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Histopathological Diversity in Hysterectomy Specimens at Jinnah Sindh Medical University Lab

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ABSTRACT

Hysterectomy is common but often overused in Pakistan, with rising cases in cities like Dera Ghazi Khan. Fibroids and abnormal uterine bleeding are the top causes, though many effective non-surgical treatments exist. Experts urge prioritizing medical management and preserving fertility through alternatives like myomectomy before resorting to surgery. **Objective:** To determine the spectrum of hysterectomies' lesions in histopathological analysis at Jinnah Sind Medical University Lab (JSMU lab). **Method:** This retrospective study was conducted in the setting of the JSMU diagnostic lab in Karachi, from January 2023 to December 2024.The sample size included the hysterectomy samples received during the two years mentioned before.The sampling technique was non-probability consecutive sampling. A proforma was designed to collect data from the records of the JSMU lab. This included the age of the patients, Indication of surgery, and outcome/diagnosis after histopathological examinations. **Results:** This study included 147 hysterectomies with a mean age of 44.11 years, and the Individuals aged between 40 and 49 years comprised the largest proportion, making up half of the total participants. Heavy menstrual bleeding was the most frequent clinical finding, present in 44% of cases. Histopathologically, 50% of cases showed leiomyoma, followed by adenomyosis, with almost all patients having chronic cervicitis and nabothian cysts. **Conclusions:** It was concluded that hysterectomy was most common in women aged 40–49 years, primarily for heavy menstrual bleeding. Leiomyoma was the leading histopathological finding, followed by adenomyosis, with chronic cervicitis and nabothian cysts in most cases.

INTRODUCTION

Hysterectomy remains a widely performed surgery across the United States. Hysterectomy in Pakistan, like in other parts of the world, is considered to be overused in several cases [1]. In a city of Pakistan, Dera Ghazi Khan, Hysterectomy cases grew from 7% of gynaecological admissions in 2013 to 17% by 2016 [1]. It is typically used as a last-line treatment when other methods fail. In nationwide study conducted in the United States identified the leading indications for hysterectomy as symptomatic uterine fibroids (51.4%), abnormal uterine bleeding (41.7%), endometriosis (30%), and uterine prolapse (18.2%) [2]. In a study of Karachi at Jinnah Postgraduate Medical Centre (JPMC) in 2020, 260 hysterectomies were done in a single hospital in only one year [3]. The most common reason for hysterectomy in gynaecological cases was fibroids, followed by uterine prolapse. For obstetric cases, the main cause was a severely attached placenta. Experts believe that with better treatment options now available, the number of hysterectomies for non-cancerous reasons may decrease in the future [3]. Fibroid is the most common cause of hysterectomy. Evidence from recent analyses suggests that the location of uterine fibroids plays a critical

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role in fertility outcomes. Fibroids growing just below the uterine lining are most frequently linked to difficulties in embryo implantation, whereas those embedded in the muscular wall or on the outer uterine surface tend to have less impact. Instead of giving hope, hysterectomies are usually done. However, Myomectomy appears to affect fertility improvement in different cases [4]. In a recent study, regarding fibroids treatment, there are many options for fibroid treatment, like surgical, medical and nonsurgical alternatives [5]. So there is a point to ponder if there are so many options apart from the last resort, why hysterectomies' frequency is increasing. On the other hand, if we take the second most common cause of hysterectomy which is abnormal uterine bleeding then there is a recommendation that women presenting with abnormal uterine bleeding require a comprehensive workup involving ultrasound examination, preferably supplemented by hysteroscopy, along with blood tests including platelet levels and coagulation profiles to rule out manageable sources of bleeding [6]. Typically, medical interventions are favoured as the primary approach for addressing abnormal uterine bleeding (AUB). When it comes to managing acute AUB, hormonal techniques stand as the initial choice in medical treatment. Options such as intravenous administration of combined oral contraceptive pills or oral progestins are effective therapeutic options. Surgery should be considered only in patients in whom medical treatment has failed, cannot be tolerated, or is contraindicated [7]. Although several regional and international studies have explored the histopathological spectrum of lesions found in hysterectomy specimens, there is limited data specific to the population served by Jinnah Sindh Medical University (JSMU). There is significant histopathological diversity in hysterectomy specimens at JSMU, with benign lesions being more prevalent than malignant ones, and their distribution varying with age and clinical presentation.

This study aims to evaluate the histopathological diversity in hysterectomy specimens at JSMU Lab, to categorize findings by type, correlate them with clinical indications and patient demographics, and assess the concordance between clinical and histological diagnoses.

METHODS

The retrospective descriptive study was conducted in the setting of Jinnah Sind Medical University (JSMU) Diagnostic Lab, Karachi. The study duration was between January 2023 and December 2024. Informed consent was obtained from all patients at the time of specimen submission through a standardized research consent form in Urdu and the English language provided by the Histopathology Department of Jinnah Sindh Medical University Laboratory. Patients were informed that their anonymized data may be used for academic and research purposes. Only those specimens for which written consent was provided were included in the study. Approval for the study was obtained from the Institutional Review Board (IRB) of Jinnah Sindh Medical University (JSMU/IRB/2024/871). Patient confidentiality and anonymity were strictly maintained throughout the study. The sampling technique was non-probability consecutive sampling, while the sample size type was complete enumeration of available cases (census of available data). After receiving the hysterectomy specimen, a general consent form for Specimen Collection and testing for research purposes was asked to be filled out by the patient. A proforma was designed to collect data from the records of the JSMU lab. This included the age of the patients, the Indication of surgery, and outcome/diagnosis after histopathological examination. All hysterectomy specimens received at the Histopathology Department of Jinnah Sindh Medical University Laboratory were included in this study. Each specimen was accompanied by a histopathology requisition proforma containing relevant clinical details such as patient age, presenting symptoms, provisional diagnosis, and type of surgical procedure performed. Inclusion criteria were such specimens that were adequately preserved and suitable for histopathological evaluation. Exclusion criteria included poorly preserved, damaged, or inadequate specimens that cannot be processed or yield conclusive histopathological results. Upon receipt, the specimens were labelled with unique identification numbers and fixed in 10% neutral buffered formalin for 24–48 hours. Gross examination was performed by a pathologist or trained technologist, and the following details were noted: size, weight, and appearance of the uterus, condition of endometrium, myometrium, and cervix, presence of any lesions, masses, polyps, fibroids, or adhesions, involvement of adnexal structures (if present). Representative tissue sections were taken from: endometrium, myometrium (including any fibroids or masses), cervix, ovaries and fallopian tubes (if included), and any abnormal or suspicious areas. The selected tissue samples were processed using an automatic tissue processor. The tissues underwent dehydration (using increasing grades of alcohol), clearing (in xylene), and impregnation with molten paraffin wax. Once embedded, tissue blocks were prepared using paraffin embedding stations. Thin sections (4–5 microns) were cut from the paraffin blocks using a microtome. These sections were mounted on glass slides and allowed to dry. Slides were then stained using the routine Hematoxylin and Eosin (H and E) staining method. Special stains (e.g., PAS, Masson's Trichrome) were used when required for specific diagnostic purposes. The stained slides were examined under a light microscope, MAKE AND MODEL? by qualified histopathologists. Each case was evaluated for: type and nature of the lesion (inflammatory, benign, and malignant),

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presence of specific pathological features such as leiomyoma, adenomyosis, endometrial hyperplasia, carcinoma, polyps, or chronic cervicitis coexistence of multiple pathologies.The tabulated results underwent statistical analysis to determine the type of lesion, clinical findings and age group distribution for frequency /percentage. The data were compiled and processed using Microsoft Excel software for subsequent analysis.

RESULTS

This study comprised a total of 147 hysterectomy cases. The average age of participants was 44.11 years, with ages ranging broadly from 28 to 85 years.The largest proportion of cases, 73 (50%), fell within the 40–49-year age group. The most frequent clinical finding was heavy menstrual bleeding, which accounts for 44% of total cases (Table 1).

Table 1: Age and Clinical Features of the Total 147 Cases of Hysterectomies

Sr. No	Variables	Frequency (%)
	Age (Years)	
1	20-29	02 (1%)
2	30-39	28 (19%)
3	40-49	73 (50%)
4	50-59	34 (23%)
5	60 and Above	10 (7%)
	Total	147 (100%)
	Clinical Findings	
1	Heavy Menstrual Bleeding	65 (44%)
2	Irregular Bleeding	18 (12%)
3	Post- Menopausal Bleeding	13 (9%)
4	UV Prolapse	09 (6%)
5	Lower Abdomen: Heaviness or Pain	09 (6%)
6	Abdominal Distension	05 (3%)
7	Post Coital Bleeding	01 (0.5%)
8	Percutaneous Umbilical Blood	02 (1%)
9	History Not Provided	26 (17%)

The most common significant histopathological diagnosis is adenomyosis, followed by leiomyoma. The frequency of the coexisting and single diseases was analyzed (Table 2).

Table 2: Histopathological Diagnosis in 147 Cases, Most Cases Carries More Than One Diagnosis

Sr. No	Histopathological Diagnosis	Frequency
1	Adenomyosis	81
2	Leiomyoma	76
3	Endometritis	45
4	Endometrial Hyperplasia	35
5	Endometrial Atrophic Changes	19
6	Endometrial Polyp	7
7	Cervical Polyp	4
8	Ovarian Cyst	3
9	Endometrial Cancer	2
10	Leiomyosarcoma	2
11	Ovarian Cancer	2
12	Cin	1
13	Ovarian Endometriosis	1
14	Cervical Cancer	0
1	Coexisting Diseases	98
2	Single Diseases	49

The 30–40 age group demonstrated high rates of ovarian cysts (67%), chronic cervicitis (27%), and endometritis (42%), suggesting a predominance of inflammatory and functional disorders in early reproductive years. Adenomyosis (21%) and endometrial hyperplasia (29%) were also noted in this group, though less frequently than in the 40–50 range. ovarian cancer (figure 5) is solely seen in women the 40-50 years. of the age range. In the 50–60-year group, there was a marked reduction in overall pathology, although ovarian cysts (33%), endometrial polyps (43%), and cervical polyps (50%) persisted, potentially reflecting postmenopausal presentations or incidental findings during surgery.Patients over 60 showed minimal pathology, with isolated cases of chronic cervicitis, adenomyosis, and leiomyoma (all <5%). The <30 age group showed almost no significant pathology except minor percentages of chronic cervicitis (1%), endometritis (2%), and adenomyosis (1%), indicating a low burden of histopathological disease at younger reproductive ages. This distribution emphasizes that the most significant uterine and adnexal pathologies occur in the fourth and fifth decades, coinciding with perimenopausal hormonal changes. It also reinforces the need for heightened clinical surveillance and diagnostic evaluation in women aged 40–50, especially for conditions with malignant potential, such as CIN and cervical cancer (Table 3).

Table 3: Correlation of Histopathological Diagnosis with Age

Variables	Age (Years)				
	<30	30-40	40-50	50-60	60+
Chronic Cervicitis	1%	27%	52%	17%	4%
Nabothian Cyst	0%	33%	51%	15%	1%
Endometritis	2%	42%	40%	11%	4%
Ovarian Cyst	0%	67%	0%	33%	0%
Cervical Polyp	0%	0%	50%	50%	0%
Endometrial Atrophic Changes	0%	21%	37%	37%	5%
Ovarian Endometriosis	0%	0%	100%	0%	0%
Leiomyosarcoma	0%	50%	50%	0%	0%
Endometrial Hyperplasia	3%	29%	66%	3%	0%
Leiomyoma	1%	28%	49%	20%	3%
CIN	0%	100%	0%	0%	0%
Adenomyosis	1%	21%	56%	19%	4%
Endometrial Cancer	0%	0%	100%	0%	0%
Cervical Cancer	–	–	–	–	–
Endometrial Polyp	0%	14%	43%	43%	0%
Ovarian Cancer	0%	0%	100%	0%	0%

The cross-tabulated data revealed significant associations between clinical complaints and underlying

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histopathological findings in hysterectomy specimens. Heavy menstrual bleeding was most frequently associated with leiomyoma (62%), cervical intraepithelial neoplasia (CIN) (58%), adenomyosis (43%), and endometritis (31%). This indicates that heavy bleeding is a dominant clinical manifestation in patients with fibroids, precancerous cervical lesions, and adenomyosis. Irregular bleeding demonstrated a particularly strong association with CIN (100%), followed by endometritis (20%) and endometrial atrophic changes (12%), suggesting that irregular bleeding may serve as a clinical indicator of precancerous or atrophic endometrial changes. Postmenopausal bleeding was commonly linked with endometrial atrophic changes (33%) and ovarian endometriosis (18%), emphasizing the need to investigate atrophic or ovarian pathology in postmenopausal women presenting with such symptoms. Cases clinically diagnosed as fibroid uterus frequently showed histological evidence of leiomyoma (5%) and adenomyosis (3%), confirming clinical suspicion but also indicating that adenomyosis may coexist and contribute to the symptomatology. Ovarian cysts and cervical polyps were found with high frequency (33%) across diverse complaints such as constipation and heavy bleeding, suggesting that these may often be incidental or coexisting findings rather than primary causes. Interestingly, uterovaginal prolapse showed a notable association with ovarian endometriosis (35%), possibly reflecting pelvic floor involvement or deep infiltrating disease. This analysis underscores that certain clinical presentations—particularly heavy and irregular bleeding correlate strongly with specific histopathological diagnoses such as leiomyoma, CIN, adenomyosis, and endometritis. Findings like CIN and leiomyoma appear to be complaint-linked rather than incidental, supporting their diagnostic significance. Such clinico-pathological correlations are valuable for enhancing clinical suspicion and guiding appropriate diagnostic and therapeutic strategies (Table 4).

Table 4: Correlation Between Clinical Complaints and Histopathological Findings in Hysterectomy Specimens

Variables	Column Labels Complain of Lower Abdominal Pain							
	Constipation	Fibroid Uterus	Heavy Menstrual Bleeding	Irregular Bleeding	Not Provided	Pain in Both Iliac Fossa	Post-Menopausal Bleeding	U/V Prolapse
Chronic Cervicitis	1%	3%	48%	9%	16%	2%	9%	12%
Nabothian Cyst	1%	1%	45%	13%	21%	3%	7%	7%
Endometritis	0%	3%	31%	20%	29%	3%	9%	6%
Ovarian Cyst	33%	0%	33%	33%	0%	0%	0%	0%
Cervical Polyp	33%	0%	33%	0%	0%	0%	33%	0%
Endometrial Atrophic Changes	0%	12%	18%	12%	6%	0%	18%	35%
Ovarian Endometriosis	0%	0%	0%	100%	0%	0%	0%	0%
Leiomyosarcoma	–	–	–	–	–	–	–	–
Endometrial Hyperplasia	0%	0%	58%	15%	12%	3%	6%	6%
Leiomyoma	0%	5%	62%	9%	14%	2%	6%	3%
CIN	–	–	–	–	–	–	–	–
Adenomyosis	1%	3%	43%	10%	19%	3%	10%	11%
Endometrial Cancer	0%	0%	100%	0%	0%	0%	0%	0%
Cervical Cancer	–	–	–	–	–	–	–	–
Endometrial Polyp	0%	0%	33%	17%	0%	0%	50%	0%
Ovarian Cancer	0%	0%	50%	0%	0%	0%	50%	0%

The age-stratified distribution of histopathological findings among hysterectomy specimens reveals distinct patterns across reproductive age groups. The 40–50-year age bracket showed the highest concentration of pathologies, with notable peaks in endometritis (40%), adenomyosis (56%), endometrial hyperplasia (66%), indicating this decade as the most clinically active period for uterine pathology (Figure 1).

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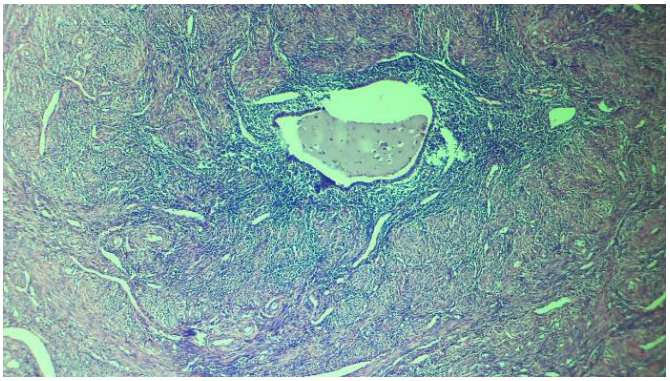

Figure 1: Adenomyosis (H and E Staining at Power of Scanner)

The 40-50-year age bracket showed the highest concentration of pathologies, with notable peaks in chronic cervicitis (52%) indicating this decade as the most clinically active period for uterine pathology (Figure 2).

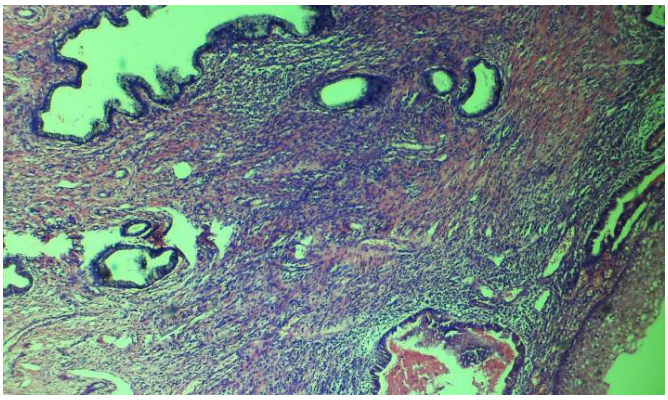

Figure 2: Chronic Cervicitis (H and E Staining at the Power of Scanner)

The 40-50-year age bracket showed the highest concentration of pathologies, with notable peaks in nabothian cysts (51%) indicating this decade as the most clinically active period for uterine pathology (Figure 3).

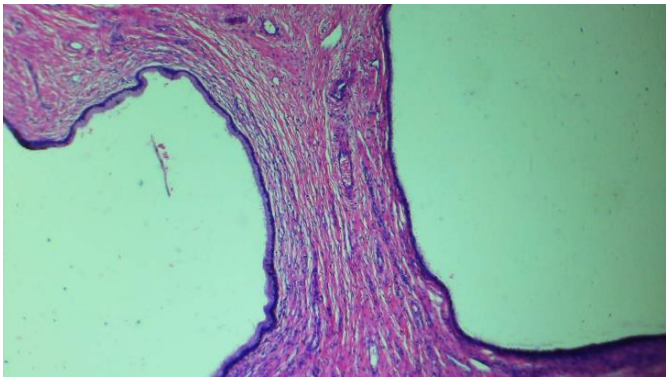

Figure 3: Nabothian Cyst (H and E Staining at Power of Scanner)

The 40-50-year age bracket showed the highest concentration of pathologies, with notable peaks in leiomyoma (49%), indicating this decade as the most clinically active period for uterine pathology (Figure 4).

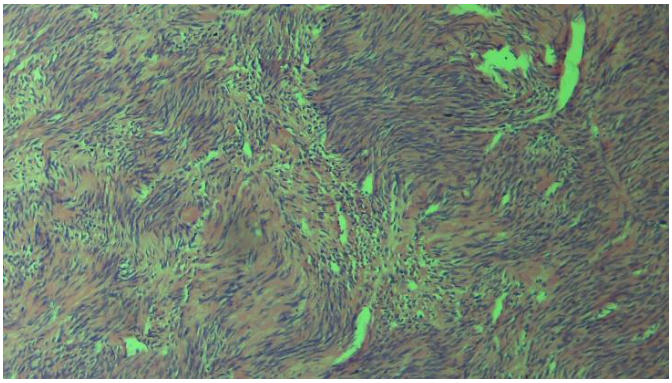

Figure 4: Leiomyoma (H and E Staining at Power of Scanner)

The 40-50-year age bracket showed the highest concentration of pathologies, with notable peaks in cervical polyps, (50%) indicating this decade as the most clinically active period for uterine pathology (Figure 5).

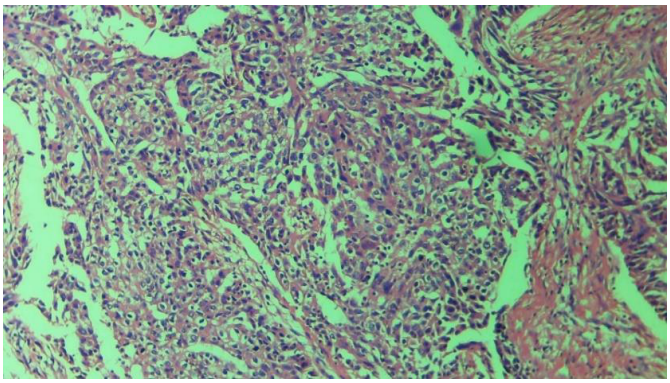

Figure 5: Ovarian Cancer (H and E Staining at Power of Scanner)

This age group also accounted for 100% of CIN, ovarian endometriosis, and cervical cancer, highlighting its critical role in both benign and premalignant or malignant conditions.

DISCUSSION

Removal of the uterus is likely a critical intervention in the presence of malignancies involving the uterus or ovaries, or in cases of severe uterine hemorrhage refractory to conservative management. In other clinical scenarios, the procedure is performed electively to alleviate symptoms and improve the patient's quality of life. When not performed as an emergent, life-saving measure, the surgery is classified as an elective hysterectomy. Hysterectomy is preferred for specific gynecologic conditions. However, the anticipated benefits must be carefully balanced against the potential risks of the procedure and other treatment options. For appropriately chosen patients, the surgery should lead to an improved quality of life. The cost of the procedure, both to the healthcare system and to the patient, should be considered concerning the expenses of leaving the condition untreated. Additionally, the method chosen for performing the hysterectomy will influence the overall cost of the surgery. Heavy menstrual bleeding (HMB) affects women's

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health, daily life, and well-being. While medication is the first-line treatment, surgery is considered when it fails. Hysterectomy is the definitive solution, but it comes with major risks and costs. Less invasive options like endometrial resection and ablation offer effective symptom relief with fewer complications [8]. Hysterectomy can lead to physical and emotional challenges, including estrogen deficiency (if ovaries are removed) and health risks. Loss of femininity often contributes to anxiety and depression [9, 10]. The uterus symbolizes womanhood, pregnancy, and femininity for many. Its removal, even post-menopause, can impact self-image and identity. Abdominal hysterectomy may also affect sexual function; which estrogen therapy cannot fully restore [11]. Recent research suggests that declining estrogen levels may heighten vulnerability to mental health issues [12]. Hysterectomy should not be the only solution for adenomyosis. Emerging treatments like GnRH therapy, progestin IUDs, and ultrasound ablation offer promising alternatives. Levonorgestrel IUD stands out as a highly effective, non-invasive, and fertility-preserving option [13, 14]. Urgent research is needed to refine treatment strategies and establish definitive guidelines, ensuring patients have better choices beyond hysterectomy. Uterine fibroids can be treated by myomectomy, myolysis [15]. uterine fibroid volume decreases by an average of 57% over a six-month course of treatment by GnRH agonists [16], while Laparoscopic myolysis may be considered as an alternative to abdominal hysterectomy for women over 40 with large or multiple intramural fibroids who do not wish to have children but want to avoid undergoing a hysterectomy [17]. In certain situations, the decision to undergo a hysterectomy may be influenced or even unintentionally swayed by doctors. Several factors could contribute to this happening, like Pressure for Quick Solutions, Lack of Awareness of Alternatives or Financial and Institutional Pressures. The cost of a hysterectomy in Pakistan varies widely, typically ranging from 150,000 to 250,000 Pakistani Rupees (PKR). The final price depends on factors such as the hospital, location, surgeon's fees, and the type of procedure performed, whether laparoscopic, robotic-assisted, or abdominal [18]. In India, many women undergo hysterectomies without medical need due to a mix of misconceptions, economic hardship, and poor healthcare access. Some view the uterus as unnecessary after childbirth, while others see surgery as a one-time, cheaper alternative to ongoing treatment. Fear of cancer, misdiagnosis, and lack of contraception further fuel the trend [19]. So the solution to this is to improve reproductive health education, access to primary care, and promote non-surgical treatment options [20]. The increasing rate of hysterectomy, despite the availability of alternative treatments, is a complex issue influenced by a variety of factors, including lack of awareness, perceived simplicity of the procedure, and pressure from healthcare systems. To reverse this trend, it is crucial to provide better education to both healthcare providers and patients about the range of available treatments, ensure that hysterectomy is only recommended when truly necessary, and encourage shared decision-making in treatment planning. By adopting these strategies, we can help ensure that women receive the most appropriate care and avoid unnecessary surgeries whenever possible.

CONCLUSIONS

This study analyzed the histopathological characteristics of lesions identified in hysterectomy specimens. The most common uterine pathologies encountered were leiomyoma and adenomyosis. Chronic cervicitis was the predominant cervical lesion observed, along with one case of cervical polyp and three cases of cervical intraepithelial neoplasia grade III (CIN III). Malignant tumors were identified in four specimens, including three cases of endometrial carcinoma and one case of ovarian carcinoma.

Authors Contribution

Conceptualization: MA
Methodology: MA, YAZ, BAS, SP
Formal analysis: MA
Writing review and editing: WH, YAZ, FZ

All authors have read and agreed to the published version of the manuscript

Conflicts of Interest

All the authors declare no conflict of interest.

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