**Alqalam Journal of Medical and Applied Sciences**. 2025;8(4):2765-2771
https://doi.org/10.54361/ajmas.258498

*Original article*

# Frequency and Risk Factors of Adenomyosis in Women Undergoing Hysterectomy at Benghazi Medical Center

**Fawzia Alharari[1,2*], Asma Belrawin[2], Najwa Bouzaid[2]**

[1]*Department of Obstetrics and Gynecology, University of Benghazi, Benghazi, Libya*
[2]*Benghazi Medical Center, Benghazi, Libya*
***Corresponding author***. *Fawzia.elharary@uob.edu.ly*

**Abstract**
Adenomyosis is a non-malignant disorder characterized by the infiltration of endometrial tissue into the myometrium, resulting in an enlarged, soft uterus. It may be asymptomatic or manifest symptoms, including abnormal uterine bleeding, dysmenorrhea, pelvic discomfort, and, less frequently, dyspareunia. A physical examination frequently indicates a painful, diffusely enlarged uterus. To ascertain the prevalence and risk factors of adenomyosis in patients having hysterectomy at Benghazi Medical Center (BMC). A descriptive case series study was conducted over one year, from June 2023 to December 2023, at the Benghazi Medical Center. The study includes all women admitted to the Obstetrics and Gynecology Department who undergo a hysterectomy, regardless of indication, during the specified study period. Adenomyosis was diagnosed histopathologically in 19.2% of cases. Among these, 40% had coexisting uterine leiomyoma; a statistically significant association was found (p = 0.047). Women with adenomyosis had a higher mean parity (4.6 vs. 4.0). Hormonal therapy use has a significant association with adenomyosis (p = 0.001), potentially reflecting prior symptomatic treatment or a link with disease modulation, and pelvic pain is significantly associated (p = 0.032), suggesting it may be a more specific symptom of adenomyosis.
Age was not significantly associated with adenomyosis; higher parity showed a statistically significant relationship. Pelvic pain and prior hormonal therapy use were also significantly associated with adenomyosis, highlighting their potential value in clinical suspicion and management. However, other factors such as menorrhagia, dysmenorrhea, dyspareunia, cesarean section, curettage, and menstrual cycle patterns showed no significant associations.
**Keywords.** Adenomyosis, Hysterectomy, Pelvic Pain, Hormonal Therapy, Benghazi.

## Introduction

Adenomyosis is characterized by the non-malignant infiltration of endometrial tissue into the myometrium, resulting in a uniformly enlarged uterus that microscopically displays ectopic, non-neoplastic endometrial glands and stroma encased by hypertrophic and hyperplastic myometrial tissue [1]. It may be asymptomatic, may be found as an accidental pathologic finding, or may cause abnormal uterine enlargement, dysmenorrhea, abnormal pelvic discomfort, and dyspareunia, which is the least prevalent symptom [2]. The physical exam traditionally indicates a “boggy”, larger uterus owing to the combined effects of increased vascularization from ectopic endometrial tissue and smooth muscle proliferation. In contrast to the larger leiomyomata of the uterus, a painful uterus is more prevalent [3]. As the diagnosis of adenomyosis depends on histological testing, the problem is best characterized in women at the time of hysterectomy [4]. Transvaginal ultrasound (TVU) is the primary diagnostic imaging modality for the first workup of adenomyosis, with good sensitivity and specificity [5].
Non-steroidal anti-inflammatory drugs (NSAIDs) and hormonal therapy (oral contraceptive pills, high-dose progestins, a levonorgestrel-releasing intrauterine device, danazol, and gonadotropin-releasing hormone agonists) are commonly used to treat the symptoms of adenomyosis and temporarily induce its regression. But a lot of women require more aggressive sorts of treatment. The most frequent therapy for symptomatic adenomyosis has been hysterectomy. Which is not acceptable in ladies who intend to have [6]. Adenomyosis risk factors: Women in their fourth or fifth decade of age make up 70–80% of those having a hysterectomy for adenomyosis. Adenomyosis risk factors included multiparity, prior abortion, dilatation and curettage, chronic smoking, irregular menstruation, ectopic pregnancy, depression and antidepressant use, and tamoxifen treatment [2,7]. Adenomyosis can be differentiated by polyps, leiomyoma, iatrogenic coagulopathy, malignancy (hyperplasia), and ovulatory dysfunction. In the differential diagnosis, adenomyosis frequently co-occurs with other entities, most frequently leiomyoma (50%), endometriosis (11%), and hyperplasia (7%) [8]. When medication treatment for adenomyosis is unsuccessful, hysterectomy is the only effective surgical option available [9].
One of the most common gynecological procedures performed globally, a hysterectomy is the surgical removal of the uterus. Depending on the rationale, the treatment may also involve the removal of the cervix, ovaries, and fallopian tubes [10]. The aims of this study are to estimate the frequency and identify risk factors of adenomyosis among patients undergoing hysterectomy in BMC.

## Materials and methods

### *Study Design and Setting*

A descriptive case series study was conducted over a one-year period from June 2023 to December 2023 at the Benghazi Medical Center, a major tertiary referral hospital in eastern Libya.


***Received****: 30-09-2025 -* ***Accepted****: 30-11-2025 -* ***Published****: 07-12-2025*

***Ethical Considerations***
This is an observational, non-interventional study. Informed consent was obtained from all cases after explaining the study objectives. Patient confidentiality and anonymity are strictly maintained. Ethical approval and official permission were secured from the relevant institutional authorities before commencing data collection.

***Study Population***
The study includes all women admitted to the Obstetrics and Gynecology Department who undergo hysterectomy, regardless of indication, during the specified study period.

***Sampling Method***
A convenience sampling technique was employed, enrolling all eligible patients who met the inclusion criteria and consented to participate during the study period.

***Sample Size***
The sample size was primarily determined to ensure a statistically acceptable level of precision for estimating the prevalence of Adenomyosis within the study population. A total of 80 women undergoing hysterectomy were included in the study. This sample size was justified using the formula for estimating a single population proportion, which is appropriate for prevalence studies. The formula used is:

$$n = \frac{Z^2 P(1-P)}{d^2}$$

n = Desired sample size, Z= Critical value, and a standard value for the corresponding level of confidence.
P = Expected prevalence, d = Margin of error or precision.

***Inclusion criteria***
Patients admitted during the period of study for hysterectomy due to gynecological causes.

***Exclusion criteria***
Cesarean hysterectomy: patients refuse to participate.

***Data Collection***
Data collected by using a structured data collection form (Performa). Variables were included in this form: cycle pattern, dysmenorrhea, dyspareunia, parity, menorrhagia, hormonal therapy, pelvic pain, C/S, E&C, past medical illness, indication of hysterectomy, type of hysterectomy, and result of histopathology. Information was obtained through direct interviews with the patients preoperatively and supplemented by postoperative follow-up of histopathological results obtained.

***Statistical Analysis***
Version 25 of the Statistical Package for Social Sciences (SPSS) was used to enter and analyze all the data obtained. The data were summarized in tables and figures using descriptive statistics, which include means, standard deviations, frequencies, and percentages. When necessary, inferential statistical techniques were used to identify correlations between variables; a p-value of less than 0.05 was deemed statistically significant.

## Results
Table 1 shows that most women with adenomyosis were in their early to mid-50s. The average age of all participants was about 54 years, with the youngest being 32 and the oldest 82. This indicates that adenomyosis was more common among women in their 50s.

***Table 1. Distribution of age among cases***

| Age | Frequency | Percentage |
|---|---|---|
| 32-36 | 2 | 2.50% |
| 37-41 | 2 | 2.50% |
| 42-46 | 7 | 8.75% |
| 47-51 | 21 | 26.25% |
| 52-56 | 23 | 28.75% |
| 57-61 | 8 | 10.00% |
| 62-66 | 11 | 13.75% |
| 67-71 | 3 | 3.75% |
| >=72 | 3 | 3.75% |
| Total | 80 | 100% |
| Mean = 54.1 | Standard deviation = 8.98434 | Minimum = 32<br>Maximum = 82 |


***Received****: 30-09-2025 -* ***Accepted****: 30-11-2025 -* ***Published****: 07-12-2025*

The most frequent complaint among cases of hysterectomy is heavy menstrual bleeding, while the least common symptoms are dyspareunia (Figure 1).

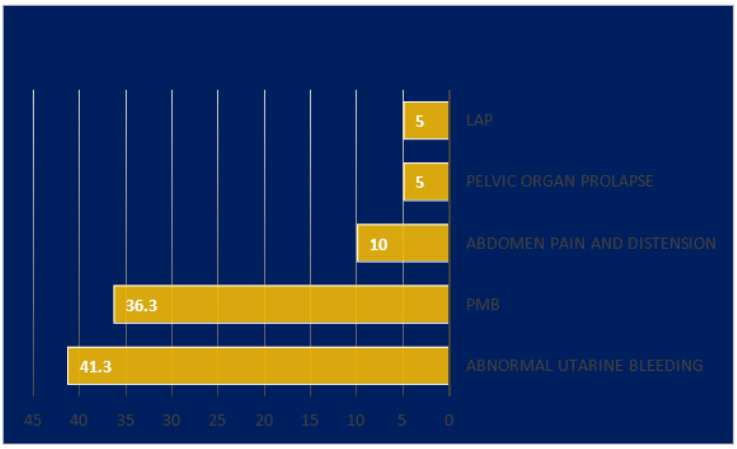


***Figure 1. Distribution of cases according to complaints***

Bleeding disorders predominated, with PMB (27%) and AUB (23%) comprising 50% of cases. Structural pathologies account for 37%: fibroids (22%) and ovarian masses (15%). Minor indications include abnormal D&C results (8%) and prolapse (5%) (Figure 2).

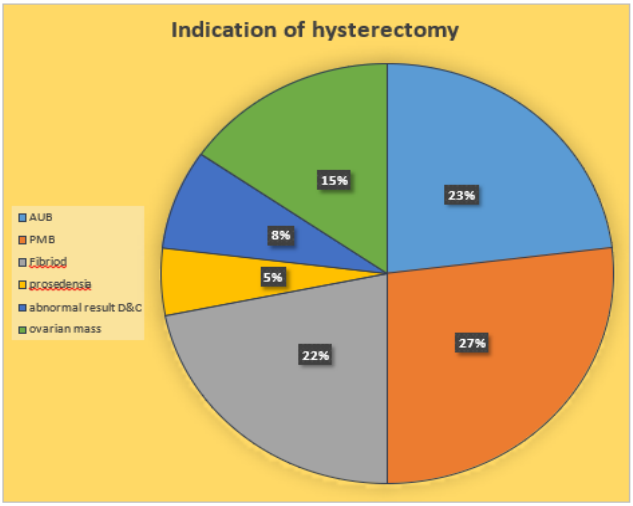


***Figure 2. Distribution of cases according to the indication of hysterectomy***

The TAH&BSO (Total Abdominal Hysterectomy with Bilateral Salpingo-Oophorectomy) represents the overwhelming majority at 85%, indicating the abdominal approach with concurrent ovarian removal as the predominant surgical method. TAH (Total Abdominal Hysterectomy) alone accounts for 11.3% of procedures. Vaginal hysterectomy comprises only 3.8% of cases (Figure 3).

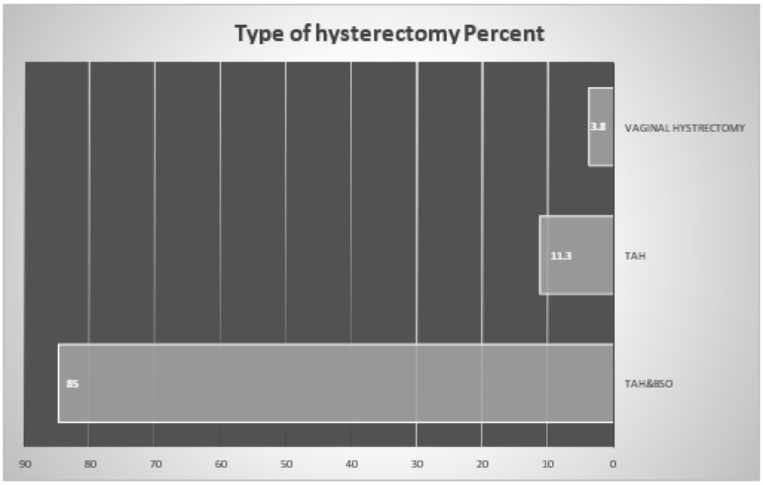


***Figure 3. Distribution of cases according to type of hysterectomy***


***Received****: 30-09-2025 -* ***Accepted****: 30-11-2025 -* ***Published****: 07-12-2025*

Endometrial cancer represents the most prevalent finding at 30%, constituting the primary malignant diagnosis. Adenomyosis accounts for 18.8% of cases, representing benign myometrial pathology. Ovarian cancer and leiomyoma each comprise 16.3%, indicating significant structural and malignant ovarian pathology. Benign endometrium and sarcoma each represented 7.5% and 2.5%, respectively, while benign cervical polyp accounted for another 2.5%. Benign cyst, no result, and cervical cancer each constituted minimal proportions at 1.3% (Figure 4). Figure 5 shows that 40% of cases have adenomyosis result with uterine leiomyoma.

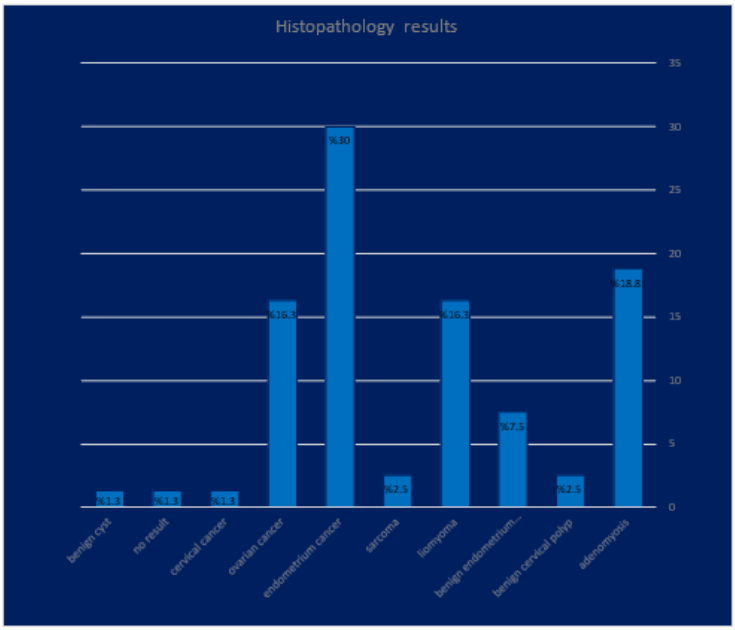


***Figure 4. Distribution of cases according to histopathology results***

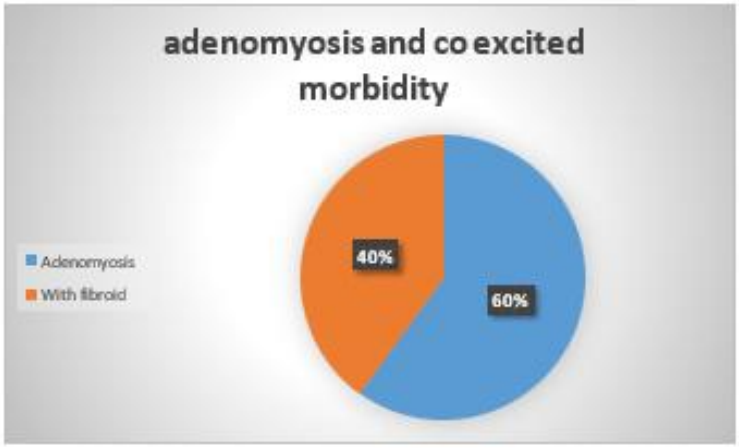


***Figure 5: Percentage of adenomyosis and coexisted morbidity***

Table 2 showed no association between age and adenomyosis result p-value more than 0.05.

***Table 2. Distribution of mean age among cases***

| Group | Mean age | SD | P value |
|---|---|---|---|
| Adenomyosis | 52.93 | 6.72380 | 0.217 |
| Other histopathology results | 55.06 | 8.96026 | |

Table 3 shows a statistically significant difference between parity and adenomyosis p-value less than 0.05.

***Table 3. Distribution of mean parity among cases***

| Group | Mean parity | P value |
|---|---|---|
| Adenomyosis | 4.6 | 0.047* |
| Other histopathology results | 4.0 | |

Table 4 shows that heavy menstrual bleeding, dysmenorrhea, and dyspareunia are not specific clinical features for adenomyosis; there is no statistically significant difference. But the result showed a statistically


***Received****: 30-09-2025 -* ***Accepted****: 30-11-2025 -* ***Published****: 07-12-2025*

significant difference between pelvic pain, hormonal therapy used, and adenomyosis (P-value 0.032 and P-value 0.001, respectively).

***Table 4. Distribution of cases according to heavy menstrual bleeding, dyspareunia, pelvic pain, and hormonal therapy used in both groups***

| Heavy menstrual bleeding | Adenomyosis group | Other histopathology result group | P value |
|---|---|---|---|
| Yes | 14 | 50 | 0.282 |
| No | 1 | 13 | |
| Total | 15 | 63 | |
| Dysmenorrhea | | | |
| Yes | 13 | 48 | 0.501 |
| no | 2 | 15 | |
| Total | 15 | 63 | |
| Pelvic pain | | | |
| Yes | 7 | 48 | 0.032* |
| no | 8 | 15 | |
| Total | 15 | 63 | |
| Hormonal therapy used | | | |
| Yes | 14 | 25 | 0.001* |
| no | 1 | 38 | |
| Total | 15 | 63 | |

Cesarean section, history of E&C, marital status, past medical illness, and pattern of cycle have no statistically significant difference in histopathology results of adenomyosis (P-value 0.536, 0.536, 0.426, 0.216, and 0.539, respectively) (Table 5).

***Table 5. Distribution of cases according to history of cesarean section in both groups***

| H\O Cesarean section | Adenomyosis result | Other result | P-value |
|---|---|---|---|
| Yes | 3 | 19 | 0.536 |
| No | 12 | 44 | |
| Total | 15 | 63 | |
| H\O E&C | | | |
| Yes | 7 | 33 | 0.691 |
| No | 8 | 30 | |
| Total | 15 | 63 | |
| Marital state | | | |
| married | 12 | 55 | 0.426 |
| Single | 3 | 6 | |
| Divorce | 0 | 2 | |
| PMH | | | |
| No medical illness | 9 | 28 | 0.216 |
| DM | 2 | 21 | |
| HTN | 4 | 21 | |
| Thyroid disease | 0 | 5 | |
| Total | 15 | 63 | |
| Menstrual cycle | | | |
| Regular | 4 | 18 | 0.539 |
| Irregular | 6 | 16 | |
| Menopause | 5 | 29 | |
| Total | 15 | 63 | |

## Discussion

This study examined the frequency and associated factors of adenomyosis among 80 women who underwent hysterectomy. The histopathological diagnosis revealed that 19.231% of the cases had adenomyosis, and 40% of them coexisted with uterine leiomyoma, which is consistent with previous literature reporting a prevalence ranging between 20% and 35% in hysterectomy specimens [4]. The presence of endometrial glands and stroma within the myometrium is a characteristic of adenomyosis, a benign gynecological disorder. It usually manifests as dysmenorrhea, pelvic pain, and irregular uterine flow, but the diagnosis is


***Received****: 30-09-2025 -* ***Accepted****: 30-11-2025 -* ***Published****: 07-12-2025*

typically verified after a hysterectomy [4, 11]. Our study demonstrated various demographic, clinical, and other features potentially associated with adenomyosis by comparing women diagnosed histopathologically with adenomyosis to those with other uterine pathologies.

In this study, the average age of patients with adenomyosis was 52.93 ± 6.72 years, whereas the average age of patients without adenomyosis was 55.06 ± 8.96 years. Age did not differentiate people with and without adenomyosis, as the difference was not statistically significant (p = 0.217). This aligns with several previous studies that reported adenomyosis being prevalent in middle-aged women, particularly in those aged 40–55 years, though not exclusively confined to this age group. Hence, while age is considered a risk factor in some literature, our findings do not support a statistically significant association [12].

Our study revealed a statistically significant association between higher parity and adenomyosis (mean parity of 4.6 in the adenomyosis group vs. 4.0 in others; p = 0.047). This supports existing literature suggesting that repeated pregnancies may contribute to myometrial trauma, facilitating the invasion of endometrial tissue into the myometrium. Uterine involution and mechanical disruption of the endometrial-myometrial interface during childbirth might be the underlying mechanisms [13]. Menorrhagia was reported in 14 of 15 patients in the adenomyosis group and 50 of 63 in the non-adenomyosis group. Despite being a common symptom, no statistically significant difference was observed (p = 0.282). This suggests that menorrhagia is not a specific clinical indicator for adenomyosis, as it may also occur in other uterine conditions such as leiomyomas and endometrial hyperplasia. This highlights the diagnostic challenge in differentiating adenomyosis from other gynecological conditions based solely on bleeding patterns.

Dysmenorrhea and dyspareunia were also not significantly associated with adenomyosis (p = 0.501 and 0.443, respectively), although these symptoms are commonly reported in clinical practice. However, pelvic pain was significantly more frequent in the adenomyosis group (p = 0.032). This finding supports the theory that chronic pelvic pain may be more specific to adenomyosis, possibly due to the inflammatory and myometrial contractile responses elicited by ectopic endometrial tissue. Therefore, while not pathognomonic, pelvic pain may serve as a useful symptom in raising clinical suspicion for adenomyosis [14]. A significant proportion of women with adenomyosis reported previous hormonal therapy use (14 out of 15), compared to only 25 out of 63 in the control group, indicating a statistically significant association (p = 0.001). This may reflect either a greater likelihood of symptomatic treatment before hysterectomy in adenomyosis patients or a potential link between hormonal therapy and disease pathogenesis or symptom modulation. However, causality cannot be inferred, and further research is required to elucidate this relationship.

The history of cesarean section was not significantly associated with adenomyosis (p = 0.536), nor was it a history of endometrial curettage (E&C) (p = 0.691). These results contrast with some previous studies suggesting surgical uterine trauma as a contributing factor in adenomyosis development [9, 15]. Our findings indicate that in this population, cesarean section and uterine instrumentation may not be strong independent predictors of adenomyosis. No significant relationship was found between marital status (p = 0.426) or past medical illnesses (such as hypertension, diabetes, or thyroid disease) and adenomyosis (p = 0.216). These findings suggest that demographic factors and comorbidities do not play a major role in the histopathological diagnosis of adenomyosis in this cohort. Similarly, the pattern of the menstrual cycle, whether regular, irregular, or postmenopausal, did not significantly differ between groups (p = 0.539). Although adenomyosis is often considered hormonally dependent and may present differently before and after menopause, our results suggest no clear association with menstrual regularity. In comparison with studies conducted in India, the prevalence of adenomyosis was 16.8%. Most patients were ages 41–46; multiparity was common. 92% of ladies complain of abnormal uterine bleeding, followed by dysmenorrhea and chronic pelvic pain; 60% had no other pathologies. Leiomyoma (15.8%) and endometriosis (13.2%) were the most frequent co-morbidities; endometrial hyperplasia (3.9%) and polyps (2.6%) were less common [16].

## Conclusion

Adenomyosis was identified in 19.2% of women who underwent hysterectomy. Among the clinical presentations, pelvic pain emerged as a notable feature, serving as an important indicator for diagnosis and treatment consideration. The study revealed that several significant risk factors were associated with the condition, including parity and the use of hormonal therapy, suggesting that reproductive history and hormonal interventions may influence the development or progression of adenomyosis.

### *Conflicts of Interest*

The authors declare no conflicts of interest.

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***Received****: 30-09-2025 -* ***Accepted****: 30-11-2025 -* ***Published****: 07-12-2025*

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***Received****: 30-09-2025 -* ***Accepted****: 30-11-2025 -* ***Published****: 07-12-2025*