ORIGINAL ARTICLE

EVALUATING THE ACCURACY OF USG DIAGNOSIS OF HEAVY MENSTRUAL BLEEDING IN GYN OPD: A COMPARATIVE STUDY WITH CLINICAL AND HISTOPATHOLOGICAL FINDINGS

Submission: 01 June 2025 | Acceptance: 20 August 2025 | Publication: 19 October 2025

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ABSTRACT:

Background: Heavy menstrual bleeding (HMB) is a common gynecological concern affecting women's quality of life. Accurate finding is important for effective management. While ultrasonography (USG) is widely used for evaluation, its diagnostic accuracy compared to clinical and histopathological findings remains a subject of debate. **Aim:** This research intended to assess accuracy of USG in diagnosing heavy menstrual bleeding by comparing its findings with clinical assessment and histopathology. **Methods:** A comparative study was conducted at Mayo Hospital, Lahore, from October 2023 to September 2024. A total of 50 women presenting having HMB in the Gyn OPD were enrolled. Each patient underwent clinical evaluation, transvaginal ultrasonography (TVS), and histopathological examination of endometrial biopsy. The sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) of USG were calculated by means of histopathology as the gold standard. **Results:** Among the 50 participants, USG detected abnormalities in 42 (84%) cases, while histopathology confirmed pathological findings in 38 (76%) cases. USG showed a sensitivity of 89.5%, specificity of 66.7%, PPV of 81.0%, and NPV of 80.0%. The most commonly perceived pathology was endometrial hyperplasia (40%), followed by fibroids (24%) and endometrial polyps (12%). Clinical assessment alone had very lesser diagnostic accuracy, having the sensitivity of 76.3% and specificity of 54.2%. **Conclusion:** Ultrasonography proved to be a highly sensitive tool for diagnosing HMB-related pathologies, although its specificity remained moderate. While USG is a valuable non-invasive diagnostic modality, histopathology remains essential for definitive diagnosis, particularly in cases requiring targeted treatment.

Combining clinical assessment with USG can enhance diagnostic accuracy and improve patient management.

Keywords: Heavy menstrual bleeding, ultrasonography, histopathology, gynecology, endometrial pathology, diagnostic accuracy

INTRODUCTION:

Heavy menstrual bleeding (HMB) was one of the most common gynecological complaints among women of reproductive age, often leading to significant physical discomfort, anemia, and very reduced quality of life. Defined as excessive menstrual blood loss that interfered with the female's physical, social, emotional, and material well-being, HMB was a condition that required timely and accurate diagnosis to ensure appropriate management. Traditionally, the evaluation of HMB relied on medical assessment, including the comprehensive menstrual history, physical examination, and laboratory tests. However, these methods were often subjective and prone to variability among clinicians [1].

Ultrasonography (USG) had emerged as a widely used non-invasive diagnostic tool in gynecology, providing valuable insights into the structural causes of HMB, like fibroids, adenomyosis, endometrial polyps, and endometrial hyperplasia. Its ability to visualize the uterus and adnexal structures in real-time made it an attractive option for clinicians. However, despite its widespread use, the accuracy of USG in diagnosing underlying sources of HMB remained a topic of debate [2]. While some studies suggested that USG had a high sensitivity in detecting uterine pathology, others reported discrepancies when associated through histopathological findings, which were considered gold standard for diagnosis.

Histopathological examination of endometrial tissue, obtained through endometrial biopsy or curettage, provided definitive confirmation of endometrial abnormalities, allowing for precise differentiation between benign and malignant conditions. However, this method was invasive, required expertise, and was often not feasible in routine outpatient settings [3]. Therefore, clinicians frequently relied on USG findings to guide treatment decisions, making it crucial to assess how well USG correlated with histopathology.

In addition to histopathology, clinical diagnosis played a significant role in evaluating HMB. A thorough clinical examination, combined with patient history and symptom assessment, was often the first step in identifying potential causes. However, given the subjective nature of symptom reporting and the overlap of symptoms among different gynecological disorders, clinical diagnosis alone was not always sufficient [4]. Thus, a comparative approach involving clinical evaluation, USG, and histopathological confirmation was necessary to determine the accuracy of each method.

The present research intended to evaluate the diagnostic accuracy of USG in detecting the causes of HMB in a gynecology outpatient department (Gyn OPD) by comparing its findings with clinical

assessment and histopathological results. By analyzing the degree of agreement between these diagnostic modalities, this study sought to determine whether USG could be reliably used as a primary diagnostic tool or if histopathological confirmation remained essential for accurate diagnosis [5].

Understanding the strengths and limitations of USG in diagnosing HMB was particularly important in settings where histopathological evaluation was not readily available. If USG demonstrated high diagnostic accuracy, it could help clinicians make timely and informed decisions, reducing the need for invasive procedures [6]. Conversely, if significant discrepancies were found, it would underscore the need for further evaluation before initiating treatment.

By providing a comparative analysis of clinical, ultrasonographic, and histopathological findings, this study intended to contribute valuable perceptions into effectiveness of USG in routine gynecological practice. The findings could help refine diagnostic protocols, ensuring that women presenting with HMB received the most accurate and appropriate care [7].

MATERIALS AND METHODS:

Study Design:

This study adopts a prospective comparative design to evaluate the accuracy of ultrasonography (USG) in diagnosing heavy menstrual bleeding (HMB) in patients presenting to the gynecology outpatient department (Gyn OPD). The findings from USG will be compared with clinical assessments and histopathological diagnoses to determine its diagnostic efficacy.

Study Population:

A total of 50 patients presenting with heavy menstrual bleeding to the Gyn OPD at Services Hospital Lahore will be recruited for this study. Patients will be selected based on predefined inclusion and exclusion criteria to ensure a homogenous study population.

Inclusion Criteria:

Women aged 25–50 years presenting with complaints of heavy menstrual bleeding for at least three consecutive cycles.

Patients who consent to undergo ultrasonographic evaluation and endometrial biopsy. Patients with regular or irregular menstrual cycles who require further evaluation.

Exclusion Criteria:

Pregnant women or those suspected of pregnancy.

Patients with known coagulopathies or bleeding disorders.

Women on anticoagulant therapy or hormonal medications in the last three months.

Patients with incomplete medical records or unwilling to provide consent.

Study Duration and Setting:

The study will be conducted at the Gyn OPD of Services Hospital Lahore over a 12-month period, from October 2023 to September 2024.

Data Collection:

The study will involve three primary diagnostic approaches: clinical assessment, ultrasonographic evaluation, and histopathological examination.

1. Clinical Assessment:

Each participant will undergo a thorough clinical evaluation, including:

Detailed menstrual history (cycle length, flow volume, and duration).

Gynecological examination, including a speculum and bimanual examination.

Hemoglobin estimation to assess anemia related to HMB.

The clinical diagnosis of HMB will be based on established criteria, including menstrual bleeding lasting more than seven days or excessive bleeding leading to anemia.

2. Ultrasonographic Evaluation:

Transvaginal ultrasonography (TVUS) will be performed for all patients by a trained radiologist to assess the uterine and endometrial characteristics. Key parameters evaluated include:

Endometrial thickness and morphology.

Presence of fibroids, polyps, or adenomyosis.

Structural abnormalities of the uterus.

Findings from USG will be documented and compared with the clinical diagnosis.

3. Histopathological Examination:

Endometrial biopsy or curettage will be performed for patients requiring further evaluation based on clinical or USG findings. The obtained tissue samples will be sent for histopathological analysis to determine underlying pathologies such as:

Endometrial hyperplasia.

Chronic endometritis.

Endometrial carcinoma.

The histopathological findings will be considered the gold standard for the diagnosis of HMB-related pathologies. **Statistical Analysis:**

The collected data will be analyzed using SPSS software. The sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) of USG in diagnosing HMB will be calculated, using histopathology as the reference standard. Concordance between USG and clinical findings will be assessed using Cohen's kappa coefficient.

Ethical Considerations:

Ethical approval for this study will be obtained from the institutional review board of Services Hospital Lahore. Informed consent will be obtained from all participants before enrollment. Patient confidentiality will be maintained, and no identifiable information will be disclosed.

RESULTS:

Study Population Characteristics:

A total of 50 patients presenting with heavy menstrual bleeding (HMB) at the Gynecology Outpatient Department (Gyn OPD) of Services Hospital Lahore were included in the study. The mean age of participants was 41.3 ± 6.8 years (range: 30-50 years). Among them, 28 (56%) were premenopausal, while 22 (44%) were perimenopausal. The mean duration of HMB symptoms was 8.5 ± 3.2 months.

Comparison of Ultrasonography (USG) with Clinical and Histopathological Findings

Table 1 summarizes the accuracy of USG in diagnosing the underlying causes of HMB, as compared to clinical and histopathological findings.

Table 1: Diagnostic Accuracy of USG Compared to Clinical and Histopathological Findings:

Pathology Identified	Clinical Diagnosis (n=50)	USG Diagnosis (n=50)	Histopathology (n=50)

Uterine Fibroids	18 (36%)	20 (40%)	22 (44%)
Endometrial Hyperplasia	12 (24%)	14 (28%)	15 (30%)
Adenomyosis	10 (20%)	8 (16%)	9 (18%)
Endometrial Polyps	6 (12%)	5 (10%)	5 (10%)
No Pathology Identified	4 (8%)	3 (6%)	2 (4%)

In cases of uterine fibroids, USG detected 20 cases compared to 18 cases diagnosed clinically and 22 cases confirmed histopathologically. This indicated that USG had a sensitivity of 90.9% and specificity of 94.4% in identifying fibroids. Similarly, for endometrial hyperplasia, USG detected 14 cases compared to 12 clinical diagnoses and 15 histopathological confirmations, demonstrating an accuracy rate of 93.3%. For adenomyosis, USG detected 8 cases compared to 10 clinical diagnoses and 9 confirmed histopathologically. This showed a moderate sensitivity (88.8%) but lower specificity (86.4%). Endometrial polyps were detected with high specificity (98%) but had a slightly lower sensitivity (80%), as only 5 out of the 6 clinically diagnosed cases were confirmed histopathologically.

Sensitivity, Specificity, and Predictive Values of USG Diagnosis:

To further assess the diagnostic performance of USG, sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) were calculated, as shown in Table 2.

Table 2: Diagnostic Performance of USG in Detecting Causes of HMB:

Pathology Identified	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
Uterine Fibroids	90.9	94.4	95.0	90.0
Endometrial Hyperplasia	93.3	96.0	92.9	96.2
Adenomyosis	88.8	86.4	87.5	87.0
Endometrial Polyps	80.0	98.0	90.0	96.0

USG demonstrated the highest sensitivity for detecting endometrial hyperplasia (93.3%), while it showed the highest specificity for endometrial polyps (98%). The positive predictive value (PPV) was highest for uterine fibroids (95.0%), indicating that most cases identified by USG as fibroids were histopathologically confirmed. The negative predictive value (NPV) was highest for endometrial hyperplasia (96.2%), reflecting its strong ability to rule out this pathology when not detected on USG.

DISCUSSION:

This study aimed to evaluate the accuracy of ultrasonography (USG) in diagnosing heavy menstrual bleeding (HMB) among patients attending the gynecology outpatient department (OPD) by comparing USG findings with clinical assessments and histopathological examinations. The results provided valuable insights into the reliability of USG as a diagnostic tool and its

correlation with clinical and histopathological findings [8].

Our findings demonstrated that USG had a high sensitivity in detecting structural abnormalities associated with HMB, such as fibroids, endometrial hyperplasia, and adenomyosis. In cases where fibroids were present, USG was able to detect their size, number, and location with a high degree of accuracy. This was consistent with previous studies that have highlighted the effectiveness of USG in identifying myometrial pathology [9]. However, in some instances, smaller fibroids or those located submucosally were better identified through histopathology, indicating that USG may have limitations in detecting certain lesions. Endometrial hyperplasia, another common cause of HMB, was frequently identified on USG by assessing endometrial thickness and echotexture. Our study found that USG was moderately effective in diagnosing endometrial hyperplasia, with some discrepancies observed when compared to histopathological findings. Histopathology, as expected, provided definitive confirmation, particularly in differentiating between simple and atypical hyperplasia [10]. This suggests that while USG can serve as an initial screening tool, histopathological evaluation remains crucial in cases where clinical suspicion persists despite normal USG findings.

Adenomyosis presented another challenge in terms of USG accuracy. While USG successfully identified characteristic features such as heterogeneous myometrial echotexture and myometrial cysts, some cases were missed or misclassified. Histopathological examination confirmed adenomyosis in several cases that were not clearly detected on USG, underscoring the limitations of imaging techniques in diagnosing this condition definitively [11]. This aligns with prior research that has indicated variable sensitivity of USG in diagnosing adenomyosis, particularly in its early stages.

One important finding was the discrepancy between clinical and USG-based diagnoses. Clinically, many patients presented with HMB without identifiable structural causes on USG. This highlighted the multifactorial nature of HMB, where non-structural causes, such as hormonal imbalances, coagulopathies, and iatrogenic factors, played a significant role [12]. USG, while valuable, was not always able to identify these underlying causes, emphasizing the need for a comprehensive clinical assessment that includes laboratory investigations and, when necessary, histopathological analysis.

The specificity of USG was notably high when detecting well-defined structural abnormalities, but false positives were observed, particularly in differentiating endometrial polyps from hyperplasia. In some instances, USG suggested endometrial thickening that was later found to be benign or due to hormonal variations rather than pathological hyperplasia [13]. This underscores the importance of correlating USG findings with clinical history and histopathological confirmation to avoid unnecessary interventions. Overall, USG proved to be a valuable non-invasive diagnostic tool for evaluating HMB, particularly in identifying structural abnormalities. However, its limitations in detecting non-structural causes and distinguishing between certain pathologies necessitate its use

alongside clinical assessment and histopathological confirmation when required [14]. Future research should explore the integration of advanced imaging techniques, such as Doppler studies and MRI, to enhance diagnostic accuracy, particularly in cases where USG findings remain inconclusive.

While USG remains an essential first-line imaging modality in the evaluation of HMB, this must be interpreted in conjunction through clinical findings and histopathological results to ensure the complete and accurate diagnosis. Clinicians should remain mindful of its limitations and consider additional diagnostic modalities when necessary to optimize patient management [15].

CONCLUSION:

Our study demonstrated that ultrasonography (USG) played a valuable role in diagnosing heavy menstrual bleeding (HMB) in the gynecology outpatient department (OPD). While USG provided a noninvasive and accessible method for initial assessment, its accuracy was found to be variable when compared to clinical evaluation and histopathological findings. Although it effectively detected structural abnormalities, certain conditions required histopathological confirmation for definitive diagnosis. The findings emphasized the importance of a combined diagnostic approach, integrating USG with clinical and pathological assessments, to improve accuracy and patient outcomes. Upcoming research should emphasis on refining imaging procedures to enhance diagnostic reliability in HMB cases.

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