

Original article

## Evaluation of Risk Factors and Histopathological Patterns in Abnormal Uterine Bleeding: A Retrospective Study from Benghazi

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### Abstract

Abnormal uterine bleeding (AUB) is a common gynecological complaint that affects women of reproductive age and often requires thorough clinical and histopathological evaluation. This retrospective study analyzed the records of 299 female patients admitted to the Gynecology Department at Benghazi Medical Center between January 2021 and December 2024, all were presented with vaginal bleeding and diagnosed with AUB. Demographic data, clinical symptoms, and histopathological diagnoses were reviewed and analyzed. The average patient age was 26.7 years, with 91% under the age of 40. Most participants were from Benghazi (82%), married (91%), and nulliparous (87%). A large majority (87%) had no history of breastfeeding. The most frequently reported symptoms were irregular menstrual bleeding (50.5%) and spotting (39.13%). Less common complaints included postmenopausal bleeding, severe cramps, blood clots, moderate bleeding, and premenopausal bleeding. Histopathological findings were predominantly benign (68%), followed by endometrial polyps (12%), hyperplasia (6%), adenomyosis (5%), and endometrial carcinoma (4%). A statistically significant relationship was found between presenting symptoms and histopathological outcomes. Irregular cycles and spotting were most linked to benign conditions. In conclusion, AUB in this cohort was most common among young, married, nulliparous women with limited breastfeeding history. Benign causes were the predominant diagnosis, and malignancy was rare. The findings underscore the importance of early clinical assessment and appropriate investigation to ensure effective management, particularly in reproductive-aged women, to minimize potential complications and improve outcomes.

**Keywords.** Abnormal Uterine Bleeding, Histopathology, Endometrial Polyps, Hyperplasia, Adenomyosis.

### Introduction

Abnormal uterine bleeding (AUB) represents one of the most common gynecological complaints, accounting for approximately 14-25% of women of reproductive age and serving as a primary reason for gynecological consultations worldwide [1]. This condition is defined as bleeding from the uterine corpus that is abnormal in regularity, volume, frequency, and/or timing in non-pregnant women of reproductive age and has gained significant clinical importance due to its potential association with both benign and malignant pathologies [1]. Abnormal uterine bleeding is a significant clinical challenge in gynecology, affecting women across all reproductive stages. Its multifactorial nature necessitates a comprehensive understanding of underlying mechanisms and clinical manifestations to ensure effective diagnosis and management [2].

The International Federation of Gynecology and Obstetrics (FIGO) has established the PALM-COEIN classification system, which systematically categorizes AUB into structural causes (Polyp, Adenomyosis, Leiomyoma, Malignancy, and hyperplasia) and non-structural causes (Coagulopathy, Ovulatory dysfunction, Endometrial, Iatrogenic, and Not otherwise classified) [3,4]. This classification has revolutionized the diagnostic approach and management strategies for women presenting with uterine bleeding disorders. The understanding of risk factors has evolved significantly, with current research identifying multiple independent predictors including body mass index (BMI), age at menarche, intrauterine device use, diabetes mellitus, polycystic ovary syndrome (PCOS), endometrial thickness, and uterine cavity fluid as significant contributors to the development of endometrial hyperplasia and carcinoma [2].

Recent studies have shown varying prevalence rates of AUB across different populations. A cross-sectional study conducted in Ethiopia found that the magnitude of AUB among reproductive-age women was 24.21% [5]. Among women with AUB, the most common patterns were heavy periods (29.35%), followed by metrorrhagia (23.92%), polymenorrhea (16.30%), oligomenorrhea (13.04%), amenorrhea (7.61%), and intermenstrual bleeding (9.78%) [1]. Current researchers have identified several factors significantly associated with AUB. Studies demonstrated that a history of sexually transmitted infections, anemia, alcohol consumption, and perceived stress levels were significantly associated with abnormal uterine bleeding [2]. Women with a history of sexually transmitted infections had 1.44 times higher odds of developing AUB, while those with a history of anemia had 3.92 times higher odds [2].

The pathophysiology of AUB involves complex interactions between endocrine and immune systems [6]. Normal menstruation requires synchronized spatial and temporal reactions involving endometrial apoptosis, inflammatory mediator influx, and matrix metalloproteinase activation; these mechanisms become disrupted through various pathways [6].

Abnormal uterine bleeding (AUB) is the most encountered gynecological problem, and almost 33 % of women in the Gynecological outpatient department presented with AUB [7,8]. Perimenopause is the transitional period prior to menopause, which may be due to variation in the normal cyclical pattern because of physiological hormonal changes [9,10]. However, most of the cases of AUB in perimenopausal age are of a benign nature without requiring any invasive surgeries [10]. Endometrial biopsy is the preferred modality of investigation to determine the causative pathology of AUB [9]. Histopathologic changes on the endometrium may vary from physiological findings to overt pathologic features in patients with AUB in different populations and age groups. Endometrial carcinomas may clinically present as AUB in 8-50% of cases [8]. However, limited data are available regarding the endometrial patterns seen in perimenopausal women [9]. Recent epidemiological studies have demonstrated varying prevalence rates of AUB across different populations, with structural abnormalities accounting for approximately 81.3% of cases, particularly adenomyosis (33.6%), concomitant adenomyosis and leiomyoma (31.5%), and isolated leiomyoma (14.8%) [11]. This study aims to evaluate the clinical presentation, risk factors, histopathological pattern, and causes of abnormal uterine bleeding among women who were admitted to the Gynecology department at Benghazi Medical Centre and diagnosed to have AUB and elucidate the association between symptoms and histopathological diagnosis. This may help to provide a basis for earlier diagnosis, increased awareness, and improved management strategies at the local healthcare centers.

## Methodology

Ethical clearance was received from the Benghazi Medical Center to conduct a retrospective study at Benghazi Medical Center, Department of Gynecology, Benghazi, Libya.

Data were collected from records of all patients who were confirmed to have abnormal uterine bleeding in the period between January 2021 and December 2024. The collected data involved general demographic information such as age, marital status, and parity. Other data included: associated symptoms, histopathological diagnosis, and previous gynecological history. Cases with medical conditions affecting bleeding (e.g., thyroid disorder, liver disease) or pregnancy-related causes (e.g., current pregnancy, recent abortion or ectopic pregnancy) were excluded.

The data was analyzed and presented using Microsoft Excel version 2017. Correlation between symptoms and histopathological diagnosis was analyzed using the Chi-square test by IBM SPSS Statistics (Version 21), with a P-value less than 0.005 considered significant.

## Results

### General and demographic information

(Table 1) summarizes the demographic and general information of the study cases. A total of 299 patients' records were collected; the mean age was 26.7 years, with most cases (91%, n=272) below 40 years and only 9% (n=27).

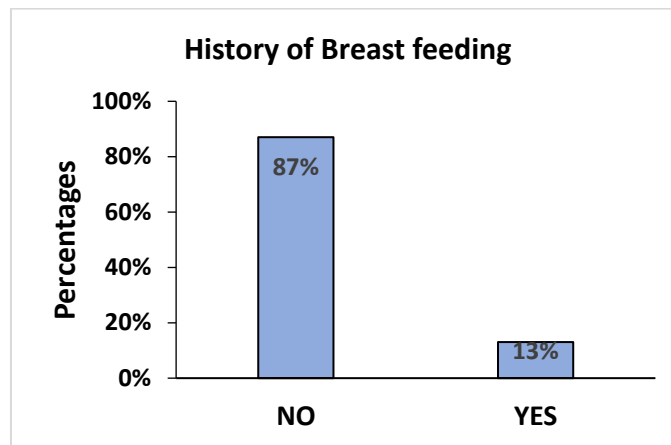
Regarding the area of residency, the majority (82%) of the total cases were from Benghazi, and the rest were from villages around Benghazi. In relation to the marital and parity status, the results showed that the majority of patients were married (91%), and others were single (4%), divorced (3%), and widows (2%) of the total study sample. On the other hand, most of the cases (87%) were marked as "nulliparous," which might mean they haven't given birth. According to records, about 8% of cases were referred to have less than 4 children, and only 3% were referred to have more than 4 children. Overall, the group is mostly young, from Benghazi, and nulliparous (Table 1).

**Table 1 Distribution of age, marital status, and parity of the study cases**

| Total number of cases: 299            |                     |               |
|---------------------------------------|---------------------|---------------|
| Demographic and obstetric information | Number of cases (n) | Frequency (%) |
| <b>Age group:</b>                     |                     |               |
| Below 40 years old                    | 272                 | 91 %          |
| Above 40 years old                    | 27                  | 9 %           |
| <b>Marital status:</b>                |                     |               |
| Single                                | 13                  | 4%            |
| Married                               | 271                 | 91%           |
| Divorced                              | 10                  | 3%            |
| Widow                                 | 5                   | 2%            |
| <b>Parity:</b>                        |                     |               |
| Nulliparous                           | 261                 | 87%           |
| Less than 4                           | 24                  | 8%            |
| More than 4                           | 10                  | 3%            |

### History of breastfeeding

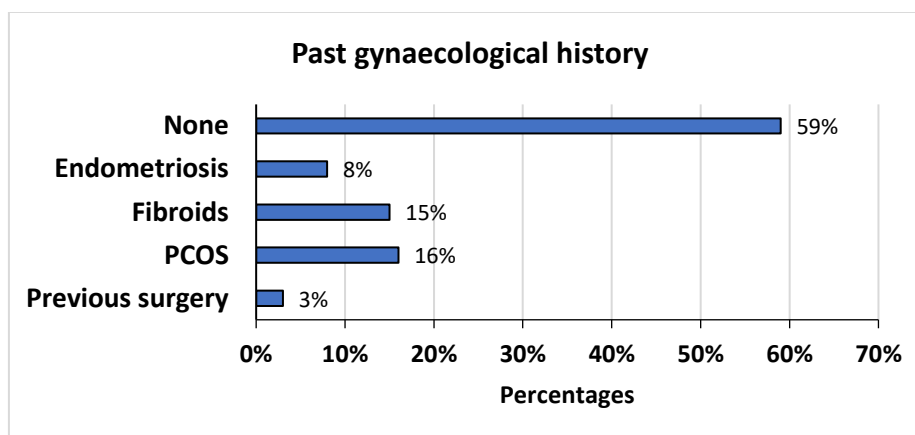
Out of the total group, 261 cases (87%) were not breastfeeding mothers, while 38 people (13%) said they were breastfed (Figure 1).



**Figure 1. Distribution of cases according to breastfeeding state**

### Past gynecological history

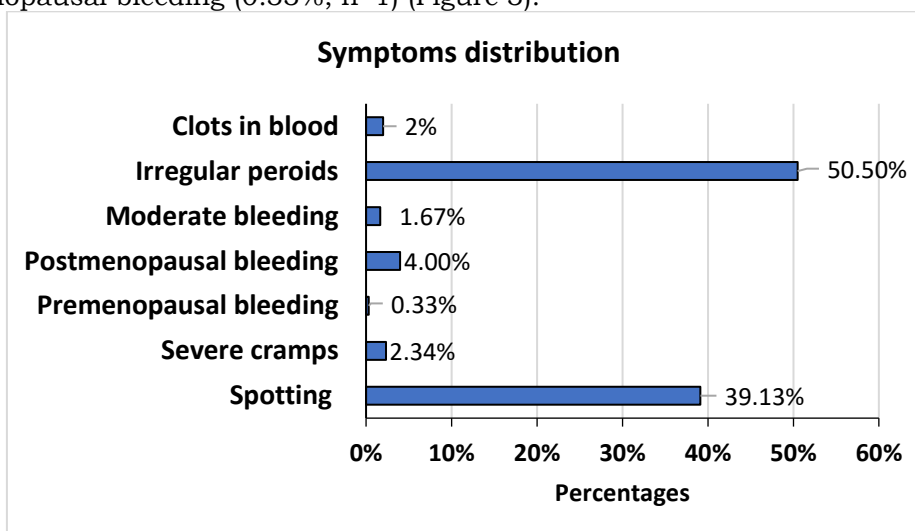
Most cases (59%, n=175) had insignificant past gynecological history as described in the records. About 16% (n=49) had Polycystic Ovary Syndrome (PCOS); fibroids were recorded in 44 cases (15%), endometriosis in 23 cases (8%), with a history of previous surgery in 8 cases (3%) (Figure 2).



**Figure 2. Distribution of the cases according to past gynecological history in hospital records**

### Symptoms distribution

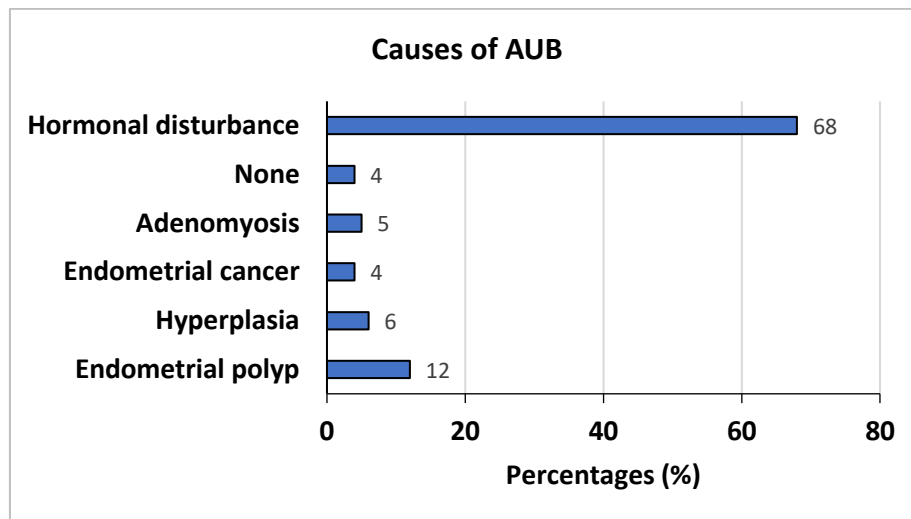
In this study, it was observed that the most frequently reported clinical symptoms were irregular menstrual bleeding (50.5%, n=151) and spotting (39.13%, n=117), followed by other symptoms: postmenopausal bleeding (4.01%, n=12), severe cramps (2.34%, n=7), blood clots (2.01%, n=6), moderate bleeding (1.67%, n=5), and premenopausal bleeding (0.33%, n=1) (Figure 3).



**Figure 3. Distribution of the symptoms according to patients' records**

### Etiology and Histopathological Diagnosis

According to histopathological results of 299 patients' records, endometrial polyps were diagnosed as a cause of AUB in 36 cases (12%), whereas endometrial hyperplasia in 19 cases (6%), and adenomyosis in 15 cases (5%). Endometrial carcinoma was found only in 12 cases (4%), and non-specific endometrial changes were recorded in 13 cases (4%). However, the most common cause of AUB was diagnosed as hormonal disturbance, which was observed in 204 case records (68%) that had either normal or no histopathological results (Figure 4).



**Figure 4. Distribution of the registered causes of AUB in the study sample**

A chi-square test of independence was conducted to assess the association between presented symptoms and histopathological diagnoses. The results revealed a statistically significant association between the type of symptom and the histopathological findings ( $p = 0.002$ ); however, the linear-by-linear association was not statistically significant ( $p = 0.394$ ), indicating no clear linear trend. Correlation between the presenting symptoms and histopathological diagnosis was also examined (Table 2). The most obvious correlation was that benign causes are presented mostly by irregular cycle ( $n=108$ ), followed by spotting ( $n= 89$ ).

**Table 2. The association between the presenting symptoms and the histopathological diagnosis of AUB, namely the benign histopathological finding with irregular period and spotting. The Chi-square test revealed a statistically significant association (\*\* $p < 0.005$ )**

| Symptom                 | Adenomyosis | Benign | Endometrial carcinoma | Hyperplasia | None | Polyp | Total |
|-------------------------|-------------|--------|-----------------------|-------------|------|-------|-------|
| Clots in blood          | 2           | 1      | 0                     | 1           | 1    | 1     | 6     |
| Irregular periods       | 4           | 108    | 4                     | 8           | 8    | 19    | 151   |
| Moderate bleeding       | 2           | 0      | 0                     | 0           | 0    | 3     | 5     |
| Postmenopausal bleeding | 2           | 5      | 1                     | 1           | 0    | 3     | 12    |
| Premenopausal bleeding  | 0           | 1      | 0                     | 0           | 0    | 0     | 1     |
| Severe cramps           | 1           | 0      | 2                     | 2           | 1    | 1     | 7     |
| Spotting                | 4           | 89     | 5                     | 7           | 3    | 9     | 117   |
| Total                   | 15          | 204    | 12                    | 19          | 13   | 36    | 299   |

### Discussion

In the present study, we showed the highest prevalence of abnormal uterine bleeding (AUB) among women aged less than 40 years. This finding is partially consistent with the study conducted in Uganda [12], which reported that the majority of AUB cases, in absolute numbers, occurred among women aged 20–39 years. This may reflect the increased occurrence of anovulatory cycles and hormonal imbalances commonly seen in this age group, making them more vulnerable to abnormal uterine bleeding.

Records showed that the vast majority of patients with uterine bleeding were married (91%), while a relatively small percentage were single, divorced, or widowed. This high percentage suggests a possible relationship between marriage and increased exposure to factors that influence menstrual disorders, such as childbirth, breastfeeding, and the use of hormonal contraceptives, all of which may contribute to changes in the uterine lining. This finding is consistent with studies conducted in countries with a similar social profile. In Ethiopia, approximately (84%) of women with AUB were found to be married, as was the case in the Kombolcha study [13]. This supports the idea that married women are more likely to experience bleeding symptoms.

The results of the study showed that 87% (261 cases) of women with AUB had no history of breastfeeding, while 13% (38 cases) had a history of breastfeeding. This finding indicates a potential association between

breastfeeding and a reduced prevalence of uterine bleeding disorders. These findings are consistent with those reported by Adra *et al.* [14], who demonstrated that breastfeeding causes significant hormonal changes, most notably increased prolactin level, which suppresses the hypothalamic-pituitary axis, and reduces the secretion of gonadotropins such as FSH and LH, and inhibiting ovulation. This phenomenon, known as lactational amenorrhea, represents a temporary physiological protection against uterine bleeding [14]. On the other hand, the same study indicated that breastfeeding women were less likely to develop conditions such as adenomyosis and polyps, which are classified as important structural causes of bleeding according to the FIGO (PALM-COEIN) system, which may explain the lower incidence of AUB among women with a breastfeeding history in our study.

Analysis of past gynecological history revealed that the majority of participants had no previous gynecological conditions. Among those with prior conditions, polycystic ovary syndrome (PCOS) was the most frequently reported at approximately 16%, followed by uterine fibroids (15%) and endometriosis (8%), with only a minor proportion reported undergoing previous gynecologic surgery (3%). These findings suggest a relatively low burden of chronic gynecologic disease among the studied population, which may be partially explained by the relatively young average age (mean age 26.7 years) of participants. PCOS, being the most prevalent condition, aligns with its well-established high prevalence among reproductive-age women globally, typically ranging between 5% and 20% depending on diagnostic criteria used [15].

When comparing our findings to other studies, a similar pattern was observed in the work of Sun *et al.* [16], who conducted a cross-sectional analysis among 1053 women and have shown that abnormal uterine bleeding is commonly caused by ovulatory dysfunction (including PCOS), which accounts for the majority of cases (57.7%), followed by structural abnormalities such as uterine fibroids and endometrial polyps. Their findings reinforce our observation that PCOS is often the predominant gynecological issue in younger populations [16]. However, the slightly higher prevalence rates in their study could be attributed to differences in population size, geographical health disparities, or varying awareness and diagnostic accessibility. Thus, our findings are largely consistent with international trends, particularly concerning the prevalence of PCOS. However, regional variations and healthcare system differences may influence the relative prevalence of other conditions such as fibroids and endometriosis, warranting further investigation and public health efforts to improve early detection and management.

We also looked at the symptoms that were reported by women to find out which ones are the most common. We studied 299 cases and grouped symptoms into seven types. The most common symptom was irregular periods, seen in about 50 % of the women, followed by spotting in 39 %. Spotting between periods can be due to ovulation, birth control, or issues like endometrial hyperplasia or cervical problems. These results highlight the need for regular check-ups, hormone tests, and personalized care for women with menstrual problems. The most common diagnosis was hormonal endometrial changes, observed in 68%, indicating that most AUB cases are non-malignant. These benign findings often represent hormonal imbalance or normal cyclic patterns. However, the second most frequent finding was endometrial polyps, diagnosed in 12% as a cause of AUB. Polyps are focal overgrowths of endometrial tissue and are commonly associated with intermenstrual bleeding or prolonged menses, whereas adenomyosis was found in 5% of the cases, particularly in women aged 35 and above, presenting with heavy or painful menstruation.

Endometrial hyperplasia appeared in 6% of the cases, which may be a precursor to endometrial carcinoma, especially when atypical. However, endometrial carcinoma was diagnosed in 4% of our sample, highlighting the necessity of histological evaluation, especially in postmenopausal women or those with risk factors. On the other hand, 4% showed no histopathological abnormality, which may be due to hormonal causes or limitations in sampling technique. These findings align with previous literature. In a review by Benetti-Pinto *et al.* [17], structural causes of AUB, such as polyps, adenomyosis, and malignancy, were emphasized as major contributors to abnormal bleeding patterns [17]. The same study supported the FIGO PALM-COEIN classification, which allows for accurate diagnosis and standardized reporting [3].

## Conclusion

In conclusion, benign pathologies represent most AUB cases, but the identification of premalignant and malignant lesions, even in smaller proportions, underscores the critical role of histopathological assessment in the clinical workup of AUB.

**Conflict of interest.** Nil

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