

Original Research Article

Assessment of Causes of Abnormal Uterine Bleeding in Perimenopausal Age Group in Patients Under Going Hysterectomies

Article History:

Name of Author:

Dr. Maria Ashfaq¹, Prof. Dr. Nadia Sharif², Dr. Sumbal Alnehal³, Dr. Sadeema Rahman⁴, Dr. Tahira Parveen⁵, Dr. Rohma Saddique⁶

Affiliation:

¹MO, Independent University Hospital, Faisalabad

²Professor, Independent University Hospital, Faisalabad

³ MO, Independent University Hospital, Faisalabad

⁴ MO, Independent University Hospital, Faisalabad

⁵ MO, Independent University Hospital, Faisalabad

⁶ MO, Independent University Hospital, Faisalabad

Corresponding Author:

Dr. Maria Ashfaq
dr.desi909@gmail.com

Received: 07-11-2025

Revised: 18-12-2025

Accepted: 25-12-2025

Published: 30-12-2025

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-Noncommercial-Share Alike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Abstract:

Objective: To determine the frequency of structural causes of abnormal uterine bleeding (AUB) according to the FIGO PALM–COEIN classification in perimenopausal women undergoing hysterectomy.

Study Design Descriptive cross-sectional study.

Place and Duration of Study: Department of Gynecology and Obstetrics, Independent University Hospital, Faisalabad from 5 August 2025 to 5 November 2025 following approval of the research synopsis.

Methodology: A total of 275 perimenopausal women aged 42–52 years presenting with abnormal uterine bleeding and planned for hysterectomy were included using non-probability consecutive sampling. Abnormal uterine bleeding was diagnosed based on clinical history and ultrasonographic findings. Structural causes were identified through ultrasonography and categorized according to the PALM component of the FIGO PALM–COEIN classification system. Demographic variables, parity, gravidity, body mass index, family history of AUB, and comorbidities were recorded on a predesigned proforma. Data were analyzed using SPSS version 25. Frequencies, percentages, means, and standard deviations were calculated. Associations between structural causes and selected effect modifiers were assessed using the chi-square test, with a p-value ≤ 0.05 considered statistically significant.

Results: The mean age of participants was 46.56 ± 3.12 years. Leiomyoma was the most common structural cause of AUB, identified in 47.6% of cases, followed by adenomyosis (17.8%), polyps (5.5%), and malignancy (5.8%). Nearly one-quarter of cases (23.3%) could not be classified under the PALM category. No statistically significant association was observed between structural causes of AUB and age, body mass index, parity, gravidity, family history, or comorbidities ($p > 0.05$).

Conclusion: Perimenopausal women having a hysterectomy are most often affected by leiomyoma, adenomyosis, or another structural cause of irregular uterine bleeding. For a correct diagnosis and the best treatment of AUB in this age range, histopathological assessment is still crucial.

Keywords: Abnormal uterine bleeding, Perimenopause, Hysterectomy, PALM–COIN, Leiomyoma.

INTRODUCTION

Abnormal uterine bleeding (AUB) is a common gynecological symptom characterized by menstrual bleeding that differs in regularity, frequency, duration, or volume from normal menstrual patterns in non-

pregnant women (1,2). AUB is particularly prevalent in the perimenopausal age group, where it represents a substantial cause of morbidity and healthcare utilization (3,4). The clinical impact of AUB extends beyond bleeding itself, contributing to anemia, impaired quality

of life, psychological distress, and increased risk of surgical intervention (5-7). Perimenopause denotes the transitional period leading to menopause, typically between 42 and 52 years of age, during which ovarian follicular depletion results in hormonal fluctuations and irregular ovulatory cycles (8). These endocrine alterations, including unopposed estrogen exposure and progesterone deficiency, predispose the endometrium to dysfunctional proliferation, ultimately manifesting as irregular or heavy menstrual bleeding (9, 10). As endocrine homeostasis becomes erratic, structural and non-structural contributors to AUB become more prominent in clinical presentation. The PALM-COEIN classification was created by the International Federation of Gynecology and Obstetrics (FIGO) to provide a standard for the examination of the causes of ATUB (1). The structural components (PALM) consist of polyps, adenomyosis, leiomyoma, and malignancy or hyperplasia, while the non-structural categories (COEIN) comprise coagulopathy, ovulatory dysfunction, endometrial reasons, iatrogenic factors, and disorders not otherwise defined (11). The use of this schema improves diagnostic precision and enables the linkage of clinical observations, imaging, and histology (12). Structural uterine diseases represent a considerable percentage of the causes of abnormal uterine bleeding in perimenopausal women. Leiomyomas are among the most often diagnosed lesions and are typically linked to menorrhagia and pelvic pain (13). Adenomyosis, characterized by endometrial glands within the myometrium, also contributes to AUB and dysmenorrhea in this demographic (14). Endometrial polyps are usually harmless; however, they might cause bleeding in specific areas and can coexist with other abnormalities in the uterus. Because the likelihood of neoplastic transformation rises with age and chronic estrogen exposure, perimenopausal and postmenopausal women are more likely to have endometrial hyperplasia and carcinoma, premalignant and malignant entities, respectively, that take on more clinical significance throughout these stages (15, 16). Non-structural causes such as ovulatory dysfunction and primary endometrial disorders also contribute to the burden of AUB, particularly when structural pathology is absent (17). In clinical practice, differentiating between structural and non-structural etiologies informs management strategies, ranging from hormonal therapy to procedural interventions (18). The International Federation of Gynecology and Obstetrics (FIGO) has suggested a new classification system based on etiology, known by the acronym PALM-COEIN, in 2010, which has been modified in 2018 to standardize the terminology, investigations, diagnosis, and management of AUB. A study determined the structural causes of AUB in perimenopausal women and classified the causes on the basis of PALM-COEIN classification. There were 8(5.3%) cases of AUB polyp, 27(17.9%) of adenomyosis, 72(47.6%) cases of Leiomyoma and 9(6%) cases of Malignancy (19). We know that AUB

has a major effect on women's health and well-being, but we don't know enough about the variables that put them at risk.

Objective

Thus, the purpose of this research is to examine, at this critical juncture, the many elements that lead to AUB. In order to aid in early diagnosis and appropriate treatment, the research will help doctors discover structural reasons for AUB during the menopausal transition. Patients' life expectancy, quality of life, and illness management will all be improved as a result of this study.

METHODOLOGY:

This descriptive cross-sectional study was conducted in the Department of Gynecology and Obstetrics, Independent University Hospital, Faisalabad from 5 August 2025 to 5 November 2025 following approval of the research synopsis. The study aims to assess the structural causes of abnormal uterine bleeding (AUB) in perimenopausal women undergoing hysterectomy, using the FIGO PALM-COEIN classification system as the analytical framework. The study was initiated after obtaining formal approval from the Institutional Ethical Review Committee and the College of Physicians and Surgeons Pakistan (CPSP). The study population was consisting of women belonging to the perimenopausal age group, defined operationally as 42–52 years of age, who present with abnormal uterine bleeding and are planned for hysterectomy. Abnormal uterine bleeding was diagnosed on the basis of detailed clinical history and confirmed through ultrasonographic evaluation, specifically the presence of endometrial thickness greater than 4–5 mm and/or hypoechoic or isoechoic lesions within the uterine wall. Women who are pregnant, using hormonal preparations, or have a history of previous abdominopelvic surgery was excluded to minimize confounding factors. The sample size was calculated using the WHO sample size calculator, with a confidence level of 95%, an expected prevalence of structural causes of AUB of 5.3%, and a margin of error of 2.65%. Based on these parameters, a total sample size of 275 participants were enrolled using a non-probability consecutive sampling technique.

After obtaining informed written consent, participants were enrolled in the study. Each participants were informed about the study objectives, procedures, and confidentiality of data. Demographic variables such as age, height, weight, body mass index, gravidity, parity, family history of abnormal uterine bleeding, and associated comorbidities, including hypertension, diabetes mellitus, and thyroid disorders, was recorded on a predesigned proforma. All participants undergone a detailed ultrasonographic evaluation. Structural causes of AUB was identified and categorized according to the PALM component of the FIGO PALM-COEIN classification. Endometrial polyps were identified as hypoechoic or isoechoic lesions projecting into the uterine cavity. Adenomyosis was diagnosed based on heterogeneous uterine texture with diffuse or focal

myometrial thickening. Leiomyomas were identified as well-defined hypoechoic masses within the uterine wall, while suspected malignancy are labeled in the presence of irregular hypoechoic masses with or without cystic areas. Findings are correlated with hysterectomy specimen histopathology to ensure diagnostic accuracy. Data was entered and analyzed using Statistical Package for Social Sciences (SPSS) version 25. Quantitative variables such as age and body mass index was presented as mean and standard deviation, whereas categorical variables, including gravidity, parity, comorbidities, and structural causes of AUB, was expressed as frequencies and percentages. The chi-square test was applied to assess associations between categorical variables. Effect modifiers such as age, parity, gravidity, BMI, family history of AUB, and comorbid conditions were controlled through stratification. Post-stratification chi-square testing was performed, and a p-value of ≤ 0.05 considered statistically significant.

RESULTS

The results of this study summarize the demographic profile, clinical characteristics, and structural etiologies of abnormal uterine bleeding in perimenopausal women undergoing hysterectomy. Data were analyzed for 275 participants aged 42–52 years. The findings are presented in tabular form to illustrate baseline characteristics, distribution of structural causes according to the PALM component of the FIGO classification, and their association with selected effect modifiers.

Table 1. Demographic and Clinical Characteristics of Study Participants (n = 275)

Characteristic	Category	n	%
Age groups (years)	42–44	89	32.4
	45–47	75	27.3
	48–50	68	24.7
	51–52	43	15.6
Mean Age (years)	–	–	46.56 ± 3.12
Height (m)	–	–	1.58 ± 0.065
Weight (kg)	–	–	68.14 ± 10.67
BMI groups (kg/m²)	Underweight	8	2.9
	Normal weight	267	97.1

Parity groups	0–1	74	26.9
	2–3	86	31.3
	≥4	115	41.8
Gravidity groups	0–1	25	9.1
	2–3	95	34.6
	≥4	155	56.4
Family history of AUB	Yes	71	25.8
	No	204	74.2
Comorbidities	None	120	43.6
	Hypertension	67	24.4
	Diabetes Mellitus	32	11.6
	Thyroid Disease	27	9.8
	Hypertension + Diabetes	29	10.5

In Table 1, we can see the study population's demographic and clinical characteristics at the beginning of the research. With an average age of 46.56 ± 3.12 years, most of the women were in the age bracket of 42 to 47. While greater parity and gravidity were typical results, most subjects had a normal body mass index. Half of the patients had a history of irregular uterine bleeding in their family, and hypertension was the most common co-morbidity.

Table 2 Distribution of Structural Causes of Abnormal Uterine Bleeding (PALM) (n = 275)

Structural Cause	n	%
Adenomyosis	49	17.8
Polyps	15	5.5
Leiomyoma	131	47.6
Malignancy	16	5.8
Not yet classified	64	23.3

In Table 2, we can see how the PALM categorization breaks down the structural reasons of irregular uterine bleeding by frequency and percentage distribution. Nearly half of all cases were leiomyomas, making them the most common structural pathology. After polyps and cancer, adenomyosis was the next most prevalent reason. The diversity of structural findings in perimenopausal AUB is underscored by the fact that a significant number of cases have not been diagnosed yet.

Table 3. Association of Structural Causes with Effect Modifiers (n, %) – Using Exact SPSS Values and Grouped Parity/Gravidity

Effect Modifier	Category	Adenomyosis n (%)	Polyp's n (%)	Leiomyoma n (%)	Malignancy n (%)	Not yet classified n (%)	p- value
Age groups	42–44	12 (24.5)	7 (46.7)	43 (32.8)	4 (25.0)	23 (35.9)	0.530
	45–47	11 (22.4)	5 (33.3)	35 (26.7)	5 (31.3)	19 (29.7)	
	48–50	13 (26.5)	1 (6.7)	34 (26.0)	4 (25.0)	16 (25.0)	
	51–52	13 (26.5)	2 (13.3)	19 (14.5)	3 (18.8)	6 (9.4)	
BMI groups	Underweight	0 (0.0)	1 (6.7)	3 (2.3)	2 (12.5)	2 (3.1)	0.107
	Normal weight	49 (100.0)	14 (93.3)	128 (97.7)	14 (87.5)	62 (96.9)	
Comorbidities	None	20 (40.8)	4 (26.7)	61 (46.6)	6 (37.5)	29 (45 cd.3)	0.305
	Hypertension	7 (14.3)	6 (40.0)	28 (21.4)	5 (31.3)	21 (32.8)	
	Diabetes Mellitus	8 (16.3)	2 (13.3)	14 (10.7)	1 (6.3)	7 (10.9)	
	Thyroid Disease	4 (8.2)	1 (6.7)	15 (11.5)	2 (12.5)	5 (7.8)	
	Hypertension + Diabetes	10 (20.4)	2 (13.3)	13 (9.9)	2 (12.5)	2 (3.1)	
Family history AUB	Yes	12 (24.5)	4 (26.7)	32 (24.4)	5 (31.3)	18 (28.1)	0.962
	No	37 (75.5)	11 (73.3)	99 (75.6)	11 (68.8)	46 (71.9)	
Parity groups	0–1	13 (26.5)	10 (66.7)	38 (29.0)	5 (31.3)	8 (12.5)	0.742
	2–3	18 (36.7)	4 (26.7)	37 (28.2)	7 (43.8)	20 (31.3)	
	≥4	18 (36.7)	1 (6.7)	56 (42.7)	4 (25.0)	36 (56.3)	
Gravidity groups	0–1	4 (8.2)	1 (6.7)	11 (8.4)	2 (12.5)	7 (10.9)	0.619
	2–3	16 (32.7)	5 (33.3)	47 (35.9)	8 (50.0)	19 (29.7)	
	≥4	29 (59.2)	9 (60.0)	73 (55.8)	6 (37.5)	38 (59.4)	

Table 3 presents the association between structural causes of abnormal uterine bleeding and selected

effect modifiers, including age groups, body mass index, comorbidities, family history of AUB, parity,

and gravidity. No statistically significant associations were observed between structural causes and these variables, as indicated by p-values greater than 0.05. Leiomyoma predominated across most categories of age, parity, and gravidity, whereas malignancy and polyps were less frequent across all subgroups.

DISCUSSION

In this study of perimenopausal women undergoing hysterectomy for abnormal uterine bleeding (AUB), structural pathologies predominated as the underlying etiologies, with uterine leiomyomas and adenomyosis accounting for the majority of histopathological diagnoses. This pattern is consistent with recent epidemiological observations that structural causes, as defined by the FIGO PALM classification, remain the principal contributors to AUB in mid-age women approaching menopause. Leiomyoma was the most frequent finding in our cohort, aligning with emerging data from tertiary care settings where fibroids account for a substantial proportion of cases presenting with heavy or irregular uterine bleeding. In a 2025 cross-sectional analysis of perimenopausal AUB, leiomyomas were reported in 26.4% of women, exceeding other structural and hormonal abnormalities, while adenomyosis and polyps were less common etiologies in the same demographic cohort (20).

Adenomyosis, although less prevalent than leiomyoma in our series, remains a significant contributory pathology. Its relative frequency in histological specimens has been variably reported, with some retrospective analyses indicating it may rival or exceed leiomyomas in specific populations. For example, a rural cohort study reported adenomyosis in 56% of hysterectomy specimens from women with AUB, with a mean age in the mid-40s (21). Meanwhile, older histopathological evaluations from the Kumaon region identified adenomyosis as the most common cause of AUB among women aged 40–50 years, suggesting potential geographic or population-specific influences on disease prevalence (22). These observations underscore that while leiomyomas are often the predominant structural lesions, adenomyosis remains an important differential diagnosis that may be underdiagnosed clinically due to overlapping symptomatology and limitations of imaging modalities. Indeed, 2-D ultrasound demonstrates limited sensitivity for adenomyosis in the presence of coexisting myomas, as shown by imaging pathology correlation studies (23). The strong association between leiomyomas and AUB in our cohort reflects pathophysiological mechanisms involving distorted uterine architecture, increased surface area of endometrial bleeding, and vascular derangements. These mechanisms have been reiterated in systematic literature reviews

emphasizing benign myometrial and endometrial lesions as principal contributors to dysfunctional uterine bleeding in perimenopausal women (24). In contrast, endometrial hyperplasia and malignant transformation, while clinically crucial to exclude, were uncommon in our sample, a finding that mirrors broader reports of rare malignancy among perimenopausal cohorts undergoing hysterectomy (20).

Comparative analyses with other contemporary studies reveal convergent patterns. A multi-center cross-sectional investigation from Imphal, India, reported leiomyoma as the primary histopathological finding in 62.1% of cases, with adenomyosis diagnosed in 21% following surgical intervention for AUB, reinforcing the consistency of leiomyoma predominance across diverse populations (25). Similarly, among ultrasound-histopathology correlated cohorts, fibroids frequently accounted for the largest share of structural lesions diagnosed, albeit with varying proportions of concomitant proliferative endometrial patterns (26).

Although comparisons across studies are broadly concordant, there is notable variability in the relative frequencies of specific pathologies, which may reflect differences in study design, population demographics, diagnostic criteria, and imaging technology. For example, structural causes accounted for 81.3% of AUB in one study that integrated detailed transvaginal sonography, with concomitant adenomyosis and leiomyoma reported at comparable rates of 31.5% and 14.8%, respectively (27). This suggests that reliance on imaging alone without histological confirmation may either overestimate or underestimate specific lesion frequencies, highlighting the ongoing importance of surgical pathology as a definitive diagnostic tool. The implications of these findings extend to clinical practice. While non-invasive diagnostic modalities such as ultrasonography and MRI are valuable for the initial assessment of AUB, definitive characterization of structural abnormalities frequently requires histopathological evaluation, particularly when clinical and imaging findings are inconclusive. This is particularly relevant for adenomyosis, which often eludes preoperative detection yet contributes significantly to symptom burden.

From a therapeutic perspective, delineating the predominant causes of AUB in perimenopausal women supports more informed decision-making regarding conservative management versus surgical intervention. Given the predominance of benign structural lesions like leiomyomas and adenomyosis, minimally invasive procedures, targeted medical therapy, and fertility-preserving options should be considered alongside hysterectomy when appropriate, to optimize patient-centered outcomes and reduce

overtreatment.

This study corroborates and extends the contemporary literature on histopathological etiologies of AUB in perimenopausal women. Structural lesions, particularly leiomyomas, emerge consistently as the dominant contributors, while adenomyosis remains a significant yet variably reported pathological entity. Integration of histopathological findings with clinical and imaging data remains essential for accurate diagnosis and tailored management in this heterogeneous clinical population.

CONCLUSION:

Conclusion: Structural abnormalities remain the leading causes of abnormal uterine bleeding in perimenopausal women undergoing hysterectomy, with leiomyoma identified as the predominant pathology, followed by adenomyosis, polyps, and malignancy. The findings support the clinical utility of the FIGO PALM–COEIN classification in systematically identifying structural etiologies of AUB and guiding diagnostic evaluation. Although no significant associations were observed between structural causes and demographic or clinical variables such as age, BMI, parity, gravidity, family history, or comorbidities, the high prevalence of leiomyoma highlights its major contribution to symptomatic bleeding during the menopausal transition. A considerable proportion of cases also remained unclassified, emphasizing the complexity of AUB in this population. Histopathological correlation remains essential for definitive diagnosis, exclusion of malignancy, and formulation of individualized management strategies to improve patient outcomes and quality of life and support evidence-based therapeutic decision-making in routine gynecological practice.

REFERENCES:

1. Munro, M. G., Critchley, H. O., Broder, M. S., & Fraser, I. S. (2011). FIGO classification system (PALM-COEIN) for causes of abnormal uterine bleeding in nonpregnant women of reproductive age. *International Journal of Gynecology & Obstetrics*, 113(1), 3–13. <https://doi.org/10.1016/j.ijgo.2010.11.011>
2. American College of Obstetricians and Gynecologists. (2019). ACOG practice bulletin: Pelvic organ prolapse. American College of Obstetricians and Gynecologists.
3. Fraser, I. S., Critchley, H. O., Broder, M., & Munro, M. G. (2011). The FIGO recommendations on terminologies and definitions for normal and abnormal uterine bleeding. *Seminars in Reproductive Medicine*, 29(5), 383–390. <https://doi.org/10.1055/s-0031-1287662>
4. Khan, A. T., Shehmar, M., & Gupta, J. K. (2014). Uterine fibroids: Current perspectives. *International Journal of Women's Health*, 6, 95–114. <https://doi.org/10.2147/IJWH.S51083>
5. Hapangama, D. K., & Bulmer, J. N. (2016). Pathophysiology of heavy menstrual bleeding. *Women's Health*, 12(1), 3–13. <https://doi.org/10.2217/whe.15.80>
6. Rezende, G. P., Yela Gomes, D. A., & Benetti-Pinto, C. L. (2023). Prevalence of abnormal uterine bleeding in Brazilian women: Association between self-perception and objective parameters. *PLoS ONE*, 18(3), Article e0282605. <https://doi.org/10.1371/journal.pone.0282605>
7. Matteson, K. A., Raker, C. A., Clark, M. A., & Frick, K. D. (2013). Abnormal uterine bleeding, health status, and usual source of medical care: Analyses using the Medical Expenditures Panel Survey. *Journal of Women's Health*, 22(11), 959–965. <https://doi.org/10.1089/jwh.2013.4288>
8. Burger, H. G., Hale, G. E., Dennerstein, L., & Robertson, D. M. (2008). Cycle and hormone changes during perimenopause: The key role of ovarian function. *Menopause*, 15(4), 603–612. <https://doi.org/10.1097/gme.0b013e318174ea4d>
9. Obeagu, E., & Obeagu, G. (2016). A review on haematological profile in menstruating, premenopausal and menopausal women. *International Journal of Advanced Research in Biological Sciences*, 3(11), 92–108.
10. Farquhar, C. M. (1992). Management of dysfunctional uterine bleeding. *Drugs*, 44(4), 578–584. <https://doi.org/10.2165/00003495-199244040-00005>
11. Kakar, R. N., Hamza, S., Yousaf, H., Farwa, S. U., & Ruqia, B. (2025). Palm-Coein classification of abnormal uterine bleeding and clinicopathological correlation. *Indus Journal of Bioscience Research*, 3(4), 227–232.
12. Cooper, N. A., Robinson, L. L., & Clark, T. J. (2015). Ambulatory hysteroscopy and its role in the management of abnormal uterine bleeding. *Journal of Family Planning and Reproductive Health Care*, 41(4), 284–291. <https://doi.org/10.1136/jfprhc-2014-101084>
13. Laughlin, S. K., Schroeder, J. C., & Baird, D. D. (2010). New directions in the epidemiology of uterine fibroids. *Seminars in Reproductive Medicine*, 28(3), 204–217. <https://doi.org/10.1055/s-0030-1251477>

14. Naftalin, J., Hoo, W., Pateman, K., Mavrelos, D., Holland, T., & Jurkovic, D. (2012). How common is adenomyosis? A prospective study of prevalence using transvaginal ultrasound in a gynaecology clinic. *Human Reproduction*, 27(12), 3432–3439. <https://doi.org/10.1093/humrep/des332>
15. Barr, C. E., Ryan, N. A., Derbyshire, A. E., Wan, Y. L., MacKintosh, M. L., McVey, R. J., et al. (2021). Weight loss during intrauterine progestin treatment for obesity-associated atypical hyperplasia and early-stage cancer of the endometrium. *Cancer Prevention Research*, 14(11), 1041–1050. <https://doi.org/10.1158/1940-6207.CAPR-21-0201>
16. Amant, F., Cadron, I., Fuso, L., Berteloot, P., de Jonge, E., Jacomen, G., et al. (2005). Endometrial carcinosarcomas have a different prognosis and pattern of spread compared to high-risk epithelial endometrial cancer. *Gynecologic Oncology*, 98(2), 274–280. <https://doi.org/10.1016/j.ygyno.2005.04.009>
17. Fraser, I. S. (2011). Contraception in women with abnormal uterine bleeding. *Contraception*, 84(3), 209–218. <https://doi.org/10.1016/j.contraception.2011.02.004>
18. MacGregor, B., Munro, M. G., & Lumsden, M. A. (2023). Therapeutic options for the management of abnormal uterine bleeding. *International Journal of Gynecology & Obstetrics*, 162(Suppl. 1), 43–57. <https://doi.org/10.1002/ijgo.14941>
19. Vivarna, G. P. S., Devi, S., & Rani, B. S. (2023). Clinicopathological evaluation of abnormal uterine bleeding in perimenopausal women. *Asian Journal of Pharmaceutical and Clinical Research*, 12, 260–263.
20. Mirza, G. F., Hayat, Z., & Nazeer, S. (2025). Frequency of structural and hormonal causes of abnormal uterine bleeding (AUB) in perimenopausal women. *Journal of the Society of Obstetricians and Gynaecologists of Pakistan*, 15(4), 247–252.
21. Sumathi, S. (2016). Is adenomyosis, a frequent association of abnormal uterine bleeding? A retrospective study on hysterectomy samples in the rural area of Melmaruvathur. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*, 5(4), 1192–1196. <https://doi.org/10.18203/2320-1770.ijrcog20161133>
22. Rizvi, G., Pandey, H., Pant, H., Chufal, S. S., & Pant, P. (2013). Histopathological correlation of adenomyosis and leiomyoma in hysterectomy specimens as the cause of abnormal uterine bleeding in women in different age groups in the Kumaon region: A retrospective study. *Journal of Mid-Life Health*, 4(1), 27–30. <https://doi.org/10.4103/0976-7800.109627>
23. Lonky, N. M., Chiu, V., Portugal, C., Estrada, E. L., Chang, J., Fischer, H., et al. (2023). Adenomyosis in women undergoing hysterectomy for abnormal uterine bleeding associated with uterine leiomyomas. *PLoS ONE*, 18(12), Article e0294925. <https://doi.org/10.1371/journal.pone.0294925>
24. Ahmed, A., Khadija, S., & Irshad, A. (2022). Causes of dysfunctional uterine bleeding in pre-menopausal, peri-menopausal and post-menopausal women: A systematic review of world literature between year 1992 to 2017. *Pakistan BioMedical Journal*, 5, 03–06.
25. Latha, L., & Borah, A. (2016). Clinicopathological evaluation of abnormal uterine bleeding in perimenopausal women. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*, 5(9), 3072–3075. <https://doi.org/10.18203/2320-1770.ijrcog20163102>
26. Talukdar, B., & Mahela, S. (2016). Abnormal uterine bleeding in perimenopausal women: Correlation with sonographic findings and histopathological examination of hysterectomy specimens. *Journal of Mid-Life Health*, 7(2), 73–77. <https://doi.org/10.4103/0976-7800.185336>
27. Tian, Y., Bai, B., Wang, L., Zhou, Z., & Tang, J. (2024). Contributing factors related to abnormal uterine bleeding in perimenopausal women: A case-control study. *Journal of Health, Population and Nutrition*, 43(1), 52. <https://doi.org/10.1186/s41043-024-00531-0>