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St. Paul's Hospital Millennium Medical College

EXPERIENCE OF LAPAROSCOPIC GYNEACOLOGICAL SURGERY AT
SAINT PAUL'S HOSPITAL MILLENNIUM MEDICAL COLLEGE FROM
JANUARY 1, 2016 to DECEMBER 31, 2018

By: Geracho Garolla (MD)

ATHESIS SUBMITTED TO THE DEPARTMENT OF OBSTETRICS AND
GYNECOLOGY, ST. PAUL'S HOSPITAL MILLENNIUM MEDICAL COLLEGE;
FOR THE PARTIAL FULFILLMENT OF THE SPECIALTY CERTIFICATE IN
OBSTETRICS & GYNECOLOGY

May/2019

Addis Ababa/Ethiopia

**SAINT PAUL’S HOSPITAL MELLENIUM MEDICAL COLLEGE,
DEPARTMENT OF OBSTETRICS AND GYNECOLOGY**

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ABSTRACT

BACKGROUND: Laparoscopic surgery that is considered minimally invasive is now rapidly replacing laparotomy in the field of gynecologic surgery. As opposed to laparotomy, laparoscopy has the benefit of reduced postoperative pain, faster recovery, shorter hospital stay, better cosmetics, lower cost, reduced morbidity/mortality and overall improved surgical outcomes. Generally, there are limited data concerning the utility of laparoscopy in gynecologic surgery. Specifically, in third-world countries, data are further limited & in Ethiopia there is no data about laparoscopic gynecological surgery so far is available.

OBJECTIVES: To assess the experience of Laparoscopic Gynecological Surgery at Saint Paul's Hospital Millennium Medical College from January 1, 2016 to December 31, 2018, AA, Ethiopia.

METHODS: A hospital based retrospective patient record review was conducted to assess laparoscopic gynecological surgery at St. Paul's hospital for various gynecologic conditions. Data collection was carried out by trained data collectors. Data was checked for completeness daily, coded, and entered into Epi-info Version 7.2.2.6 and exported to SPSS Version 24 for analysis after data cleaning was done. Ethical clearance was obtained and confidentiality was assured.

RESULTS: In this study, diagnostic laparoscopy was done for more than half of patients (58%) and the major indication for laparoscopy in this study was primary infertility (42.7%). The most dominant laparoscopic procedure type performed was chromopertubation (30.9%). Adhesion was nearly one third of all intra-operative findings in this study. Eleven (7.3%) patients had conversion mainly due to extensive adhesion (63.6%). The operation time ranges from 20 – 220 minutes and its median was 60 minutes $\pm$ 40 IQR. Only 8(5.3%) patients had complications and majority 6(75%) were minor complications. . Fourfifth (81.3%) of patients stayed for one day in the hospital.

CONCLUSION: Overall there was better institutional experience of gynecologic laparoscopic surgery as there was no mortality related to it. So, it should be expanded to other hospitals in the city as well as other hospitals nationwide as the practice was feasible with short-term surgeon trainings.

Key words: Laparoscopic Gynecological Surgery, St. Paul hospital

ACKNOWLEDGMENT

First of all, I am very grateful to GOD who always helps me in the all process. Then I would like to thank Department of Gynecology & Obstetrics, St. Paul's Hospital Millennium Medical College for facilitating to conduct this research. I am also grateful to Institutional review board of St. Paul's Hospital Millennium Medical College for approving and providing ethical clearance and letter of collaboration.

Next, I am grateful to give especial thanks to my advisors Dr. Balkachew Nigatu and Dr. Takele Menna for their constructive comments without which the successful completion of this thesis could not be possible.

My last, but not least gratitude goes to data collectors for all their supports during preliminary survey, pre-test and actual data collection , as well as Dr. Genet for her help during data entry, my brother Samuel Kusheta for his enormous help during data analysis.

Table of contents

Contents	Page No
ABSTRACT	iii
ACKNOWLEDGMENT	iv
List of Tables & Figures	vi
Abbreviations and acronyms	vii
1. INTRODUCTION	1
1.1. Background:.....	1
1.2. Statement of the Problem.....	2
1.3 Significance of the Study	3
2. LITERATURE REVIEW	4
2.1. PRE-OPERATIVE DETAILS.....	4
2.2. INTRA-OPERATIVE DETAILS.....	5
2.3. POST-OPERATIVE DETAILS	6
3. OBJECTIVES:.....	7
3.1. General Objective:	7
3.2. Specific Objectives:	7
4. METHODS AND MATERIALS.....	8
4.1. STUDY AREA AND PERIOD.....	8
4.2. STUDY DESIGN AND POPULATION:	8
4.2.2. POPULATION.....	8
4.4. SAMPLE SIZE AND SAMPLING PROCEDURE	9
4.5. STUDY VARIABLES	9
4.6. OPERATIONAL DEFINITIONS & DEFINITIONS OF TERMS	9
4.7. DATA COLLECTION PROCEDURE AND INSTRUMENT	10
4.8. DATA PROCESSING AND ANALYSIS	10
4.9. DATA QUALITY MANAGEMENT	10
4.10. ETHICAL CONSIDERATIONS	11
5. RESULT	12
5.1. Socio-demographic characteristics.....	12
5.2. Pre-operative History and Indication for Laparoscopy	13
5.3. Intra-operative Details and Outcomes.....	16
5.4. Post-operative Details and Outcomes.....	18
6. DISCUSSION.....	20
7. CONCLUSION AND RECOMMENDATION	24
Annex-1: CONSENT FORM:	29
Annex-2: Data Collection Questionnaire	29

List of Tables & Figures

List of tables:

Table 1:- Socio-demographic characteristics of women who undergone gynecologic laparoscopic surgery at SPHMMC from January 1/2016 to December 31/2018, AA, Ethiopia (n=150).	12
Table 2:- Pre-operative history of women who undergone gynecologic laparoscopic surgery at SPHMMC from January 1/2016 to December 31/2018, AA, Ethiopia (n=150).	14
Table 3:- :- Indications for laparoscopy by type of laparoscopy among women who undergone gynecologic laparoscopic surgery at SPHMMC from January 1/2016 to December 31/2018, AA, Ethiopia (n=150).	15
Table 4:- Intra-operative details and outcome among women who undergone gynecologic laparoscopic surgery at SPHMMC from January 1/2016 to December 31/2018, AA, Ethiopia. .	16
Table 5:- Post-operative details & outcomes among women who undergone gynecologic laparoscopic surgery at SPHMMC from January 1/2016 to December 31/2018, AA, Ethiopia. .	19

List of figures

Figure 1:- Indications for laparoscopy among women who undergone gynecologic laparoscopic surgery at SPHMMC from January 1/2016 to December 31/2018, AA, Ethiopia (n=150).	15
Figure 2:- type of laparoscopy by operation time among women who undergone gynecologic laparoscopic surgery at SPHMMC from January 1/2016 to December 31/2018, AA, Ethiopia. .	18
Figure 3:- Type of laparoscopy by hospital stay among women who undergone gynecologic laparoscopic surgery at SPHMMC from January 1/2016 to December 31/2018, Ethiopia (n=150)	19

Abbreviations and acronyms

AA	Addis Ababa
AIDS	Acquired Immunodeficiency Syndrome
DCs	Data Collectors
FMOH	Federal Ministry of Health
HIV	Human Immunodeficiency Virus
IRB	Institutional Review Board
LGS	Laparoscopic Gynecologic Surgery
LMICs	Low and Middle income countries
PI	Principal Investigator
SPHMMC	Saint Paul's Hospital Millennium Medical College
OT	Operative Time
TB	Tuberculosis

1. INTRODUCTION

1.1. Background:

Endoscopes are currently used to perform a variety of operations. In gynecology, endoscopes are used most often to diagnose conditions by direct visualization of the peritoneal cavity (laparoscopy) or the inside of the uterus (hysteroscopy). When used appropriately, endoscopic surgery offers the benefits of reduced pain, improved cosmetics, lower cost, and faster recovery. Operative laparoscopy was developed in the 1970s, and in the early 1980s, laparoscopy was first used to direct the application of electrical or laser energy for the treatment of advanced stages of endometriosis (1). There is no clear document on the time of introduction of laparoscopy into Ethiopia but in Saint Paul's Hospital Millennium Medical College, Laparoscopic Gynecological Surgery was started at the beginning of 2016().

Laparoscopic surgery that is considered minimally invasive is now rapidly replacing laparotomy in the field of gynecologic surgery. As opposed to laparotomy (the traditional surgical technique), laparoscopy has the benefit of reduced postoperative pain, faster recovery, shorter hospital stay, better cosmetics, lower cost, reduced morbidity/mortality and overall improved surgical outcomes (1-4). But there was no difference between the procedures with regard to outcomes of fever, postoperative infections, and tumor recurrence (5).

Despite the advantages of laparoscopic surgery, there are potential limitations such as exposure of the operative field can be reduced, small instruments are required and can be used only through fixed ports, and the ability to manipulate the pelvic viscera is limited (1).

Although a growing number of procedures are being added onto an endless array of surgery undertaken laparoscopically, changing from the familiar "open" procedures to superior, but more challenging laparoscopic procedures is so often discouraged. Minimal access surgery often takes longer than the standard open procedures particularly in early "learning curve" phase. Increased operative times, colleague unwillingness or inability to embrace change, or lack of initiative to mould practices for the benefit of their patients are given as excuses to justify the argument that the standard operative techniques developed as long ago as during the early years of the last century are still the classic operations best suited for their patients (6).

1.2. Statement of the Problem

Laparoscopic surgery has been demonstrated as a valid approach in almost all gynecologic procedures including malignant diseases. Benefits of the minimally invasive approach over traditional open surgery have been well demonstrated in terms of minimal perioperative morbidity and reduced postoperative pain and hospital stay duration, with consequent quick postoperative recovery. Over the last three decades, there has been an increase in uptake of laparoscopy among gynecologists and gynecologic oncologists in developed countries. Currently, laparoscopy is not widely available in LMICs (5,10, 21). But gynecologic conditions for which laparoscopy is instrumental for diagnosis as well as for intervention are more common in LMICS like Infertility which occurs in about 8 – 12% among couples worldwide and 11 – 20% in Sub-Saharan Africa. Primary infertility is the most common worldwide. Sub-Saharan Africa being exception with 52% of secondary infertility (7).

Gynecologic laparoscopy is also useful in the intervention of cancers like cervical cancer which is most common gynecologic cancer in women worldwide and more than 85% of new cases are diagnosed in economically disadvantaged people& responsible for nearly 90% of deaths occur in low-resource regions of the world (8). Ovarian tumor is next to cervical and endometrial cancers. It is the most common cause of deaths among women who develop gynecologic malignancies for w/c laparoscopy play a role (9). It is estimated that 70-80% of gynaecological surgery can be performed by using laparoscopy .In the industrialized countries it is often the first choice intervention when surgery is needed. However, there is still a major gap in the implementation of LGS in under-resourced settings (17).

Many studies showed that experiences in LGS in developed countries are advanced but experiences in Laparoscopic surgery for gynecologic conditions in LMICs are extremely limited. The benefits of laparoscopy over open surgery are even more pronounced in LMICs than in resource-rich countries (10).

Laparoscopy is rapidly replacing laparotomy in the field of gynecologic surgery. Generally, there are limited data concerning the utility of laparoscope in gynecologic surgery. Specifically, in third-world countries, data are further limited & in Ethiopia there is no data about laparoscopic

gynecological surgery so far is available. This study therefore, was aimed to assess experience of laparoscopic gynecologic surgery done at Saint Paul's Hospital Millennium Medical College.

1.3 Significance of the Study

There is growing momentum to increase access to surgical services in low-resource countries in order to reduce the global disease burden, more importantly minimally invasive surgery but data on minimal invasive surgery (MIS) are limited in Low & Middle income countries (LMICS) (19). (Documented experiences of laparoscopic surgery in public hospitals are, to the best of my knowledge, in Ethiopia is only one at Ayder Referral hospital in Northern Ethiopia but documented experiences of laparoscopic gynecologic surgery is nonexistent in Ethiopia (20). Considering the lack of information on experience of Laparoscopic Gynecological surgery at SPHMMC initiated me to conduct this study which hopefully will help us bridge the existing information gap on the subject matter).

This study therefore, aimed to assess experience of LGS at SPHMMC which helps us to determine where we are in terms of LGS & also act as the first documented experience of LGS done at SPHMMC as well as in our country. The results of this study will be also valuable reference on experience in Laparoscopic Gynecological surgery, not only for our country but also for other low income countries worldwide. It would also be used as input for further research .

2. LITERATURE REVIEW

Laparoscopic surgery has replaced open surgery for many interventions over the years and since 1994, almost 30 years after its development, it is estimated that 70-80% of gynecological surgery can be performed by using laparoscopy. In the industrialized countries its evolution is rapid for surgical needs. But, there is still a major gap in the implementation of LGS in under-resourced settings often due to restricted availability or access to the equipment and lack of training. The study conducted in Cameroon showed that only 6.9% of gynecologic operations were done using laparoscopic surgery during the 8 years study period (17). The prevalence of LGS in Saudi Arabia is higher compared to Cameroon, i.e. 14.3% (2). The data regarding laparoscopic surgery for diagnosis as well as management of gynecologic conditions in our country is not available.

2.1. PRE-OPERATIVE DETAILS

Laparoscopy can provide valuable clinical information in a number of circumstances. It can aid in the evaluation of patients with acute pelvic and abdominal pain, including ovarian torsion, ovarian cyst rupture, ectopic pregnancy, appendicitis, and pelvic inflammatory disease. In the evaluation of less emergent conditions, such as chronic pelvic pain and infertility, it is useful to identify pelvic adhesions, endometriosis, hernias, uterine fibroids, and adnexal masses. Commonly performed laparoscopic procedures include adhesiolysis, treatment of endometriosis, tubal sterilization, ovarian cystectomy, oophorectomy, salpingectomy, salpingostomy, and hysterectomy. More advanced procedures include repair of pelvic organ prolapse, tubal reanastomosis, myomectomy, radical hysterectomy, and lymphadenectomy (1,9,12).

There are diagnostic as well as operative indications identified by different literatures for LGS. The study conducted in France identified suspicion of peritoneal carcinomatosis accounted for 13% indication for diagnostic laparoscopy and the main indication for operative laparoscopy was BRCA₁ mutation which accounts for 24% (18) whereas the study conducted in Cameroon showed infertility that accounts 69.8% as a main indication for operative laparoscopy (17). From the preliminary report of experience with gynecology laparoscopy in Nigeria, 28.8% patients had diagnostic laparoscopy for various gynecologic conditions (23).

Regarding the history of previous abdominal or pelvic surgery among patients who are diagnosed or operated using LGS; the study conducted in France revealed 54% of patients who

underwent LGS have previous history of pelvic surgery and according to study conducted in Korea, 19% of patients have previous abdominal surgery (16,18). The study conducted in Saudi Arabia indicated 14.8% and 9.3% patients who underwent LGS had one and two previous abdominal and/or pelvic surgeries respectively (2). 7.4% of patients who have three and more concomitant co-morbidities underwent LGS according to study conducted in Saudi Arabia (2).

2.2. INTRA-OPERATIVE DETAILS

A systematic review report of laparoscopic outcomes in randomized prospective studies and systematic reviews for laparoscopic hysterectomies indicated the study that reports the highest intra-operative complications occurrence of 7.5% and the same report showed the median operative room time of 190 minutes $\pm$ (114 – 364) for laparoscopic hysterectomy, whereas the mean operative time duration of LGS reported by study done in Cameroon is 55.5 (41.0%) minutes (13,14). The total procedures performed using LGS reported by the study done in Saudi Arabia is 45.5% unilateral salpingo-oophorectomy (2). The report of the study in Kenya indicated that the surgical procedures performed include laparoscopic adhesiolysis (34.55%) and tuboplasty (17.89%) for primary or secondary infertility, 33 cases (8.08%) for the management of ectopic pregnancies, laparoscopic myomectomy (15.44%), ovarian cystectomy (16.91%), ovarian drilling (4.65%), laparoscopic assisted vaginal hysterectomy (15.19%) and total laparoscopic hysterectomy (2.20%)& the operating room times for the various above surgical procedures ranged from the 50 to 310 minutes, the average of 95 minutes (6).

The report of the study in Nigeria indicated that the surgical procedures performed include (28.9%) ovarian cystectomies, (15.4%) tubal surgery for tubal factor infertility, (11.5%) laparoscopic adhesiolysis, (11.5%) salpingectomies for ectopic pregnancy, 5.8% excision for endometriosis nodule, (3.9%) had bilateral tubal occlusion as permanent method of contraception, 3.8% laparoscopic ovarian drilling for polycystic ovarian syndrome (PCOS) & (1.9%) laparoscopic retrieval of the translocated intrauterine copper device (IUCD). The duration of the surgery ranged from 45 minutes to 150 minutes (mean time = 76.6 $\pm$ 32.55 min) (23). Regarding conversion to laparotomy intraoperatively, the study done in Kenya reported 1.96% of patients had conversion to laparotomy intraoperatively, whereas 5.6% intra-operative conversion to laparotomy was reported by the study done in Saudi Arabia (2,6). There were also 2 conversions to laparotomy (3.8%), all are following emergency laparoscopy according to the

study done in Nigeria(23). The median size (greatest dimension) of resected lesion by LGS is $12\text{cm} \pm 8.6\text{cm}$ and the pathology seen on hysteroscopy was 29.6% single sub-mucous fibroid (2,11).

The commonest intraoperative findings were: tubo-peritoneal adhesions (71.6%), hydrosal-pinx with distal tubal occlusion (41.5%), peri-hepatic adhesions (22.4%), uterine fibroids (20.2%) and tubal phimosis (14.0%). Adhesiolysis, neosalpingostomy and fimbrioplasty were the commonest surgical procedures. The commonest intra-operative serious complications reported by the similar study were uterine perforation (1%), intestine perforation (0.7%) and vascular lesion with massive hemorrhage (0.7%). (18) According to study conducted in Island, Inferior epigastric vessel injury (1.2%) and large bowel injury (1.2%) were the main intra-operative complications of total laparoscopic hysterectomy (15). The estimated blood loss is 50ml (20 – 2000ml) for laparoscopy (2). The study done in Island showed the mean $\pm$ SD estimate of operative blood loss by total laparoscopic hysterectomy among non-obese women ($\text{BMI} < 30\text{kg/m}^2$) is 177.5 (9.3) and 4% of patients had blood loss of $\geq 500\text{ml}$ (15).

2.3. POST-OPERATIVE DETAILS

Laparoscopy is usually associated with few complications .According to published studies, the overall rate of complications ranges from 0.4% to 3%. Minor complications of laparoscopy occur more frequently than major complications which the most common is organ injury caused by puncture or electro-surgical tools (9, 22). The major post-operative complication reported by the study done Island is fever (6.1%) followed by vaginal cuff cellulitis (3.0%) and vaginal cuff dehiscence (2.4%). Only 4.1% study women were readmitted for postoperative complications, of whom 3.7% patients required reoperation (15). In the study conducted to evaluate total multi-port laparoscopy: difficulty voiding, bowel distention, and abdominal wall hematoma were reported complications (3).

The mean and median length of postoperative hospital stay for subjects operated with LGS in Island and Korea were 1.2 days and 2(1-12) days respectively (3,15). The duration of the hospital stay postoperatively ranged from 4hr to 4 days (median time=11hr) & there is no mortality according to the study report in Nigeria (23).

3. OBJECTIVES:

3.1. General Objective:

- To assess experience of Laparoscopic Gynecological Surgery at Saint Paul's Hospital Millennium Medical College from January 1, 2016 to December 31, 2018, AA, Ethiopia.

3.2. Specific Objectives:

- ✓ To describe socio-demographic characteristics of patients who underwent laparoscopic gynecological Surgery at St. Paul hospital.
- ✓ To assess patients' pre-operative conditions with their indications who underwent laparoscopic gynecological surgery at St. Paul's hospital.
- ✓ To assess intra-operative conditions of patients who underwent laparoscopic gynecological surgery at St. Paul's hospital.
- ✓ To assess immediate post operative conditions of patients who underwent laparoscopic gynecological surgery at St. Paul's hospital.

4. METHODS AND MATERIALS

4.1. STUDY AREA AND PERIOD

The study was conducted in St. Paul hospital millennium medical collage which is one of the tertiary referral hospitals directly under the federal ministry of health. It was built in 1961 EC by the Emperor Hailesilasse with the help of the German Evangelical Church. The core services that the hospital provided are medical care, teaching and research. The hospital has 952 clinical and non clinical staffs that provide service to 200,000 people annually who are referred from all corners of the country. It gives service under different clinical disciplines which include obstetrics and gynecology. It started obstetrics & gynecology residence since 2012 to increase its contribution for the production of competent obstetricians and gynecologists. The study was conducted from January 1 to 31 /2019.

4.2. STUDY DESIGN AND POPULATION:

4.2.1. STUDY DESIGN

A hospital based retrospective patient record review was conducted to assess laparoscopic gynecological surgery done for various gynecologic conditions.

4.2.2. POPULATION

Source population: all patients who were admitted to gynecology ward & operated by laparotomy or laparoscopy for different gynecologic conditions at St. Paul hospital from January 1, 2016 to December 31, 2018.

Study population: all patients with different gynecologic conditions who were admitted to gynecology ward & operated or diagnosed using laparoscopy at St. Paul hospital from January 1, 2016 to December 31, 2018 and fulfilled inclusion criteria.

. 4.3 ELIGIBILITY CRITERIA

Inclusion criteria: All patients who were diagnosed or operated using laparoscopy and had records with operation note were included in the study.

Exclusion criteria: Patient records with missing information of greater than 10% of pertinent information related to laparoscopic surgery were excluded. Accordingly five of the records were excluded because of missed operation note.

4.3. SAMPLE SIZE AND SAMPLING PROCEDURE

All patients who underwent Laparoscopic Gynecological surgery from January 1, 2016 to December 31, 2018 and fulfilled eligibility criteria were included. So, selection of all eligible records during the stated period that particularly underwent laparoscopic gynecological surgery was done and information was extracted from all records. SPHMMC's operation theatre record book, computerized records and Michu clinic's records were visited for inclusion of all records was done.

4.4. STUDY VARIABLES

- Socio-demographic factors
 - Age, religion, ethnicity
 - Educational level, Occupation
 - Marital status, Residence
- Parity, Gravidity
- Co-morbidity
- Previous history of surgery
- Indications
- Types of laparoscopy
- Type of procedure performed
- Operation time
- Intra-operative findings
- Intra-operative and immediate post-operative major and minor complications
- Hospital stay duration

4.5. OPERATIONAL DEFINITIONS & DEFINITIONS OF TERMS

- **Major Laparoscopic Complications:** Includes injury to the hollow organs of the viscera (intestine, bladder, or ureter) and great vessels (severe bleeding) or infection during laparoscopy or the postoperative period requiring additional intervention by laparoscopy or laparotomy. Deaths and severe medical pathologies that occurred during the postoperative period.
- **Minor Laparoscopic Complications:** Complications that generally have a relatively low impact on the patient's postoperative course & includes mild bleeding or infection, fever,

abdominal wall hematoma, urinary tract infection, postoperative urinary retention, and ileal paralysis. Major and minor complications or 1 minor complication could coexist in a single patient; women with 1 major and 1 minor complication were considered to have a major complication.

- **Operative time (OT):** The interval from the initial umbilical skin incision to its closure in minutes.
- **Laparoscopy:** Is a modern surgical technique in which operations are performed through small incisions (usually 2 to 3 cm long) using a laparoscope.
- **Laparoscopic Gynecological Surgery (LGS):** It is laparoscopic surgery intended to diagnose or intervene various gynecologic conditions or pathologies.

4.6. DATA COLLECTION PROCEDURE AND INSTRUMENT

Record review technique was used for data collection. All records were reviewed using structured questionnaire and all the information was recorded on to the questionnaire by trained data collectors who were year-II residents. A questionnaire which was developed after a thorough review of literatures included four parts such as socio-demographic, Pre-operative history, Intra-operative and Post-operative conditions. Overall data collection process was supervised by the principal investigator.

4.7. DATA PROCESSING AND ANALYSIS

After data collected, each questionnaire was checked for completeness, coded and entered in to a computer using Epi-Info 7.2.2.6. Final analysis was done using SPSS for windows version 24 after data cleaning was done. Frequencies and measures of variation were used to describe the study population in relation to socio-demographic and other relevant variables. Results were presented using tables and charts.

4.8. DATA QUALITY MANAGEMENT

Data collectors (2nd year residents) were trained for one day (1/2 day before and the other ½ day after pre-test) with the structured questionnaire until they became well conversant with the instrument about the objectives of the study and techniques of collection, and how to fill the questionnaire.

Every day, all of the collected data was reviewed and checked for completeness and relevance by the principal investigator and continuous supervision was arranged to control the data collection procedure and all the data from the registration book as well as patient records was checked for completeness, clarity, and consistency by the principal investigator. Pre-test was carried out on the same area on 15 patient records of three years and reliability of DC tool was checked & re-structured.

4.9. ETHICAL CONSIDERATIONS

Ethical clearance was obtained from SPHMMC's Institutional review board. Permission to conduct the study was taken from the hospital administration. Confidentiality of the information was assured and data de-identified & de-linked was stored in a secure location.

4.10. DISSEMINATION OF THE RESULT

The findings of the research were being presented and submitted to SPHMMC. The results would also be disseminated through publication on peer reviewed reputable journal, presented on annual scientific seminars and conferences.

5. RESULT

A total of 155 laparoscopic surgeries were done over three years between January 01/2016 and December 31/2018 at SPHMMC and 150 records were included in analysis. Five of the records were excluded because they missed operation note.

5.1. Socio-demographic characteristics

Age of the study participant women ranges from 20 – 50 years with the median age of 30 ± 8 IQR. Majority of patients 78 (52.0%) were in age group of 28 – 35 years. The dominant patients' ethnicity was Oromo (29.3%) followed by Amhara (28.0%). Nearly half of patients 71 (47.3%) were orthodox religion followers. With regard to participant level of education, about one third of them completed primary school. Half of the patients were housewives in their occupation and 98% of them were married at time of admission. 79 (52.7%) patients resided in rural area (table_1).

Table 1:- Socio-demographic characteristics of women who undergone gynecologic laparoscopic surgery at SPHMMC from January 1/2016 to December 31/2018, AA, Ethiopia (n=150).

Variables	Category	Frequency	Percent (%)
Age of participants	20 – 27	44	29.3
	28 – 35	78	52.0
	36 – 43	25	16.7
	44 – 50	3	2.0
Ethnicity	Oromo	44	29.3
	Tigre	12	8.0
	Amhara	42	28.0
	Gurage	27	18.0
	Other	25	16.7
Religion	Orthodox	71	47.3
	Muslim	41	27.3
	Protestant	38	25.4
Participant level of	Illiterate	21	14.0

education	Primary school	53	35.3
	Secondary school	22	14.7
	Preparatory school	19	12.7
	College & above	35	23.3
Participant occupation	Housewife	74	49.3
	Farmer	4	2.7
	Civil Servant	44	29.3
	Merchant	15	10.0
	Other (student, daily laborer, House maid)	13	8.7
Marital status	Single	2	1.3
	Married	147	98.0
	Divorced	1	0.7
Residence	Urban	71	47.3
	Rural	79	52.7

5.2. Pre-operative History and Indication for Laparoscopy

More than half of the patients were nulligravida and 65.7% were nullipara. Eighteen (12%) of the patients had history of surgery and sixteen of them (88.9%) had only one times. All of the patients who had history of surgery had laparotomy and half of them were operated for ectopic pregnancy. Patients with history of co-morbidity were 8 (5.3%) and 87.5% of them had only one co-morbidity either of hypertension, HIV/AIDS, Asthma, or Epilepsy. The major indication for laparoscopy was primary infertility 64 (42.7%) followed by secondary infertility 30 (20%) and persistent ovarian cyst 12 (8%). Primary infertility, secondary infertility, chronic pelvic pain, and other indications like biopsy were major indications for diagnostic laparoscopy than for operative or both; whereas chronic ectopic pregnancy, unruptured ectopic pregnancy, missed IUD, ovarian torsion, persistent ovarian cyst, and complete family size were major indications for operative laparoscopy than for diagnostic or both (table_2 & 3, figure_1).

Table 2:- Pre-operative history of women who undergone gynecologic laparoscopic surgery at SPHMMC from January 1/2016 to December 31/2018, AA, Ethiopia (n=150).

Variables	Category	Frequency	Percent (%)
Gravidity (n=12)	Nulligravida	7	58.3
	Primigravida	3	25.0
	2 – 5	2	16.7
Parity (n=140)	Nullipara	92	65.7
	primipara	17	12.1
	2 – 5	27	19.3
	> 5	4	2.9
History of surgery	Yes	18	12.0
	No	132	88.0
Number of surgery (n=18)	1	16	88.9
	2	2	11.1
Indication for previous surgery (laparotomy) (n=18)	Ectopic pregnancy	9	50.0
	Cesarean section	5	27.8
	Myomectomy	3	16.7
	Hysterectomy	1	5.5
Co-morbidity	Yes	8	5.3
	No	142	94.7
Number of Co-morbidity (n=8)	1	7	87.5
	2	1	12.5
Type of co-morbidity (n=8)	Hypertension	1	12.5
	Both DM & Hypertension	1	12.5
	HIV/AIDS	4	50.0
	Other (Asthma, epilepsy)	2	25.0

DM: Diabetes Mellitus, HIV: Human Immunodeficiency Virus, AIDS: Acquired Immunodeficiency Syndrome

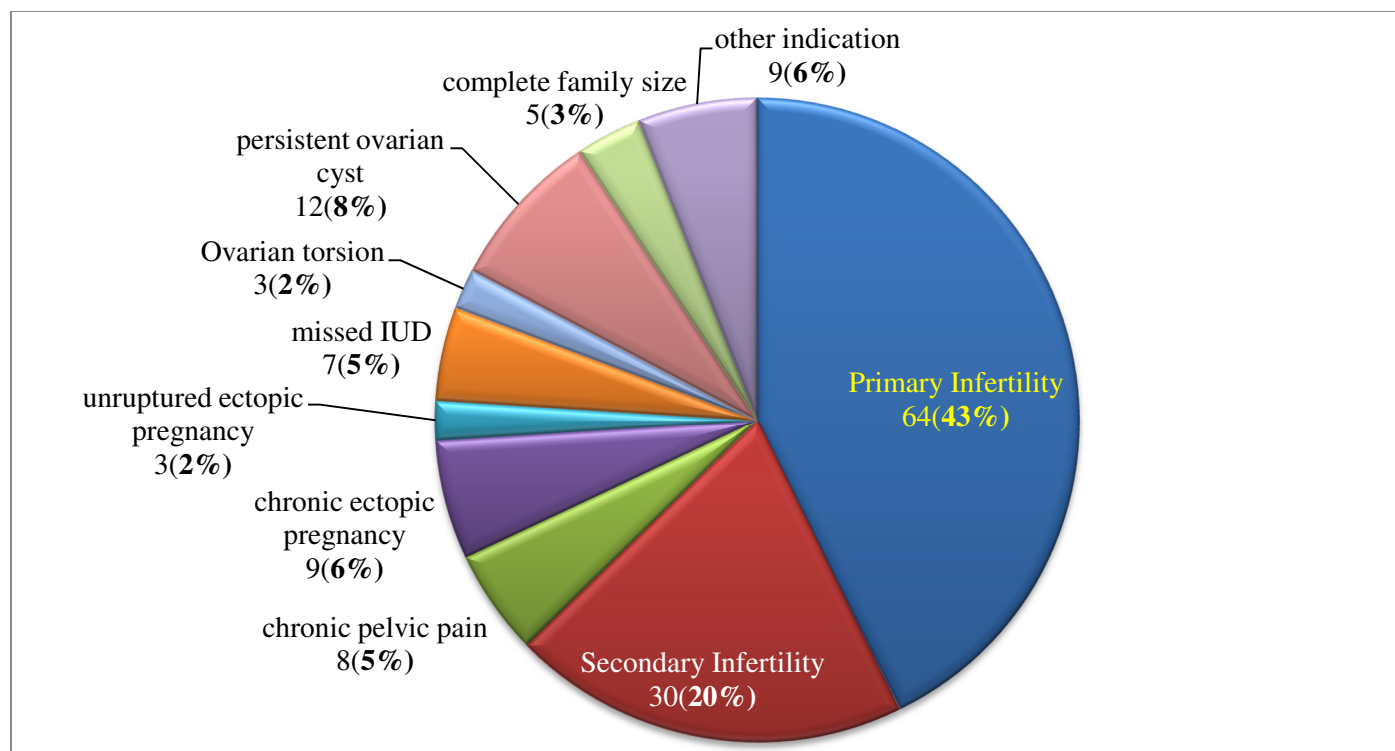


Figure 1:- Indications for laparoscopy among women who undergone gynecologic laparoscopic surgery at SPHMMC from January 1/2016 to December 31/2018, AA, Ethiopia (n=150).

Table 3:- :- Indications for laparoscopy by type of laparoscopy among women who undergone gynecologic laparoscopic surgery at SPHMMC from January 1/2016 to December 31/2018, AA, Ethiopia (n=150).

Indications for laparoscopy	Type of laparoscopy					
	Diagnostic		Operative		Both	
	No	(%)	No	(%)	No	(%)
Primary infertility	52	(81.3)	3	(4.7)	9	(14.1)
Secondary infertility	23	(76.7)	3	(10.0)	4	(13.3)
Chronic pelvic pain	8	(100.0)	0	(0.0)	0	(0.0)
Chronic ectopic pregnancy	0	(0.0)	9	(100.0)	0	(0.0)
Unruptured ectopic pregnancy	0	(0.0)	3	(100.0)	0	(0.0)
Missed IUD	0	(0.0)	7	(100.0)	0	(0.0)
Ovarian torsion	0	(0.0)	3	(100.0)	0	(0.0)

Persistent ovarian cyst	0 (0.0)	12 (100.0)	0 (0.0)
Complete family size	0 (0.0)	5 (100.0)	0 (0.0)
Other indication	4 (44.4)	3 (33.3)	2 (22.2)

5.3. Intra-operative Details and Outcomes

Diagnostic laparoscopy was done for more than half of patients (58%). The most dominant laparoscopic procedure type performed was chromopertubation (30.9%) followed by unilateral salpingectomy (11.8%). Adhesion was nearly one third of all intra-operative findings. Concerning intra-operative conversion to laparotomy, 11 (7.3%) patients had conversion mainly due to extensive adhesion (63.6%). Only 3 (27.3%) of patients with conversion to laparotomy had previous history of surgery and majority of them were at diagnostic laparoscopy (45.5%). Nine (81.8%) of the patients with conversion to laparotomy had operation time of > 60 minutes. The operation time ranges from 20 – 220minutes and its median was 60 minutes $\pm$ 40 IQR. The median operation time among those with conversion to laparotomy (110 minutes $\pm$ 50 IQR) nearly doubles that of those with no conversion (60 minutes $\pm$ 40 IQR). Longer operation time was seen among patients with operative laparoscopy than diagnostic. Regarding intra-operative complications, only 4(2.7%) patients had complications such as uterine perforation by manipulator 3 patients , and 1 patient experienced bowel serosal injury and it was repaired. There was no intra-operative laparoscopic related mortality (table_4, figure_2).

Table 4:- Intra-operative details and outcome among women who undergone gynecologic laparoscopic surgery at SPHMMC from January 1/2016 to December 31/2018, AA, Ethiopia.

Variables	Category	Frequency	Percent (%)
Type of laparoscopy (n=150)	Diagnostic	87	58.0
	Operative	48	32.0
	Both	15	10.0
Procedure type (n=168)	Tuboplasty	1	0.6
	Adhesionolysis	13	7.7
	Bilateral salpingectomy	2	1.2

	Unilateral salpingectomy	20	11.8
	IUCD removal	7	4.2
	Chromopertubation	52	30.9
	Laparoscopic BTL	5	3.0
	Laparoscopic total abdominal hysterectomy	1	0.6
	Both tuboplasty & adhesionolysis	10	6.0
	Both adhesionolysis & chromopertubation	6	3.6
	Both tuboplasty & chromopertubation	5	3.0
	Ovarian cystectomy	14	8.3
	Unilateral salpingoopherectomy	8	4.8
	Other type of laparoscopy (biopsy taken, ovarian aspiration, myomectomy, oopherectomy)	24	14.3
Intra-operative finding (n=167)	Adhesion	51	30.5
	Ectopic mass	12	7.1
	Unilateral proximal tubal block	4	2.4
	Bilateral proximal tubal block	11	6.6
	Unilateral distal tubal block	6	3.6
	Bilateral distal tubal block	6	3.6
	Ovarian cyst	20	12.0
	Ovarian mass	5	3.0
	Myoma	4	2.4
	Both myoma & adhesion	3	1.8
	Both tubes patent	20	12.0
	Hydrosalpinx	9	5.4
	Other finding (miliary seeding, paratubal cyst, abcess)	16	9.6
Conversion to laparotomy (n=150)	Yes	11	7.3
	No	139	92.7

Reason for conversion to laparotomy (n=11)	Extensive adhesion	7	63.6
	Active bleeding from fimbrial end	1	9.1
	Lack of cautery	1	9.1
	Multiple myoma with adhesion	1	9.1
	Small bowel tumor	1	9.1
Operation time (n=150)	≤ 60 minutes	77	51.3
	> 60 minutes	73	48.7

N.B:- One patient might had more than one procedure type and intra-operative finding

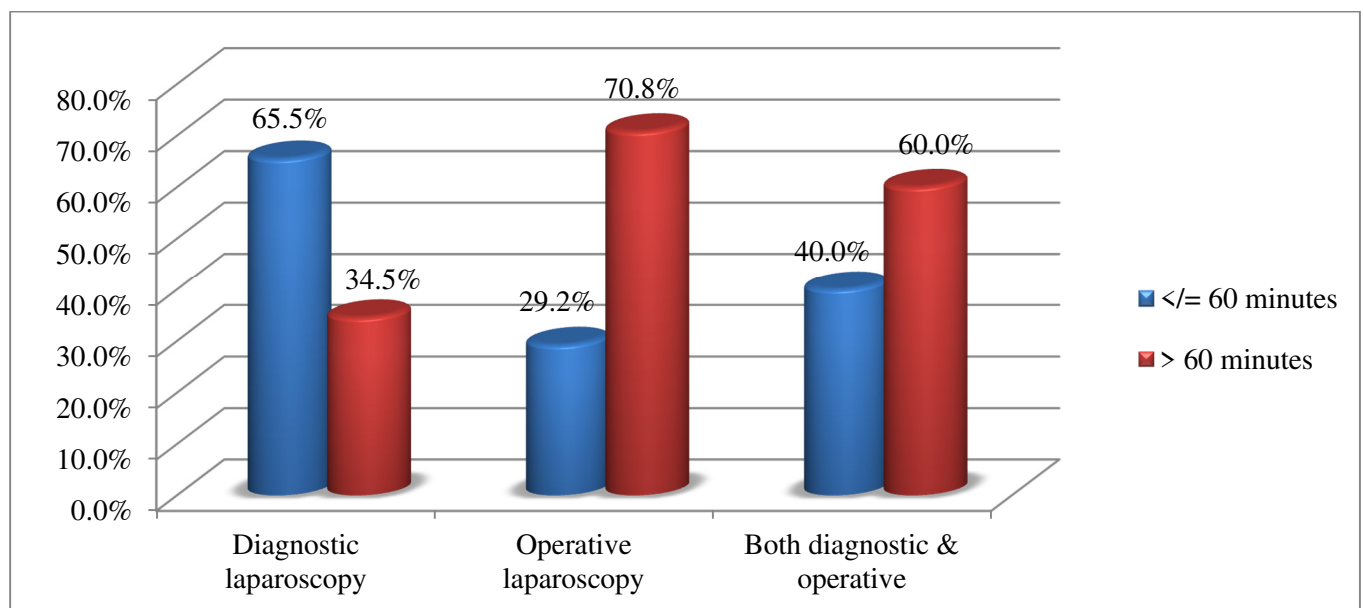


Figure 2:- type of laparoscopy by operation time among women who undergone gynecologic laparoscopic surgery at SPHMMC from January 1/2016 to December 31/2018, AA, Ethiopia.

5.4. Post-operative Details and Outcomes

Ectopic pregnancy was the most dominant histopathological post-operative outcome about 12 (19%) followed by tuberculosis 11 (17.5%) whereas myoma, chronic non-specific salpingitis and features of endometriosis were the least each account 4.8%. All of the histopathological post-operative outcomes were benign. Four fifth (81.3%) of patients stayed for one day in the hospital whereas the left one fifth were stayed for greater than one day. It ranges 1 – 7 days. With regard to post-operative complications, one patient had experienced a major complication that was wound dehiscence. On the other hand 3 patients experience a minor complication that was

subcutaneous emphysema. All of the patients with conversion to laparotomy had stayed more than one day in the hospital and majority of them 6 (54.5%) had ≥ 4 days of hospital stay. Among patients with greater than one day of hospital stay, 17 (60.7%) had had operative laparoscopy compared to diagnostic or both (table_5, figure_3).

Table 5:- Post-operative details & outcomes among women who undergone gynecologic laparoscopic surgery at SPHMMC from January 1/2016 to December 31/2018, AA, Ethiopia.

Variable	Category	Frequency	Percent
Histopathology (n = 63)	TB	11	17.5
	Myoma	3	4.8
	Chronic non-specific salpingitis	3	4.8
	Ectopic pregnancy	12	19.0
	Serous cyst-adenoma	8	12.7
	Features of hydro-salpinx	7	11.0
	Features of endometriosis	3	4.8
	Others (features of torsion, endometroma, dermoid cyst, paratubal cyst, simple cysts, polyps)	16	25.4
Hospital stay duration (n = 150)	1 day	122	81.3
	> 1 day	28	18.7

TB: Tuberculosis

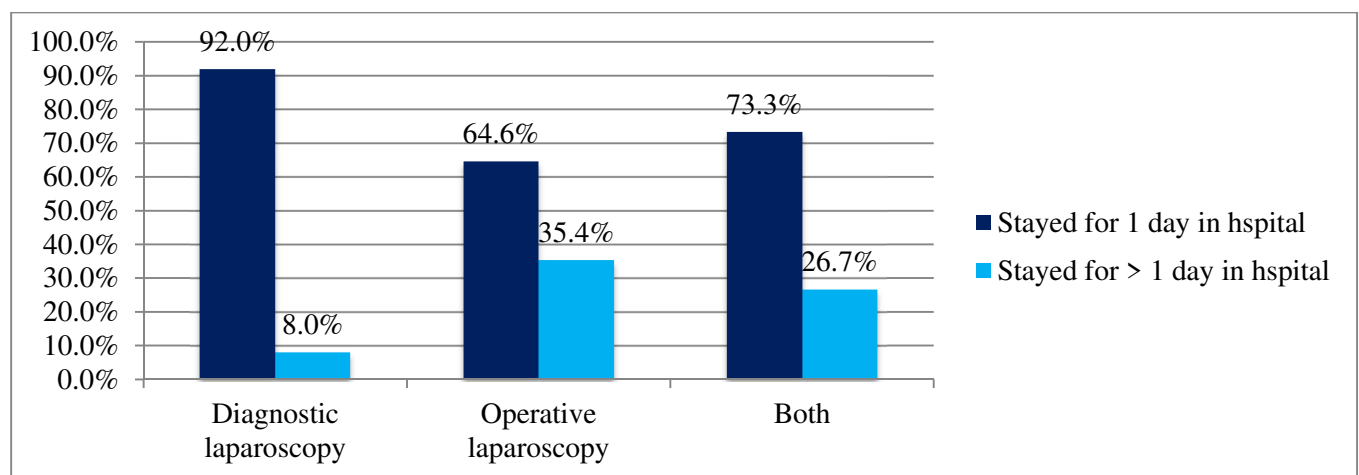


Figure 3:- Type of laparoscopy by hospital stay among women who undergone gynecologic laparoscopic surgery at SPHMMC from January 1/2016 to December 31/2018, Ethiopia (n=150)

6. DISCUSSION

In this study, diagnostic laparoscopy was done for more than half of patients (58%). This finding was higher than the preliminary report of experience with gynecologic laparoscopy in Nigeria, where 28.8% of patients had diagnostic laparoscopy for various gynecologic conditions and another study conducted in northwest Nigeria where 7.4% were diagnostic laparoscopies (23, 24). Our finding was also greater than study conducted at Kathmandu Model Hospital in Nepal where diagnostic laparoscopy accounted for 15% (25). These variations might be due to the time when laparoscopic surgery was initiated between countries; the one with recent experience might start with diagnostic laparoscopy or it might be due to real epidemiological truth.

The major indication for laparoscopy in this study was primary infertility (42.7%) followed by secondary infertility (20%) and persistent ovarian cyst (8%). This finding was different from study done in Ibadan, Nigeria where the commonest indications were secondary infertility (51.9%), primary infertility (24.1%), and chronic pelvic pain (11.2%) (26). However it was in line with study conducted in Northwestern Nigeria where Infertility (primary and secondary) was the major indication (72.9%) (24). This difference might be due to level of pelvic inflammatory disease prevalence in LICs that particularly contributed for secondary infertility; the case might be more common in some parts of Nigeria than Ethiopia.

There are diagnostic as well as operative indications identified by different literatures for LGS. In the current study, primary infertility, secondary infertility, chronic pelvic pain, and other indications like biopsy were major indications for diagnostic laparoscopy than for operative or both; whereas chronic ectopic pregnancy, unruptured ectopic pregnancy, missed IUD, ovarian torsion, persistent ovarian cyst, and complete family size were major indications for operative laparoscopy than for diagnostic or both. This finding was different from the study conducted in Cameroon which showed infertility that accounts 69.8% as a main indication for operative laparoscopy (17). This difference might be due to a site where the tubal blockage was occurred as in our study the prevalence of distal block was lower than proximal which could influence to do diagnostic laparoscopy than operative or it might be due to advancement of the procedure skill of doing operative laparoscopy for proximal tubal blockage.

Regarding the history of previous abdominal or pelvic surgery among patients who are diagnosed or operated using LGS; Eighteen (12%) of the patients had history of surgery in this

study. Our finding was comparable with the study conducted in Saudi Arabia that indicated 14.8% who underwent LGS had one previous abdominal and/or pelvic surgery (2). However it was lower than study conducted in France revealed 54% of patients who underwent LGS have previous history of pelvic surgery and according to study conducted in Korea, 19% of patients have previous abdominal surgery (16,18). These differences might be due to socio-economic statuses between countries and patient selection for laparoscopy that was due to fear of adhesions among those with previous surgeries or it might be due to the differences in sample size across studies.

The most dominant laparoscopic procedure type performed was chromopertubation (30.9%) followed by unilateral salpingectomy (11.8%). This was different from finding reported by the study done in Saudi-Arabia where the total procedures performed using LGS was 45.5% unilateral salpingo-oophorectomy (2). These differences might be due to the differences in indications for laparoscopy as infertility was the major indication in our setup and may be due to the lesser learning curve needed to do it compared to the other advanced procedures.

Adhesion was nearly one third of all intra-operative findings in this study. This finding was comparable with the study from Cameroon that indicated the most common surgical finding was tubo-peritoneal adhesion. This finding might be due to the fact that the prevalence of pelvic inflammatory disease was high in Sub-Saharan African that commonly complicate to adhesion or it might be due to contribution to adhesion from tuberculosis as TB was second most common post-opoerative histopathological finding in our study.

Concerning intra-operative conversion to laparotomy, 11 (7.3%) patients had conversion mainly due to extensive adhesion (63.6%). This finding was higher than other reports, i.e. the study done in Kenya reported 1.96% of patients had conversion to laparotomy intra-operatively, whereas 5.6% intra-operative conversion to laparotomy was reported by the study done in Saudi Arabia (2,6). There were also 2 conversions to laparotomy (3.8%), all are following emergency laparoscopy according to the study done in Nigeria (23). Because adhesion was common intra-operative finding in our setup and also its majorityy contributes to conversion, this was in line with scientific fact that adhesion was a major factor for technical difficulty and conversion to laparotomy.

The operation time ranges from 20 – 220 and its median was 60 minutes $\pm$ 40 IQR in this study. The operation time was shorter than the study finding from Nigeria where the duration of the surgery ranged from 45 minutes to 150 minutes (mean time = 76.6 ± 32.55 min) (23). The operating room times for the various surgical procedures ranged from the 50 to 310 minutes, the average of 95 minutes according to the study done in Kenya. mean in this study was 77.3 ± 41.91 (6). This difference might be due to type of procedure performed that in our setup the commonest was diagnostic laparoscopy compared to operative in Nigeria which might majorly contributed to duration of surgery.

Regarding intra-operative complications, only 4 patients had complications. Among them only one patient experienced major complication of bowel serosal injury and it was repaired. This finding was comparable with the findings reported from study conducted in Nigeria where the commonest intra-operative serious complication intestine perforation (0.7%) (18). Large bowel injury (1.2%) was also the main intra-operative complication of total laparoscopic hysterectomy according to study conducted in Island (15). Otherwise three patients in our setup experienced minor complication that was uterine perforation by manipulator. There was also no intra-operative laparoscopic related mortality in our study. This was comparable to study conducted in Nigeria where there was also no mortality reported (23).

Four fifth of patients stayed for one day in the hospital whereas the left one fifth were stayed for greater than one day and it ranges 1 – 7 days. The mean duration was 1.37 days $\pm$ 0.93 SD and this was comparable with the mean length of postoperative hospital stay for subjects operated with LGS in Island which was 1.2 days (15). But it was shorter than findings from Korea where the median duration of the hospital stay postoperatively was 2 days and ranged from 1 -12 days (3). The possible explanation for the hospital stay duration could be due to the type of procedure that in our setup the common one was diagnostic laparoscopy that can result in shorter hospital stay and also in our study among patients with greater than one day of hospital stay, 60.7% had had operative laparoscopy compared to diagnostic or both.

With regard to post-operative complications, one patient had experienced a major complication that was wound dehiscence. On the other hand 3 patients experienced a minor complication that was subcutaneous emphysema. The major post-operative complication reported by the study done in Island was fever (6.1%) followed by vaginal cuff cellulitis (3.0%) and vaginal cuff

dehiscence (2.4%) (15). These differences might depend on the type of laparoscopic procedure done that consequence with the particular type of post-operative complication.

Strengths and Limitations of the Study

The present study had strengths like the study was first of its kind to document gynecologic laparoscopic surgery experience in Ethiopia. The inclusion of all cases with gynecologic laparoscopy over three years period in the hospital could also increase precision and validity of the study.

However, the study was also prone to limitation that this study was retrospective and it was based on record review that resulted in some records with incomplete information and excluded from the study; so it can result in difficulty to minimize information bias and increase its completeness.

7. CONCLUSION AND RECOMMENDATION

7.1. Conclusion

In this study, diagnostic laparoscopy was done for more than half of patients and the major indication for laparoscopy in this study was primary infertility. The most dominant laparoscopic procedure type performed was chromopertubation. Adhesion was nearly one third of all intra-operative findings in this study. 7.3% patients had conversion mainly due to extensive adhesion. There was shorter operation time compared with other studies. Only 4 patients had intra-operative complications and among them only one patient experienced major complication of bowel serosal injury and it was repaired. Only one patient had experienced a major post-operative complication that was wound dehiscence. In general 8(5.3%) patients had complications and majority 6(75%) were minor complications, which is encouraging. Four fifth of patients stayed for one day in the hospital and it was seen that there was shorter hospital stay duration compared with other studies. Overall there was better institutional experience of gynecologic laparoscopic surgery as there was no mortality related to it.

7.2. Recommendation

- Saint Paul's Hospital Millennium Medical College:
 - ✓ Should increase and improve the practice of gynecologic laparoscopy from diagnostic to operative.
 - ✓ Should arrange ongoing training to obstetricians and operation theatre staff and experience sharing for advanced gynecologic laparoscopic surgeries to minimize rate of conversion and complications.
 - ✓ Obstetric surgeons and other HMIS staff should properly record all information of the patients that is better to minimize information bias from incomplete information.
- Researchers in higher institutions, in Saint Paul's Hospital Millennium Medical College and other independent researchers:
 - ✓ Should conduct future research particularly comparative type using this data as a baseline.

- Addis Ababa Health Department and FMOH:
 - ✓ Should try as much as possible its expansion to other hospitals in the city as well as other hospitals nationwide as the practice was feasible with short-term surgeon trainings.

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Annex-1: CONSENT FORM:

I am Dr.Geracho Garolla. I am post graduate student at SPHMMC ,department of Obstetrics&Gynecology. I am studying about experience of laparoscopic gynecological surgery done at saint paul's hospital millenium medical college from Jan 31,2015 to Jan 31,2018 by retrospectively reviewing the medical records of the all patients who had under gone surgery laparoscopically either diagnostically or therapeutically during the aforementioned period.

Laparoscopy is rapidly replacing laparotomy in the field of gynecologic surgery. Generally, there are limited data concerning the utility of laparoscope in gynecologic surgery. Specifically, in third-world countries, data are further limited & in Ethiopia there is no data about laparoscopic gynecological surgery so far is available.

This study therefore, aimed to review experience of laparoscopic gynecologic surgery done in our setting. During this study information will be recorded by principal investigator & data collectors in a way that should not identify the subject by using their medical card numbers. The medical card of the study subject will be returned soon once required information is obtained to the card room of the hospital. The obtained information is to be used only for the purpose of this study.

Annex-2: Data Collection Questionnaire

PART I: SOCIO-DEMOGRAPHIC CHARACTERISTICS OF PATIENTS and INTRA-

Ser.No.	Questions	Responses	Skip to	Coding
101	Age in complete year	_____ Years		
102	What is your ethnicity?	1. Oromo 2. Tigre 3. Amhara 4. Gurage 5. Other (specify)_____		
103	What is your religion?	1. Orthodox 2. Muslim 3. Catholic 4. Protestant 5. Other (specify) - _____		
104	What is the highest education level you have attained?	1. Illiterate 2. Only read and write (no formal education) 3. Grade 1-4 4. grade 5-8 5. Grade 9-10 6. 11 – 12 grade 7. Above 12thgrade		
105	What is your occupation?	1. Housewife 2. Farmer 3. Governmental employee 4. Merchant 5. Housemaid 6. Other (specify)_____		
106	What is your marital status?	1. Not ever married 2. Married 3. Divorced 4. Separated 5. Widowed 6. Other (specify) _____		
107	Residence	1. Urban 2. Rural		
108	Gravidity	1. primigravida 2. gravid 2 3. gravid 3 4. gravid 4 and above		
109	Parity	1. Nulliparous 2. Primiparous 3. Para 2 4. Para 3 5. Para 4 and above		
110	Previous abdominal and/or pelvic surgery	1. None 2. 1 surgery 3. 2 surgeries 4. ≥ 3 surgeries	If none, goto Q111	
111	If yes, type of previous	1. Laparoscopy		

PART II: INTRA-OPERATIVE DETAILS AND OUTCOMES				
Ser.No	Questions	Responses	Skip to	Coding
201	Indications			
202	Type of laparoscopy	1. Diagnostic 2. Operative		
203	Total procedures performed	1. Unilateral salpingo-oophorectomy(USO) 2. Bilateral salpingo-oophorectomy(BSO) 3. Unilateral ovarian cystectomy 4. Bilateral ovarian cystectomy 5. Tuboplasty 6. Adhesiolysis 7. Contralateral ovarian cyst aspiration 8. Laparoscopic-assisted vaginal hysterectomy 9. Total laparoscopic hysterectomy 10. Other _____		
204	Intra-operative findings			
205	Intra-operative serious complications	1. Yes 2. No	If No, goto Q207	
206	If yes to Q203, specify	1. Uterine perforation 2. Intestinal perforation 3. Vascular lesion with massive hemorrhage 4. Others (specify) _____ _____		
207	Intra-operative conversion to laparotomy?	1. Yes 2. No		
208	Intra-operative mortality	1. Yes 2. No		

209	Greatest dimension of resected lesions	_____cm ²		
210	Operative time	_____minutes		
211	Estimated blood loss	_____ml		

PART III: POST-OPERATIVE DETAILS AND OUTCOMES

Ser.No.	Questions	Responses	Skip to	Coding
301	Lesion pathology?	1. Benign 2. Malignant		
302	Hospital stay duration	-----days		
303	Major post-operative complications	1. Yes 2. No	If no goto Q305	
304	If yes to Q303, specify the complication	_____ _____ _____ _____ _____		
305	Minor post-operative complications	1. Yes 2. No	If no goto Q307	
306	If yes to Q303, specify the complication	_____ _____ _____ _____		
307	LGS related mortality	1. Yes 2. No		