse at different surgical fora in Nigeria. We can say that minimal access surgery is in its infancy in most tertiary centers in Nigeria. However, a breakthrough has been achieved in some developing countries in minimal access surgery through the adaptation of local resources.<sup>[7]</sup> Learning from them, we also introduced similar technology, which facilitated the establishment and sustenance of laparoscopic surgery in our centre. The majority of the study participants are below age 35 years, with a mean age of 32.6  $\pm$  6.0 years. This result is similar to the findings of previous studies in Nigeria.<sup>[2,4,7]</sup>

The most common indication for hysterolaparoscopy in this study is infertility. It is similar to the reports of El-Tabach in Egypt.<sup>[8]</sup> Secondary infertility from bilateral or unilateral tubal blockage accounts for about two-thirds of infertility in this study, as was obtained in the previous study. We found secondary amenorrhea from PCOS in about one-third of patients. This result is higher than previously reported by previous studies.<sup>[4,9]</sup> We may attribute this variation to

**Table 2: Indications for gynecological endoscopy**

Indications	Frequency (%)
Laparoscopy only	
Primary infertility	26 (15.1)
Secondary infertility	54 (30.5)
Chronic pelvic pain	12 (6.9)
Ectopic pregnancy	10 (6.3)
Primary amenorrhea	4 (2.6)
Secondary amenorrhea	52 (30.3)
Tubal sterilization	8 (4.8)
Missing IUCD	6 (3.5)
Total	172 (100.0)
Hysteroscopy only	
Abnormal uterine bleeding	5 (25.0)
Asherman's syndrome	12 (60.0)
Missing IUCD	2 (10.0)
Failed IVF	1 (5.0)
Total	20 (100.0)
Hysterolaparoscopy	
Failed IVF	10 (12.5)
Primary infertility	25 (31.2)
Secondary infertility	38 (47.5)
Asherman's syndrome	7 (8.8)
Total	80 (100.0)

IUCD: Intrauterine contraceptive device, IVF: In vitro fertilization

**Table 3: Intraoperative findings**

Intraoperative findings	Frequency (%)
Laparoscopy	n=252
Bilateral tubal blockage	57 (22.6)
Unilateral tubal blockage	30 (11.9)
Ovarian cyst (pathological)	21 (8.3)
Endometriotic nodules	22 (8.7)
Unruptured ectopic gestation	10 (4.0)
Polycystic ovaries (PCOS)	52 (20.6)
Normal looking tubes with dye spillage	19 (7.5)
Frozen pelvis	10 (4.0)
Ruptured ectopic pregnancy	10 (4.0)
Hypoplastic uterus with streak ovaries	8 (3.3)
Absent uterus	3 (1.1)
IUCD in the peritoneal cavity	10 (4.0)
Hysteroscopy	n=100
IUCD in the uterine cavity	10 (10.0)
Intrauterine adhesion	30 (30.0)
Endometrial polyp	12 (12.0)
Multiple submucous myomas	15 (15.0)
Calcified fetal bone (remnant)	1 (1.0)
Normal findings	32 (32.0)

IUCD: Intrauterine contraceptive device, PCOS: Polycystic ovary syndrome

differences in the prevalence rates of PCOS's genetic and environmental determinants in the various populations or discrepancies in the study populations. Furthermore, most patients with anovulation were referrals from other centers for LOD for clomiphene citrate-resistant PCOS.



**Table 4: Gynecological endoscopic procedures performed (n=270)**

Procedure performed	n (%)
Diagnostic hysterolaparoscopy + dye test	125 (46.3)
Laparoscopic ovarian drilling for PCOS	52 (19.3)
Laparoscopic IUD retrieval	10 (3.7)
Hysteroscopic IUD retrieval	10 (3.7)
Hysteroscopic adhesiolysis	30 (11.1)
Laparoscopic salpingectomy for ruptured ectopic gestation	10 (3.7)
Peri-tubal adhesiolysis and/or neo-salpingostomy	30 (11.1)
Tubal sterilization	3 (1.1)
Total	270 (100.0)

IUD: Intrauterine device, PCOS: Polycystic ovary syndrome

**Table 5: Outcomes of gynecological endoscopic procedures performed for infertility and anovulation**

Outcome variables	Frequency (%)
Resumption of spontaneous regular menses	
Yes	34 (75.6)
No	11 (24.4)
Total	45 (100.0)
Clinical pregnancy	
Yes	102 (60.0)
No	68 (40.0)
Total	170 (100.0)
Pregnancy outcomes	
Miscarriage	29 (28.4)
Livebirth	73 (71.6)
Total	102 (100.0)

About 6.5% present with chronic pelvic pain in our study. This finding is comparable to the results of previous studies in our locality.<sup>[2,4]</sup> The main indication for hysteroscopy in this study was Asherman's syndrome. This observation is similar to the finding in an earlier study done in the same centre where most hysteroscopy performed was due to Asherman's syndrome.<sup>[7]</sup> A previous survey among infertile Nigerian women found intrauterine adhesions as the most common hysteroscopic finding in the studied population<sup>[10]</sup>

The most common procedure carried out in this study was diagnostic hysterolaparoscopy and dye test tubal factor infertility, Asherman's syndrome, and chronic pelvic pain. LOD for Clomiphene citrate-resistant PCOS was also relatively common in this study. Other procedures included hysterolaparoscopic retrieval of missing intrauterine device, hysteroscopic adhesiolysis, and laparoscopic salpingectomy for hydrosalpinx and ruptured ectopic gestation. These range of procedures were carried out in most centres in Nigeria from previous survey thus establishing the feasibility of GE in our setting despite various restraints.<sup>[2,4,7]</sup>

The majority of patients (75.6%) with secondary amenorrhea resumed regular menses with spontaneous ovulation following LOD. This finding is similar to 84.2% and 77.7% reported in

Japan<sup>[9]</sup> and Egypt,<sup>[11]</sup> respectively, but lower than finding from Ilorin.<sup>[4]</sup> South-Western Nigeria. The higher ovulation rate in the Ilorin study may be because the patients were started on clomiphene citrate on the resumption of menses following LOD.

The clinical pregnancy rate of 60% falls within the range of 43%–84% reported by some studies<sup>[9,11,12]</sup> mainly from LOD.

Seventy-seven minutes was the average time of our procedures with a range between 45 and 150 min. Previous data recorded shorter operating times (30–105 min).<sup>[13]</sup> The variation can be accounted for by the various intraoperative technical hitches we experienced and the learning curve in our development's early stage. In our experience, working with perioperative nurses with no previous exposure to laparoscopy could also increase the procedure duration significantly. We believe their training will be useful.

The frequent challenges experienced during gynecological endoscopy procedures include access, port placement, and pneumoperitoneum.

Many surgeons favor the open Hasson port technique because of the relative reduction in the likelihood of bowel and vascular injury. However, the closed access method with the Veress needle is safe, fast, and efficient even for all ages.<sup>[13]</sup> We used the closed access method routinely when there is no previous abdominal surgical procedure; however, we then insert the working ports under direct vision following access.

Six patients (2.2%) had their surgery converted to laparotomy due to uncontrollable bleeding. This conversion rate is similar to those recorded in previous local studies<sup>[3,14,15]</sup> but higher than 0.7% and 0.12% reported by Omokanye *et al.* from Ilorin, Nigeria, and Ikechebelu *et al.* from Nnewi, Nigeria, respectively.<sup>[2,4]</sup> We encountered this within the 1<sup>st</sup> year of our practice, probably due to the long learning curve for laparoscopic surgeries

Evidently, in different centers worldwide, surgeons can safely perform most operative gynecologic laparoscopy procedures as a day case. Likewise, many other

Gynaecologists keep the patients until the first postoperative day.<sup>[14,15]</sup> However, we chose to keep our patients for one–two days after operative laparoscopy.

Because our hospital's location is semiurban we cannot guarantee patients' immediate access to the hospital if they need emergency care at midnight. We, therefore, restricted laparoscopic day case procedures in our center to diagnostic laparoscopies. We later realize that this decision to hospitalize these patients improved the acceptability of laparoscopic surgeries among our colleagues, other hospital workers, and the patients themselves.

Some other challenges included power outages and a lack of trained support staff (endoscopy nurses and technicians). The onus is on the laparoscopic surgeon to acquire an in-depth

knowledge of all aspects of the practice from a certified overseas or on-site training to train his support team.<sup>[2,6]</sup> We adopted the alternate power supply as routine during subsequent procedures. It is imperative to note that the operational cost for laparoscopy is not enormous after initial setup, i.e., training of personnel, equipment acquisition, and relevant infrastructure.

We adopted cost-reducing measures adopted, such as the use of reusable instruments and improvised end bags. Others were tissue retrieval using cannula methods and the placement of extracorporeal knots for ligation. However, these activities prolong the setup and procedure's duration. This becomes a significant challenge when there is no dedicated theater suite for gynecological laparoscopy.

## CONCLUSION

Gynecological endoscopic surgery in our setting is feasible and safe despite several but conquerable challenges. Adequate training of the support staff and a dedicated theater suite will further reduce the procedures' challenges.

## Availability of data and materials

The datasets and analyzed data for the current study are available from the corresponding author on reasonable request.

## Ethics approval and consent to participate

We obtained ethical clearance from the ethics and research committee of Bowen University Teaching Hospital, Ogbomoso, Oyo State. During data collection, the researchers informed the patients about the purpose of the study, confidentiality, and the right not to participate or withdraw at any time without affecting their health or other services. Written informed consent was obtained from the patients before the commencement of the study. We obtained written assent from patients under 18 years of age and written informed consent from their parents or guardians.

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Nil.

## Conflicts of interest

There are no conflicts of interest.

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