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Diagnostic and therapeutic hysteroscopy in Ethiopia: a retrospective study on practice and outcomes

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Abstract

Background Hysteroscopy is considered the standard for evaluating the uterine cavity. Limited data exists regarding hysteroscopy in Ethiopia. Therefore, the objective of the study was to describe the diagnostic and operative hysteroscopic procedures at St. Paul's Hospital.

Methodology A three-year retrospective descriptive study examined patients who underwent diagnostic and therapeutic hysteroscopy at the Center for Fertility and Reproductive Medicine, St. Paul's Hospital Millennium Medical College in Addis Ababa, Ethiopia, from June 2018 to June 2021. Descriptive statistics were employed to summarize the findings observed during the hysteroscopy procedures.

Result A total of 328 patient records underwent review and analysis in the study. The mean participant age was 31.9 years (31.9 ± 5.1 years), with about 81.4% being nulliparous. Primary infertility (48.5%) was the leading indication for hysteroscopic evaluation, followed by secondary amenorrhea (18%), secondary infertility (17.4%), and abnormal uterine bleeding (8.8%). Concerning hysteroscopic procedures, 6.1% of participants exhibited no uterine cavity abnormalities. Primary hysteroscopy findings comprised intracavitary adhesions (48.2%), endometrial polyps (18%), and submucosal myomas (9%). Adhesiolysis stood out as the foremost surgical procedure, conducted in 48.2% of patients, followed by polypectomy in 20.7%, and fibroid removal in 9%. The complication rate was 2.4%, exclusively during operative hysteroscopy, with uterine perforation observed in six patients.

Conclusion Our hysteroscopic evaluation was predominantly requested for primary infertility cases, with secondary amenorrhea, secondary infertility, and abnormal uterine bleeding also being commonly encountered indications. Adhesiolysis was the leading intervention during hysteroscopy, while uterine perforation was the main complication. The hysteroscopy procedures exhibited a strong safety profile, with few complications noted. Future studies should address factors affecting outcomes in diagnostic and operative hysteroscopy, and common factors linked to intrauterine adhesions.

Keywords Ethiopia, Hysteroscopy

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Background

Hysteroscopy enables an endoscopic examination of the endometrial cavity and tubal ostia, allowing for both the diagnosis and operative intervention of intrauterine pathology [1]. Essential for hysteroscopy are a hysteroscope, light source, uterine distention medium (CO₂ or saline), and often a video camera system. Hysteroscopes typically consist of a 3 to 4-mm diameter endoscope surrounded by an outer sheath, with 0 or 12-degree variants facilitating optimal uterine cavity navigation [1–6].

The rationale for performing diagnostic hysteroscopy includes evaluating abnormal uterine bleeding (AUB), recurrent miscarriages, primary and secondary infertility, and amenorrhea, as well as detecting potential findings like retained products of conception, fetal bone fragments, intrauterine contraceptive devices (IUCDs), and suture materials [1, 5, 7–11]. Operative hysteroscopy is subsequently utilized to manage intrauterine adhesions (IUA), endometrial polyps, submucosal fibroids, Mullerian duct abnormalities, and intrauterine copper devices [1, 2, 5, 7, 8, 12].

Hysteroscopy is generally safe; however, rare complications such as bleeding, uterine perforation, fluid overload, pulmonary embolism, endometritis, and post-procedure adhesions can pose serious risks [2, 13–16].

Both diagnostic and therapeutic hysteroscopy are in high demand among Ethiopian patients, but access and utilization are restricted. Furthermore, there is currently no comprehensive nationwide data available on these procedures.

Reviewing diagnostic and therapeutic hysteroscopy is critical for enhancing diagnostic accuracy, advancing minimally invasive surgical procedures, promoting reproductive health, optimizing healthcare efficiency, and empowering healthcare professionals with enhanced capabilities.

Therefore, the objective of this study was to outline the diagnostic and therapeutic outcomes from hysteroscopy performed at St. Paul's Hospital.

Methods and materials

Study setting, design, and participants

A retrospective descriptive study was conducted at the Center for Fertility and Reproductive Medicine (CFRM), located at St. Paul's Hospital Millennium Medical College in Addis Ababa, Ethiopia's capital city, covering the period from June 1, 2018, to June 1, 2021. The CFRM is dedicated to performing diagnostic and therapeutic hysteroscopy, serving as the primary public provider in the country.

Hysteroscopy, performed for diagnostic or therapeutic reasons, occurred in the operating room and necessitated spinal or general anesthesia. Both diagnostic and therapeutic hysteroscopies were performed with

a hysteroscope consisting of a 5 mm outer sheath and a rigid telescope Bettocchi (2.9 mm, up to 30° continuous flow; Karl Storz, Tuttlingen, German). Hysteroscopic scissors were used for intrauterine adhesions. The distension medium was normal saline or Ringer's lactate instilled at a controlled pressure of 70 to 80 mm Hg and rarely more than 100 mmHg for both diagnostic and operative hysteroscopy. All the procedures were monitored with a video camera and monitor. To ensure comprehensive detection of uterine pathologies, focal abnormalities were biopsied under hysteroscopic guidance, whereas blind endometrial sampling was utilized for diffuse endometrial enlargement, abnormal uterine bleeding, and cases without identifiable hysteroscopic findings. For therapeutic hysteroscopy, dilatation of the cervix was required to insert larger hysteroscopes to ease dilatation and lower the risk of uterine perforation; cervical preparation was made by using misoprostol. Hysteroscopic procedures were mainly carried out by infertility subspecialists; however, second-year fellows were also involved in both surgical and diagnostic hysteroscopy.

During the study period, 328 gynecologic patients underwent diagnostic and therapeutic hysteroscopy. Exclusion criteria were based on the unavailability and completeness of patient records. Essential variables for consideration included the indication for hysteroscopic procedures and the type of procedure performed. Each patient was consecutively enrolled as they all met the inclusion criteria. Data collection occurred between June 1 and June 30, 2021.

Study variables

Independent variables included age, parity, marital status, place of residence, indication for hysteroscopic evaluation, and the professional level of the healthcare provider performing the procedure. Dependent variables included outcomes from hysteroscopic evaluations such as normal intracavitary findings, endometrial and endocervical polyps, intracavitary adhesions, endometrial hyperplasia, presence of intrauterine contraceptive devices (IUCD), type of hysteroscopic procedure (diagnostic vs operative), surgical interventions like polypectomy, adhesiolysis, myomectomy, septum resection, and complications such as perforation, intraoperative bleeding, and fluid overload.

Data collection tools, data quality assurance, data processing, and statistical analysis

A structured and pre-tested checklist was formulated after reviewing relevant literature [5, 7–10, 12]. It was structured to evaluate participant sociodemographic characteristics, reasons for hysteroscopy, surgical outcomes, and the assessment of complications. The data collection format underwent peer and mentor review.

Data collection was done by the Kobo toolbox application using mobile devices. Clinical and demographic data from patients' records were extracted by two second-year residents, trained to understand research objectives and data collection processes. They were closely supervised and received orientation from the principal investigator. Daily, the data underwent reviews to ensure completeness and clarity. Before entering data into the software, individual checklists were coded. Data were then entered into Epi Info version 3 and analyzed using SPSS version 25.0. Descriptive statistics including frequency, percentage, and mean were used, and the results were presented in simple statistical tables.

Result

Socio-demographic and clinical characteristics

A total of 328 patient card numbers, retrieved from the electronic operating room registry, were included in the final analysis, ensuring a 100% response rate. The mean age of the patients was 31.9 years, with a standard deviation of 5.1 years, and their ages varied between 21 and

50 years. The majority of women were between 26 and 30 years old, accounting for 38.1%, with 26.8% being 35 and older and 26.5% aged 31 to 35. About 81.4% of the participants in the study were nulliparous. A total of 73.5% of the participants lived in urban areas. Primary infertility cases constituted 48.5% of the hysteroscopic evaluations, followed by secondary amenorrhea at 18%, secondary infertility at 17.4%, and abnormal uterine bleeding at 8.8%. The majority, 90.2%, of hysteroscopies were categorized as operative (Table 1).

Hysteroscopy procedures for diagnosis, treatment, and potential complications

Out of 328 patients undergoing hysteroscopy, 6.1% were found to have no intracavitary abnormalities. Hysteroscopy commonly identified intracavitary adhesions (48.2%), endometrial polyps (18%), and submucosal fibroids (9%) as primary findings. As per the European Society of Gynecology and Endoscopy [17], nearly half (48%) of the observed intrauterine adhesions were classified as dense, with 38% categorized as moderate and 14% as filmy. Submucosal fibroids were hysteroscopically classified as follows: 50% were type 1, 30% were type 2, and 20% were type 0. Around 9.8% of hysteroscopy assessments identified multiple findings, encompassing 32 cases.

The primary surgical procedure performed was adhesiolysis, accounting for 48.2% (158 cases) of procedures, followed by polypectomy at 20.7% (62 cases of endometrial polyps and 6 cases of endocervical polyps), and fibroid removal at 9.1% (30 cases). Additional surgical procedures performed via hysteroscopy included septal resection in six cases, removal of intrauterine devices (IUDs) in five cases, and extraction of intrauterine fetal bone fragments in three cases.

Complications arose in eight patients during hysteroscopy, resulting in a complication rate of 2.4%, with all incidents occurring during operative hysteroscopy. The primary complication identified was uterine perforation, observed in 6 patients, with three cases occurring during adhesion removal, two during polypectomy, and one during IUCD removal. During the procedure to remove fibroids, one patient suffered from intraoperative bleeding, and another encountered fluid overload during the removal of intracavitary adhesions (Table 2).

Discussion

Undertaken at Ethiopia's leading public fertility center, the study aimed to demonstrate diagnostic and therapeutic hysteroscopy practices. It stands as the inaugural exploration into diagnostic and surgical hysteroscopy in the country. Hysteroscopy is now the established procedure of choice for diagnosing and surgically addressing intrauterine conditions like adhesions, submucosal

Table 1 Socio-demographic characteristics and hysteroscopic indications at St.Paul's hospital (N= 328)

Variables	n	%
Age group		
21–25	28	8.5
26–30	125	38.1
31–35	87	26.5
>35	88	26.8
Residence		
Rural	87	26.5
Urban	241	73.5
Parity		
Nulliparous	267	81.4
Parous	61	18.6
Marital Status		
Married	303	92.4
Single	25	7.6
Type of hysteroscopy		
Diagnostic	32	9.8
Operative	296	90.2
The performing physician		
REI subspecialist	250	76.2
2nd -year fellow	78	23.8
Indication for hysteroscopic procedures		
Primary infertility	159	48.5
Secondary amenorrhea	59	18.0
Secondary infertility	57	17.4
Abnormal uterine bleeding	29	8.8
Recurrent pregnancy loss	10	3.0
Misplaced IUCD	5	1.5
Primary amenorrhea	4	1.2
Fetal bone fragments	3	0.9
Others	2	0.6

Table 2 Diagnostic hysteroscopy, therapeutic hysteroscopy, and related complications (N = 328)

Hysteroscopic procedures and related complications	n	%
Normal uterine cavity	20	6.1
Endometrial polyp	59	18.0
Endometrial hyperplasia	3	0.9
Atrophic endometrium	2	0.6
Small cavity	16	4.9
Congested cavity	12	3.7
Intracavitary adhesions		
Thin/ filmy	22	6.7
Firm/Moderate	60	18.3
Dense/extensive	76	23.2
Submucosal fibroid		
Type 0	6	1.8
Type 1	15	4.6
Type 2	9	2.7
Misplaced IUCD	5	1.5
Fetal bony fragments	3	0.9
Endocervical polyp	6	1.8
Uterine anomaly		
Uterine septum	6	1.8
Bicornuate uterus	5	1.5
Endometrial polyp + blocked Ostia	3	0.9
Adhesiolysis	158	48.2
Polypectomy (for both endometrial + endocervical polyps)	68	20.7
Myomectomy	30	9.1
Septum resection	6	1.8
IUCD removal	5	1.5
Removal of bony fragments embedded	3	0.9
Related complications	8	2.4
Uterine perforations	6	1.8
Intraoperative severe bleeding	1	0.3
Fluid overload	1	0.3

fibroids, endometrial polyps, and other related issues [18, 19].

Consistent with the previous studies [7, 8, 19], our study finds a higher proportion of nulliparous patients undergoing hysteroscopy, driven by concerns like infertility and abnormal uterine bleeding, particularly in older women with conditions like fibroids or polyps. This emphasizes the importance of tailored diagnostic strategies and individualized treatment approaches.

Hysteroscopic evaluation predominantly targeted primary infertility (48.5%), followed by secondary amenorrhea (18%), secondary infertility (17.4%), and abnormal uterine bleeding (AUB) (8.8%), aligning closely with results reported in previous studies [20–25]. Conversely, the indications differed from those observed in earlier studies, with abnormal uterine bleeding (AUB) being the most frequent at 36%, followed by primary infertility at 17% and IUCD misplacement at 15% [7]. This phenomenon can be attributed to the increased number of

patients needing infertility assessments, a well-established system of referrals focused on these assessments, and the essential role of hysteroscopy in such cases. Moreover, our findings indicated a reduced complaint of abnormal uterine bleeding (8.8%), even in the context of endometrial polyps (18%) and submucosal myomas (9%) being prevalent. Such findings can be linked to the fact that these lesions are often asymptomatic, the effectiveness of hysteroscopy in diagnosing them, the possibility of discovering them incidentally during evaluations for other reasons, and the diverse clinical manifestations associated with endometrial abnormalities.

Our study indicated that 6.1% of hysteroscopic procedures demonstrated normal intracavitary findings. This observation is credible given that hysteroscopy is universally recognized as the gold standard for diagnostic evaluation, with missed detections of endometrial lesions typically occurring at a low rate of 1–3% [26, 27]. However, our study found a reduced frequency of normal diagnostic hysteroscopy results compared to those reported in retrospective studies conducted in Brazil, Turkey, Egypt, and Nigeria, with rates of 79.6%, 60.5%, 68.2%, and 23%, respectively [7, 10, 19, 28]. Variations in findings may stem from differences in sample sizes across studies, with earlier studies potentially employing larger samples. Additionally, the procedural techniques and expertise of specialists can impact hysteroscopic outcomes.

The most frequent hysteroscopic observation was intra-cavitary adhesions, followed by endometrial polyps and submucosal myomas. This finding mirrors that of the prior studies where intra-uterine adhesions and endometrial polyps were commonly identified during diagnostic hysteroscopy [10, 13, 19, 28–30]. Despite its consistency, the finding suggests the greater prevalence of potential infectious risk factors, such as endometrial tuberculosis, especially prominent in developing countries like Ethiopia [31–33]. In addition, this calls attention to the necessity for specialized strategies like hysteroscopic adhesiolysis to preserve uterine cavity integrity [34]. Our review showed that despite the high rate of intrauterine adhesions (IUAs), there were lower percentages of secondary amenorrhea (18%) and abnormal uterine bleeding (8.8%). This is likely because adhesions can form without necessarily causing menstrual irregularities or abnormal bleeding. When investigating infertility, IUAs might be discovered as an independent contributing factor, unrelated to menstrual irregularities.

Clearly, owing to the marked prevalence of intrauterine adhesions, adhesiolysis formed a substantial part of our study, in line with findings reported in studies conducted in Nigeria [5, 19]. Apart from adhesiolysis, our diagnostic approach involved simultaneous operative procedures such as polypectomy, myomectomy, and removal of

IUCDs and fetal bone fragments lodged in the endometrium, aligning with observations documented in earlier studies [1, 7, 8].

The study reported a 2.4% complication rate associated with surgical hysteroscopy, while no complications were observed during diagnostic procedures, comparable to the generally low complication rates reported in the literature [15, 35]. Uterine perforation was a recognized complication that frequently occurs during procedures involving adhesiolysis, typically manifesting as a sudden loss of resistance felt by the operating physician. This observation is in line with other studies where hysteroscopic perforation was highlighted as the predominant issue [7, 15, 36]. Nonetheless, it was higher than the figures reported in studies [16, 35, 37–39], which ranged from 0.8 to 1.6%. The elevated likelihood of perforation could be linked to the frequent occurrence of multiple endometrial polyps and extensive intrauterine adhesions identified in most of our patients.

Conservative management was effective for four cases of uterine perforation, with exploratory laparotomy and uterine repair performed in the other two cases. Addressing fluid overload in patients with pulmonary edema typically involved restricting fluid intake, administering intravenous furosemide, and conducting diagnostic procedures such as chest X-ray and echocardiography. A case of severe intraoperative bleeding necessitated the cessation of the procedure, followed by bimanual compression and the insertion of a Foley catheter filled with saline. Our management of each complication and the clinical presentations were akin to those detailed in the earlier study [15, 35]. There were no reported complications such as false passage, cervical tear, endometritis, or embolism in this review.

This retrospective study is constrained by its inability to explore the underlying causes of intrauterine adhesions and its reliance on hysteroscopy without biopsy confirmation to evaluate diagnostic accuracy. Furthermore, the study's small sample size, single-center nature, and absence of local data pose challenges for drawing comparisons and generalizing findings related to surgical outcomes and complication rates. Employing electronic medical records was a notable strength as it minimized recall bias and enhanced response rates. This study represents a pioneering effort in documenting diagnostic and operative outcomes of hysteroscopy within Ethiopia, laying a solid groundwork for future research endeavors in this field.

Conclusion

Our study revealed that the most popular reasons for hysteroscopic evaluation were primary infertility, followed by secondary amenorrhea, secondary infertility, and abnormal uterine bleeding. Intracavitary adhesions

constituted the predominant hysteroscopic findings, followed by endometrial polyps and submucosal fibroids. Adhesiolysis was the primary procedure in hysteroscopy, with uterine perforation being the main complication. Despite the strong safety profile of hysteroscopy with few complications in our set-up, following the correct surgical technique, cervical preparation, and meticulous fluid management are crucial to avoid those serious complications. Future research endeavors should emphasize multicenter studies to delve into the common etiologies of intrauterine adhesions and the factors influencing outcomes in both diagnostic hysteroscopy and operative procedures.

Abbreviations

AUB	Abnormal uterine bleeding
CO ₂	Carbon dioxide
CFRM	Center for reproductive medicine
IUAs	Intrauterine adhesions
IUCD	Intrauterine contraceptive device
REI	Reproductive endocrinology and infertility
SPSS	Statistical package of social science

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Author contributions

ST conceived and designed the study, performed analysis, interpreted the data, and prepared and drafted the manuscript. MN, SZ, EY, and MS were involved in the conception, design, analysis, and interpretation of data and in drafting the manuscript. All authors read and approved the final manuscript.

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Data availability

Data can be made available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

Ethical clearance was obtained from the Ethical Review Board of St. Paul's Hospital Millennium Medical College. Due to the retrospective nature of the review, the Ethical Review Board of St. Paul's Hospital Millennium Medical College endorsed the waiver of patient informed consent. The patient information was anonymized. Ethical principles were consistent with the Declaration of Helsinki.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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