Original Article

Hysterectomy Specimens at A Tertiary Care Center: A Descriptive Histopathological Analysis

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Abstract

Objective: To determine the frequency and histopathological spectrum of lesions in hysterectomy specimens.

Methodology: A descriptive study was performed over 10 months from January 2023 to October 2023 at DDRRL, DUHS. A total of 259 hysterectomy specimens were included. Patient demographic and clinical data were collected, and specimens were processed for histopathological examination. Data analysis was achieved by using SPSS version 26, employing descriptive statistics.

Results: Mean age of patients was 40.02 ± 10.42 years. The most common age group undergoing hysterectomy was 31-40 years (35.5%). Total Abdominal Hysterectomy with Bilateral Salpingo-Oophorectomy (TAH+BSO) was the predominant procedure (75.3%). Most patients had high parity (56.8% with five or more children). The primary clinical indications were abnormal uterine bleeding (AUB) (42.9%) and fibroids (29.7%). Histopathologically, endometrial lesions were the most frequent (44.4%), followed by cervical (20.5%), myometrial (18.1%), and ovarian lesions (17.0%).

Conclusion: Hysterectomy is primarily indicated for AUB and fibroids in the studied population. Histopathological examination predominantly reveals endometrial pathology. The findings emphasize the importance of histopathological evaluation in hysterectomy specimens to ensure accurate diagnosis and appropriate postoperative management.

Keywords: Abnormal uterine bleeding, fibroids, histopathological examination, hysterectomy

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Introduction

The surgical removal of the uterus, known as hysterectomy, is one of the most common major gynecological surgeries performed around the world. This decisive treatment targets a wide range of benign and malignant disorders affecting the female reproductive system, including uterine fibroids, adenomyosis, gynecological malignancies, and postpartum problems.[1] Since its inception in the early twentieth century as a pivotal intervention for pelvic disease, hysterectomy has changed dramatically alongside advances in surgical methods and diagnostic tools, profoundly altering clinical practice and patient outcomes worldwide.[2]

The degree of symptoms, the failure of conservative therapy, and the patient's objectives for reproductive health all play a role in the decision to have a hysterectomy.[1] Among the common indications include endometriosis, adenomyosis, uterine prolapse, dysfunctional uterine bleeding (DUB), uterine fibroids producing excessive menstrual bleeding and pelvic pain, and various gynecological malignancies such as cervical and endometrial cancer. A woman's quality of life can be greatly impacted by DUB, which is frequently caused by hormonal imbalances or structural abnormalities in the uterus. It can also result in chronic anemia. Benign tumors of the uterus' smooth muscle layer called uterine fibroids can lead to excessive monthly bleeding, high pelvic pressure, and problems with reproduction. Infertility and chronic pelvic discomfort are common symptoms of endometriosis, which is defined as endometrial tissue outside the uterine cavity; heavy, painful menstruation is frequently the outcome of adenomyosis, which is endometrial tissue invading the uterine muscle.[3] In cases when medicinal interventions fail to ease symptoms or when cancer is suspected, hysterectomy provides an ultimate response to, delivering respite from debilitating symptoms and minimizing the risk of future complications. Gynecological cancers, such as endometrial carcinoma and cervical cancer, usually require chemotherapy or radiation therapy in addition to hysterectomy as a key part of the treatment plan. A detailed assessment of the patient's medical history, present state of health, and personal preferences is a crucial part of the complicated decision-making process surrounding hysterectomy.

Geographical, social-economic, and healthcare system considerations all have a major role in the variety of hysterectomy rates observed worldwide. In affluent countries like the United States, around 600,000 hysterectomy procedures are performed annually, making it the most prevalent non-obstetrical surgical treatment among women.[4] Its adaptability in treating a broad spectrum of illnesses and enabling in-depth surgical exploration is responsible for this high rate. Patient ages for laparoscopic hysterectomy (LH), total abdominal hysterectomy (TAH) (51.3 ± 12.1 years), and vaginal hysterectomy (VH) (51.7 ± 14.1 years) are reported to be on average 46.9 ± 10.9 years.[5] Laparoscopic hysterectomy, a minimally invasive technique, is recommended due to its faster recovery period and less postoperative pain. Vaginal hysterectomy, which is similarly minimally invasive, is frequently preferred for cases of uterine prolapse due to the advantages of shorter hospital stays and speedier recovery. In comparison to open treatments, laparoscopic operations have become more and more popular recently since they provide benefits including shorter hospital stays, faster recovery times, and reduced pain after surgery.[6]

The histological evaluation of hysterectomy tissues is critical for verifying preoperative diagnosis, discovering unexpected pathology, directing postoperative management decisions, and contributing to continuing research into the origin and treatment of uterine problems. In-depth understanding of the kind and severity of uterine and adnexal pathology is provided by histopathological assessment, which facilitates precise diagnosis and suitable postoperative care. For example, histological testing may reveal other or different pathologies such as adenomyosis or endometrial hyperplasia, even though preoperative imaging and clinical evaluation may point to uterine fibroids as the diagnosis. In addition to their diagnostic value, these tests yield important epidemiological information about the distribution and prevalence of different uterine pathologies in particular patient populations. This data is essential for optimizing therapy regimens and creating focused therapeutic approaches meant to enhance patient outcomes.[3]

Hysterectomy has significant long-term implications for reproductive, endocrine, and pelvic floor health, making accurate preoperative assessment and histopathological confirmation essential for appropriate patient selection. Histopathological evaluation validates clinical indications and may detect incidental pathology influencing postoperative management. For clinicians, knowledge of the local prevalence and histopathological spectrum of lesions in hysterectomy specimens is critical for optimizing diagnostic accuracy and guiding evidence-based surgical decision-making. This study sought to determine the frequency and histopathological spectrum of lesions in hysterectomy specimen.

Methodology

This descriptive study was conducted at the Department of Histopathology, DDRRL/ DUHS, Karachi. Spanning ten months from January 2023 to October 2023, the study was planned and executed. Ethical approval was obtained from the Institutional Review Board (IRB) of DUHS and informed consent was taken from participating patients. To ensure diagnostic accuracy and reliability, measures such as double reading of slides by two independent histopathologists were implemented, adding a layer of robustness to the histopathological diagnoses.

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All hysterectomy specimens received during the study period were included, provided they had complete clinical and demographic data. Specimens that were incomplete, improperly labeled, or from patients with a history of neoadjuvant therapy were excluded to maintain the study's integrity. Data collection was performed using a structured proforma, which captured patient demographic details such as age, parity, and menopausal status, clinical indications for hysterectomy (e.g., DUB, fibroids, prolapse, endometriosis, malignancies), and the type of hysterectomy performed (total abdominal hysterectomy, vaginal hysterectomy, laparoscopic hysterectomy, etc).

Hysterectomy samples were fixed in 10% neutral buffered formalin for 24-48 hours to preserve tissue morphology. Following fixation, the specimens underwent gross examination. This involved measuring the uterine corpus and cervix, inspecting for gross pathological lesions, and systematically sectioning the uterus and adnexa. Tissue specimens were then handled using an automated tissue processor, embedded in paraffin, and sectioned into 4-5 microns. These sections were stained with Hematoxylin and Eosin (H & E) following standard protocols to facilitate detailed histopathological examination.

Experienced histopathologists conducted the histopathological evaluation of the specimens. Each slide was examined under a light microscope to identify lesions, providing a detailed assessment of the pathological features present. Data were analyzed using the IBM SPSS version 26. Descriptive statistics were applied for demographic variables, clinical indications, and histopathological findings. Categorical variables were presented as frequencies and percentages, while continuous variables were summarized as means and standard deviations.

Results

Out of the 259 hysterectomy specimens analyzed, the mean age of the patients was 40.02 ± 10.42 years. The majority of patients were in the 31-40 year age range, accounting for 35.5% of the sample. TAH with Bilateral Salpingo-Oophorectomy (TAH+BSO) was the most frequently performed technique, representing 75.3% of the cases. Thirty-three patients (12.7%) were nulliparous, 79 (30.5%) had parity of one to four, and 147 (56.8%) were multiparous (parity ≥5). The leading clinical indications for hysterectomy were DUB (42.9%) and fibroids (29.7%). Histopathological examinations revealed that lesions were most commonly identified in the endometrium (44.4%), followed by the cervix (20.5%), myometrium (18.1%), and ovaries (17.0%). This detailed breakdown of patient characteristics and clinical indications was presented in Table 1.

Among cervicx specimens (n=53), chronic nonspecific cervicitis with squamous metaplasia was the most prevalent analysis, accounting for 9.3% of specimens, followed by cervical leiomyoma (5.0%) and carcinoma cervix (3.5%). Within the endometrium group (n=115), simple hyperplasia (17.0%) and endometrial polyps (7.3%) were the most frequently identified. In the myometrium category (n=47), adenomyosis (6.2%) and leiomyomata (5.8%) were prominent findings. Among ovarian specimens (n=44), serous cystadenoma (7.3%) and simple cysts (5.8%) were the predominant diagnoses (Table 2) (Fig 1).

In the analysis of clinical indications for hysterectomy among different age groups, DUB emerged as the most common indication, particularly in the 31-40 year age group with 42 cases, and also in the 41-50 year group with 32 cases. Fibroids were the second most frequent indication, evenly distributed across the 21-30, 31-40, and 41-50 year age groups, with each group contributing over 20 cases, summing to 77 cases (29.7%). Ovarian cysts, although less common, were mostly seen in the 31-40 year age group with 9 cases, contributing to a total of 16 cases (6.2%). Adenomyosis presented relatively evenly across various age groups, totaling 16 cases (6.2%), while carcinoma of the cervix was more prevalent in mature age groups, particularly in the 41-50 year age group, accounting for 4 out of the 8 cases (3.1%). Chronic pelvic pain was reported in 12 cases (4.6%), primarily in the 41-50 year age group with 6 cases while endometrial hyperplasia was more common in 31-40 years age group (Fig 2).

Chronic nonspecific cervicitis (24 cases) and carcinoma cervix (9 cases) were most frequent in the 41-50 age group, while cervical leiomyoma (13 cases) was common in ages 31-40. Simple hyperplasia (44 cases) and endometrial polyp (19 cases) were prevalent in the 31-50 age group, with endometrioid carcinoma (13 cases) more frequent in ages 21-30. Myometrial leiomyomata (15 cases) and adenomyosis (16 cases) mainly affected the 31-40 group. In ovarian specimens, serous cystadenoma (19 cases) and simple cysts (15 cases) were most common in ages 31-40. (Table 3).

Table 1. Demographic and Clinical Characteristics of Patients Undergoing Hysterectomy

Characteristics	Frequency	Percent
Age		
21-30 years	52	20.1
31-40 years	92	35.5

41-50 years	75	29.0
51-60 years	26	10.0
>60 years	14	5.5
Type of Hysterectomy specimen		
TAH+BSO	195	75.3
TAH	54	20.8
TAH+ Ovary	6	2.3
TAH+ Cervix	1	0.4
Uterine Mass	3	1.2
Parity		
Nulliparous	33	12.7
Parous 1-4	79	30.5
Parous ≥5	147	56.8
Clinical Indication		
DUB	111	42.9
Fibroid	77	29.7
Ovarian Cyst	16	6.2
Adenomyosis	16	6.2
Uterovaginal (Uv) Prolapse	1	0.4
Carcinoma cervix	8	3.1
Endometrial/ Cervical Polyp	8	3.1
Chronic Pelvic Pain	12	4.6
Endometrial Hyperplasia	10	3.9
Anatomical Site		
Cervix	53	20.5
Endometrium	115	44.4
Myometrium	47	18.1
Ovary	44	17.0

Table 2. Frequency and Histopathological Spectrum of Hysterectomy Specimens by Anatomical Site and Histological Diagnosis

Anatomical Site	Histological Diagnosis	Frequency	Percent
Cervix (n=53)	Chronic nonspecific cervicitis	3	1.2
	Chronic nonspecific cervicitis with squamous metaplasia	24	9.3
	Cervical leiomyoma	13	5.0
	Cervical Polyp	6	2.3
	Carcinoma Cervix	9	3.5

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Endometrium (n=115)	Endometrial Polyp	19	7.3
	Simple hyperplasia	44	17.0
	Complex hyperplasia without atypia	15	5.8
	Complex Hyperplasia With Atypia	5	1.9
	Endometrioid Carcinoma	13	5.0
	Endometritis	18	6.9
Myometrium (n=47)	Leiomyoma	10	3.9
	Adenomyosis	16	6.2
	Myohyperplasia	5	1.9
	Leiomyomata	15	5.8
Ovary (n=44)	Simple Cyst	15	5.8
	Serous Cystadenoma	19	7.3
	Mucinous Cystadenoma	5	1.9
	Dermoid Cyst	2	0.8
	Follicular Cyst	3	1.2

Table 3. Distribution of Histopathological Diagnoses of Hysterectomy Specimen by Anatomical Site and Age Group

Anatomical Site	Histological Diagnosis	21-30 years	31-40 years	41-50 years	51-60 years	>60 years	Total
Cervix (n=53)	Chronic nonspecific cervicitis	1	1	1	0	0	3
	Chronic nonspecific cervicitis with squamous metaplasia	6	7	9	2	0	24
	Cervical leiomyoma	4	5	3	0	1	13
	Cervical Polyp	3	2	1	0	0	6
	Carcinoma Cervix	2	1	4	2	0	9
Endometrium (n=115)	Endometrial Polyp	6	7	5	0	1	19
	Simple hyperplasia	6	15	15	5	3	44
	Complex hyperplasia without atypia	3	6	4	1	1	15
	Complex Hyperplasia With Atypia	1	2	2	0	0	5
	Endometrioid Carcinoma	6	3	4	0	0	13
	Endometritis	2	4	10	1	1	18
Myometrium (n=47)	Leiomyoma	0	6	2	1	1	10
	Adenomyosis	3	5	1	5	2	16
	Myohyperplasia	0	2	0	3	0	5
	Leiomyomata	3	6	5	1	0	15

Ovary (n=44)	Simple Cyst	1	7	4	1	2	15
	Serous Cystadenoma	4	7	4	3	1	19
	Mucinous Cystadenoma	0	3	1	0	1	5
	Dermoid Cyst	1	1	0	0	0	2
	Follicular Cyst	0	2	0	1	0	3
Total		52	92	75	26	14	259

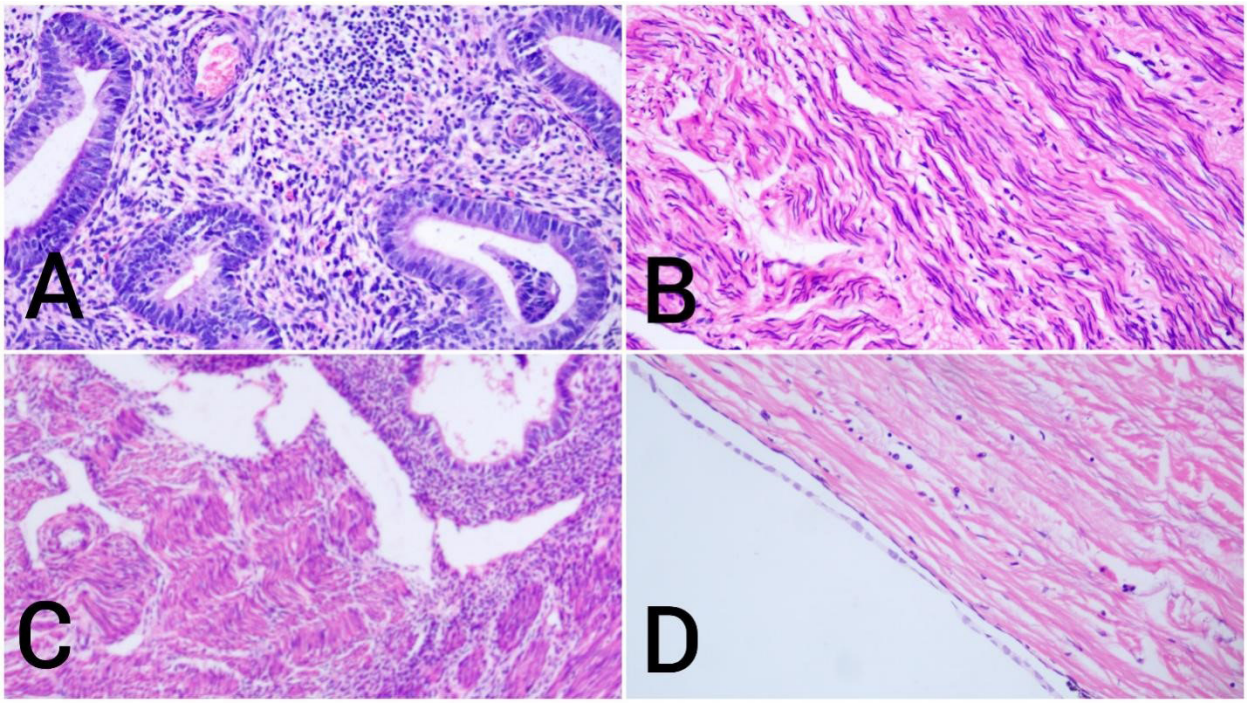

Figure 1: H & E showing lesions of hysterectomy specimens at 400x magnification

A: Photomicrograph of Endometrial Polyp showing cystically dilated endometrium glands lined by columnar cells while stroma is fibrocellular with thick and thin walled blood vessels, B: Photomicrograph of Leiomyoma showing spindle shaped cells arranged in fascicles individuals cells having elongated nuclei with scant cytoplasm, C: Photomicrograph of Adenomyosis showing endometrium glands and stroma with myometrium, D: Photomicrograph of Serous Cystadenoma showing cyst wall lined by single layer of flat columnar cells.

Discussion

Hysterectomy is the most frequently performed gynecological procedure worldwide, providing effective and lasting relief for a range of uterine and adnexal disorders. This major surgery involves the removal of the uterus, and potentially the ovaries and fallopian tubes. Despite the development of less invasive alternatives, hysterectomy remains a most common procedure for conditions such as fibroids, abnormal uterine bleeding, adenomyosis, prolapse, and malignancies even in USA and worldwide.[7] Since its introduction, with the first subtotal hysterectomy in 1843 and the total hysterectomy in 1929, it has become a standard procedure. This study determine the frequency and histopathological spectrum of lesion in hysterectomy specimens.

Our study's demographic distribution, with the majority of hysterectomy patients in the late reproductive age group, reflects patterns seen in other regional audits. A local tertiary care dataset from Karachi reported that women aged 40–49 years comprised the largest proportion of hysterectomy cases, with heavy menstrual bleeding and fibroids as leading clinical features.[8] Similarly, a study reported that AUB and fibroids were common indications for hysterectomy among reproductive aged women, with fibroids particularly frequent in the myometrium.[9] These similarities show that symptomatic uterine pathology remains a major driver of hysterectomy in comparable populations.

The prevalence of grand multiparity in our study, with 56.8% of women having parity ≥5, aligns with trends reported in developing regions, where larger family sizes

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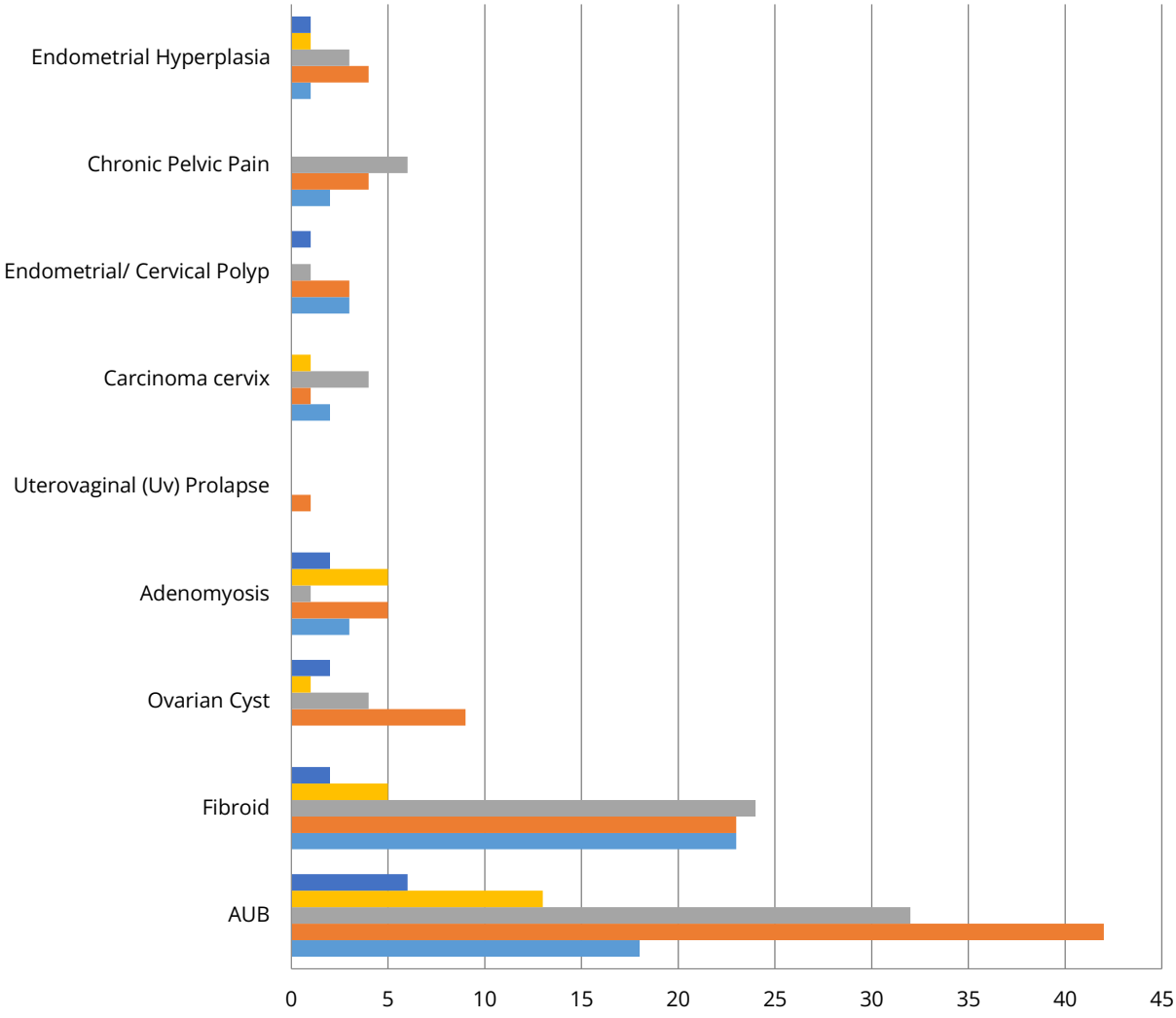

	AUB	Fibroid	Ovarian Cyst	Adenomyosis	Uterovaginal (Uv) Prolapse	Carcinoma cervix	Endometrial/ Cervical Polyp	Chronic Pelvic Pain	Endometrial Hyperplasia
>60 years	6	2	2	2	0	0	1	0	1
51-60 years	13	5	1	5	0	1	0	0	1
41-50 years	32	24	4	1	0	4	1	6	3
31-40 years	42	23	9	5	1	1	3	4	4
21-30 years	18	23	0	3	0	2	3	2	1

Figure 2: Distribution of Clinical Indications for Hysterectomy across Different Age Groups

remain common. Data from Pakistan and neighboring countries indicate that women undergoing hysterectomy frequently exhibit higher parity compared with populations in developed settings. For instance, hospital-based studies in Pakistan report that a majority of women requiring hysterectomy are grand multiparous, highlighting the influence of reproductive history on clinical presentation and surgical management.[10-12]

The predominance of AUB and fibroids as indications for surgery in our study is well supported by recent histopathological analyses. In a 2024 cross-sectional study of 140 hysterectomy specimens from women with AUB, leiomyoma was the most frequent lesion found, followed by a significant portion with dual pathology of adenomyosis and leiomyoma, and adenomyosis alone was also a common finding on histopathology.[13] Simi-

larly, a study examining 349 hysterectomy specimens for AUB reported that leiomyoma accounted for about 2/3 of cases, with adenomyosis present in a minority and coexistence of both lesions have been observed.[14] Moreover, contemporary research assessing the prevalence of adenomyosis in women undergoing hysterectomy for bleeding conditions highlights that adenomyosis is frequently observed alongside leiomyomas, underscoring both the relative contributions of these entities to symptomatology and their frequent coexistence.[15]

While many studies identify fibroids as the dominant pathology, contrasting trends are also documented. A retrospective analysis from a tertiary care centre in Peshawar reported that adenomyosis was the most common histopathological finding in hysterectomy specimens of women with AUB, followed by fibroids and other lesions, suggesting that local referral patterns and diagnostic practices can shift the relative prevalence of uterine lesions16 Other studies in other settings have documented adenomyosis in approximately 40–49 % of hysterectomy specimens, either alone or in combination with leiomyomas, and up to 59 % among women presenting with bleeding disorders or dysmenorrhea.[15], [17-20] These findings point to variability in lesion prevalence that may reflect differences in imaging diagnostics, clinical thresholds for surgery, and the underlying disease burden across populations.

Histopathological findings such as chronic cervicitis and incidental benign endometrial or ovarian lesions in hysterectomy specimens, as observed in our cohort, have been widely reported. Several retrospective studies identify chronic cervicitis as the most frequent incidental cervical finding, along with benign ovarian cysts and unsuspected endometrial pathology.[21-23] Although infrequent, occult premalignant and malignant lesions have been documented in hysterectomy specimens removed for presumed benign indications, underscoring the critical importance of routine histopathological examination. Large retrospective analyses report that unexpected malignancies are identified in 0.5–1.8 % of cases, including endometrial carcinoma, cervical cancer, ovarian malignancies, and uterine sarcomas.[24-28] Additionally, premalignant lesions such as cervical intraepithelial neoplasia have been observed in a small proportion of specimens initially thought to be benign.[24] These findings reinforce that even when preoperative clinical evaluation and imaging suggest benign disease, histopathological assessment remains essential to ensure patient safety and guide further management.

Taken together, these findings demonstrate that although certain patterns, particularly the predominance of fibroids and abnormal uterine bleeding, are consistently observed across studies, there are notable differences in the relative frequency of adenomyosis and other uterine pathologies. Such variability highlights the importance of locally generated data in shaping patient counseling, clinical decision making, and surgical planning within specific healthcare settings.

This study did not evaluate long term clinical outcomes or quality of life measures. Future prospective multicenter studies incorporating standardized clinical and imaging criteria, along with patient reported outcome measures, would offer a more comprehensive understanding of the relationship between clinical presentation, histopathological patterns, and therapeutic effectiveness across both surgical and conservative management pathways.

Conclusion

Hysterectomy remains a key surgical intervention for gynecological disease, with abnormal uterine bleeding and fibroids as the leading indications in our setting. The wide histopathological spectrum observed highlights the importance of routine examination of all specimens to confirm clinical diagnoses and detect incidental or malignant lesions. These findings provide valuable region-specific data to support evidence-based decision-making and optimal patient management.

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Authors' Contribution Statement

SS contributed to the conception, acquisition, analysis, drafting of the manuscript, critical review of the manuscript, and final approval of the version to be published. UB contributed to the conception, design, acquisition, analysis, and drafting of the manuscript. SJ contributed to the design, acquisition, analysis, critical review of the manuscript, and final approval of the version to be published. SHS contributed to the acquisition, analysis, and interpretation of data. FD contributed to the acquisition, analysis, and interpretation of data. LA contributed to the analysis, interpretation of data, and drafting of the manuscript. All authors are accountable for their work and ensure the accuracy and integrity of the study.

Conflict of Interest

Authors declared no conflict of interest

Grant Support and Financial Disclosure

None

Data Sharing Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.