**REVIEW OF LITERATURE**

**Liu Z et al., (2007)35** conducted a systematic review of the medical literature to evaluate the impact of abnormal uterine bleeding (AUB) on health related quality of life (HRQoL) and to quantify the economic burden of AUB from a societal perspective. The search yielded 1009 English- language articles. Ninety-eight studies (including randomized controlled trials, observational studies, and reviews) that met the inclusion and exclusion criteria underwent a full-text review. The prevalence of AUB among women of reproductive age ranged from 10% to 30%. The HRQoL scores from the 36-item Short-Form Health Survey Questionnaire (SF-36) suggested that women with AUB have HRQoL below the 25th percentile of that for the general female population within a similar age range. The conservatively estimated annual direct and indirect economic costs of AUB were approximately $1 billion and $12 billion, respectively. The burden of AUB needs further and more thorough investigation. Additional research should prospectively evaluate the impact of AUB and the value of treatment provided to help guide future health resource allocation and clinical decision-making.

**Bhosle A and Fonseca M (2010)36** did a study to evaluate clinically the gynaecological causes of abnormal uterine bleeding in perimenopausal women and to correlate clinical evaluation with ultrasonographic and histopathological examination. Retrospective study of 112 perimenopausal women with abnormal uterine bleeding for a period of 6 months. These women were evaluated and clinical, ultrasonographic and histopathological findings were correlated. The major symptom with which the women presented was menorrhagia in 53.3%. All these women underwent D and C followed by medical management or hysterectomy depending upon the diagnosis. The HPE of endometrium was analysed. The HPE of uterus confirmed fibroid uterus and DUB correlated well with ultrasonographic and histopathological examination. Clinical as well as USG proved less useful for diagnosing adenomyosis.

**Doraiswami S et al., (2011)** conducted a study to analyze the histopathology of the endometrium and identify the causes of abnormal uterine bleeding (AUB) across different age groups. The study was carried out at Sri Ramachandra Medical College and Research Institute, Chennai, India, involving 620 patients who presented with AUB between June 2005 and June 2006. Out of these, 409 cases with isolated endometrial lesions diagnosed by histopathology were included in the final analysis. Statistical analysis using the chi-square test was performed to assess the relationship between age and specific endometrial causes. The most common age group with AUB was 41–50 years (33.5%), with the predominant finding being a normal cycling endometrium (28.4%). The most frequent pathology across all age groups was a disordered proliferative pattern (20.5%). Other identified causes included pregnancy-related complications (22.7%), benign endometrial polyps (11.2%), endometrial hyperplasia (6.1%), endometrial carcinoma (4.4%), and chronic endometritis (4.2%). The study found a statistically significant association between age and endometrial pathology (P < 0.05). In perimenopausal women, AUB was most commonly of dysfunctional origin, while in reproductive-aged women, pregnancy complications should be considered first. The high incidence of disordered proliferative patterns suggests early presentation of these patients.

**Khan S et al., (2011)** studied the histopathological patterns of the endometrium in patients with abnormal uterine bleeding (AUB) at Madina Teaching Hospital. The study included patients who presented to the outpatient department with AUB, and after meeting specific inclusion and exclusion criteria, they underwent a detailed history taking, physical and gynecological examinations, pelvic ultrasound, and diagnostic D&C. Endometrial biopsy samples were sent for histopathological analysis in the hospital's pathology department. Data was collected over 18 months and analyzed using SPSS version 15. The most common histopathological finding was proliferative phase endometrium (46.4%), followed by secretory phase endometrium (37.6%). Other findings included cystic (5.2%), adenomatous (3.8%), and atypical (3.6%) hyperplasia, which together accounted for 12.6% of cases. Endometritis was found in 1.4% of cases, atrophic endometrium in 1%, polyps in 0.6%, and endometrial carcinoma in 0.4%. The study concluded that the histopathological patterns in patients with AUB varied widely, regardless of age, parity, or ethnicity.

**Forae GD and Aligbe JU (2013)** conducted a study aimed to examine the frequency and histological patterns of endometrial lesions in women with abnormal uterine bleeding (AUB) in Benin City, Nigeria. The study reviewed archived H&E-stained slides of endometrial biopsies from the Ashamas Foundation Histopathology Diagnostic Center over a 10-year period. The researchers analyzed clinical data, diagnoses, and biopsy types, and the results were entered into Microsoft Excel and analyzed using SPSS software for descriptive statistics. A total of 231 endometrial lesions were identified, with 207 cases (89.6%) occurring in reproductive and perimenopausal women, and 24 cases (10.4%) in postmenopausal women. The age range of patients was 17 to 86 years, with the highest incidence occurring in the fourth decade, and a mean age of 38.8 years. Among the lesions, the most common finding in reproductive and premenopausal women was product of conception (27.7%, 64/231 cases), while complex endometrial hyperplasia was the most frequent lesion in postmenopausal women (2.6%, 6/231 cases). The study concluded that the histopathological patterns of endometrial lesions in women with AUB varied, with product of conception being most common in reproductive-aged women and endometrial hyperplasia more frequently observed in perimenopausal women.

**Gupta A et al., (2013)37** studied the causes of abnormal uterine bleeding in perimenopausal women and to correlate their clinical evaluation with ultrasonographic and histopathological examination. The age, parity, menstrual complaints of these patients were noted and clinical diagnosis and ultrasonography were analysed. Finally, histopathology report of the hysterectomy specimen was correlated with the clinical profile of the patient and ultrasonographic findings. Maximum frequency of abnormal uterine bleeding was seen in the age group 40-45 years. Most of the patients were para 3. Menorrhagia was the commonest complaint and fibroid uterus was responsible for abnormal uterine bleeding in 53% of women. Out of 39 women labelled clinically as dysfunctional uterine bleeding, 8 patients were diagnosed with fibroid uterus on ultrasound and in rest of the 31 patients, no organic cause was found. Out of these 31 patients, 4 patients were diagnosed to have adenomyosis on histopathology and in rest, no gross pathology was detected. Suspected malignancy in all the 3 patients was confirmed on histopathology. Simple endometrial hyperplasia without atypia was present in 19% patients. Clinical, radiological and pathological evaluation correlated well to diagnose fibroids, however clinically as well as ultrasound proved to be of little help in diagnosing adenomyosis.

**Qureshi FU and Yusuf AW (2013)41** conducted a descriptive cross-sectional study comprised of non-gravid women of reproductive age with unpredictable, excessive duration, abnormal volume, and/or abnormal frequency of menses for at least 3 months coming to the outpatient department. The subjects underwent structured history, physical examination and pelvic ultrasonography. Endometrium and hysterectomy specimen were obtained for histopathology where applicable. Possible underlying causes were categorised according to the new classification system. A total of 2109 women comprised 19.6% of total of the 10712 woman who visited the gynecological outpatients clinic, 2109 (19.6%) had abnormal uterine bleeding. PALM-COEIN categorization done in 991(47%) cases that showed 30 (3%) polyp, 15 (15%) adenomyosis, 250 (25%) leiomyoma, 66 (6.6%) malignancy and hyperplasia, 3 (0.3%) coagulopathy, 236 (24%) ovulatory dysfunction, 48 (5%) endometritis, and 53(6%) iatrogenic. The remaining 155 (15%) cases were uncategorised. The classification should facilitate multi-institutional investigation into the epidemiology, etiology and treatment of women with Abnormal Uterine Bleeding.

**Vaidya S et al., (2013)** conducted a study to assess the histopathological patterns of the endometrium in women of different age groups presenting with abnormal uterine bleeding (AUB). A total of 403 endometrial biopsies and curettings were reviewed, with patient ages ranging from 18 to 70 years. The most common finding was normal cyclical endometrium, observed in 165 (40.94%) cases, followed by disordered proliferative endometrium in 54 (13.40%) cases, and hyperplasia in 44 (10.92%) cases. Malignancy was identified in 10 (2.48%) cases, with hyperplasia and malignancy being more prevalent in the perimenopausal and postmenopausal age groups. The study concluded that histopathological evaluation of endometrial biopsies and curettings reveals a broad range of conditions, from normal endometrium to malignancy. It emphasized that such evaluations are especially important in perimenopausal and postmenopausal women with AUB, to rule out preneoplastic or malignant conditions.

**Bodal VK et al., (2014)42** conducted a study to find the incidence of various pathological lesions of endometrium i.e. non-neoplastic as well as neoplastic and to correlate various clinical findings like age, chief complaints, and duration of these complaints with histopathological features. The present study included 300 endometrial biopsies with clinical diagnosis of Dysfunctional uterine bleeding or infertility. The biopsies were processed and sections stained with H and E stain. Special stain (ZiehlNeelsen) was done wherever necessary. Primary infertility (75%) is more common than secondary infertility (25%). Most common presenting age group for DUB cases was 41-50 years (40.91%) and for infertile cases, 26-30 years (47.5%). The most common type of bleeding in DUB cases was menorrhagia (47.73%). Proliferative endometrium (30.45%) was the most common endometrial pattern in DUB cases and secretory endometrium (35%) in infertility cases. Benign neoplasms (endometrial polyp) constituted 3.64% of DUB cases and premalignant conditions (hyperplastic endometrium)-16.36% of DUB cases. Malignant neoplasms (endometrial carcinoma) were found in 3.64% of DUB cases, being most common in 6th decade of life (50%) and postmenopausal bleeding (62.5%) was the most common clinical presentation.

**Patil P et al., (2014)** compared three methods of endometrial sampling – nasogastric tube aspiration cytology, Pipelle biopsy, and dilatation and curettage (D&C) – for diagnosing perimenopausal bleeding. The study, conducted at R.L. Jalappa Hospital from 2012 to 2013, involved 100 women with perimenopausal bleeding. Results showed that aspiration cytology detected benign pathologies in 44% and premalignant lesions in 19%, while Pipelle biopsy detected benign lesions in 49% and premalignant ones in 45%. D&C identified benign pathology in 50% and premalignant lesions in 44%. Aspiration cytology had a higher rate of inadequate samples (37%) compared to Pipelle (4%) and D&C (4%). Pipelle biopsy had 100% sensitivity, 98.15% specificity, and 99% diagnostic accuracy, making it an ideal initial screening method due to its speed and ability to preserve tissue architecture.

**Verma U et al., (2014)38** studied the prevalence of abnormal uterine bleeding and its type in perimenopausal women as well as to compare diagnostic efficacy of ultrasonography, hysteroscopy and histopathology. Most of the patients were multiparous, more than 50% belong to socioeconomic class III and IV and mean age was 43.05 ± 4.09 years. Commonest complaint was menorrhagia (45%) followed by metrorrhagia in 19% and menometorrhagia in 14%. Majority of patients (85%) had uterine volume between 151 and 250 cm3. Only three patients had uterine volume more than 252 cm3. Endometrial hyperplasia was diagnosed in 14% with ultrasonography, 11% on hysteroscopy while in 15% on hystopathological examination. In perimenopausal women with AUB, ultrasonography should be first investigation because of its freely availability, noninvasiveness and cost effectiveness.

**Cheheb N et al., (2016)43** to evaluate female infertility using two complementary methods of exploration: hystero-laparoscopy and endometrial biopsy, to compare histopathological data with those of hystero-laparoscopy findings in the same patients, and finally assess the interest to couple both methods to detect a greater number of pathologies. The study included 64 patients aged 20-43 years with primary or secondary infertility for a period of 3 years ranging from 2012 to 2015 at obstetrics and gynecology department in which all pa tients were admitted to a hysteroscopy followed by laparoscopy. Endometrial biopsy curettage was performed and sent to the Pathological Anatomy Department for a histopathological study. On 64 infertile women explored, no pathologies were findings in 20 patients (31.3%) to the biopsy and 27 patients (42.2%) by hysteroscopy-laparoscopy. Histopathological study was in favor of dysfunctional endometrium (50%) followed by hyperplasia (10.9%). The lesions findings in the hystero-laparoscopy were in the first place uterine (18.8%) followed by equally between tubal and endometrial pathologies (10.9%). Associated diseases affecting the same organs or more were recorded with a percentage of 7.8%. The two methods have been shown effective and the most of common pathologies findings were uterine and endometrial. They concluded that the endometrial biopsy was more decisive in the exploration of endometrium pathologies while hystero-laparoscopy is more sensitive for the exploration of uterine, tubal and ovarian pathologies.

**Khan R et al., (2016)44** did a study to evaluate DUB in various age groups, carry out histopathological study of the endometrium and analyze its clinic-pathological patterns. The study included 500 cases of atypical uterine bleeding, out of which 120 cases of DUB were included based on clinical features and detailed investigations. Hyperplasia was the commonest endometrial pathology (20.5%) followed by luteal phase insufficiency (15.6%) and secretory endometrium (13.7%). Endometritis including tubercular endometritis (12.7%), post abortal (5.8%), proliferative (6.8%), polyp (3.9%), atrophic (3.9%), exogenous hormone changes (2.9%) and anovulatory cycles (6.8%) made up for the remaining lesions. DUB occurs secondary to a wide variety of functional and structural abnormalities, warranting a thorough evaluation especially in perimenoupausal females. Menorrhagia is a common symptom and the most likely etiology relates to the patient’s age.

**Nepal N et al., (2016)** conducted a study to assess the histopathological patterns of endometrial biopsies in patients with dysfunctional uterine bleeding. This cross-sectional observational study took place at Nobel Medical College, Biratnagar, Nepal, over a three-year period from June 2012 to June 2015. It included all patients with dysfunctional uterine bleeding who underwent endometrial biopsy. The study analyzed various histopathological patterns across different age groups. A total of 300 cases were included, with proliferative endometrium being the most common finding (61%). The most frequent pathology was simple cystic hyperplasia (13.3%), followed by secretory endometrium, chronic endometritis, and pill endometrium. Malignant lesions were found in 8 patients (2.7%), predominantly in those aged over 50, followed by those in the 41-50 age group. Atrophic endometrium was the most common finding in postmenopausal bleeding (3.6%), followed by endometrial carcinoma in 8 cases (2.7%). The study observed that the incidence of endometrial bleeding was highest in the perimenopausal age group. The authors concluded that dilatation and curettage is a valuable diagnostic tool for assessing dysfunctional uterine bleeding, evaluating therapeutic responses, and identifying organic lesions in affected women.

**Talukdar B et al., (2016)39** did a study among perimenopausal women who underwent hysterectomy for abnormal uterine bleeding (AUB). The clinical presentations, ultrasonographic findings, and histopathological reports of hysterectomy specimen were correlated. Among 103 number of hysterectomized cases for AUB, most of the patients were between 40 and 45 years of age (67.97%) and menorrhagia was the dominant clinical presentation. 45.63% of cases were diagnosed as fibroid uterus by ultrasonography with 89.13% sensitivity and 89.47% specificity. Histopathological reports of myometrium showed 44.66% fibromyoma, followed by 34.95% of the normal myometrium. Histopathology of endometrium revealed hyperplasia in the most cases (56.31%) where simple typical type was the predominant. In conclusion, uterine fibroid was the leading cause of AUB and radiological, pathological evaluation correlated well to diagnose fibroid.

**Tiwari A et al., (2016)45** conducted a study to find out the histopathological pattern of endometrium in abnormal uterine bleeding (AUB) in the light of clinical details. Formalin fixed endometrial specimens were processed, paraffin embedded, sectioned at 3-4μm, stained with hematoxylin and eosin, and studied under light microscopy along with their demographics. The study included 100 cases of endometrial biopsy specimens with clinical diagnosis of AUB. Menstrual disturbances was found in wide age range between 17-75 years with the mean age of 45 (SD=13.36) years. Menorrhagia was the commonest (n=60, 60%) clinical presentation. Most (n=85; 85%) endometrium had non-neoplastic lesions. Among them, normal endometrial patterns were commonest (n=50, 50%). Neoplastic lesions (n=15, 15%) were distributed in all menstruation status with majority in postmenopause (n=7, 7%) and included malignant cases (n=5, 5%) among others. They concluded that post-menopausal bleeding was common presentation among women with malignant and premalignant disease which was present in 15% of the cases together. Timely evaluation of AUB by histopathology can be life-saving with early tissue diagnosis and management.

**Betha K et al., (2017)40** conducted a study to categorize women with Abnormal Uterine Bleeding (AUB) according to PALM COEIN classification system and to correlate the clinical diagnosis and histopathologic features of various causes of AUB. A retrospective study was carried out on 250 non- gravid reproductive age women between 25-45 years with complaints of AUB at Mediciti Institute of Medical Sciences, a rural tertiary teaching hospital during the period January 2014 to December 2015. The PALM and COEIN groups accounted for 60.4% and 39.6% respectively. Leiomyoma was the most common cause of AUB (30.4%) and Ovulatory disorders was the 2nd most common cause of AUB (13.6%). A total of 172 (68.8%) were classified as having chronic AUB and 78 (31.2%) as having acute AUB. In AUB-L, the difference in clinical and histopathological diagnosis was significant (p=0.03). Structural causes of AUB contributed more to the cause of AUB. The PALM COEIN classification system helps us in understanding various etiological causes of AUB and can be used by clinicians and researchers for international comparisons.

**Inal ZO et al., (2017)** conducted a study to examine the relationship between clinical indications and histopathological findings in patients undergoing endometrial sampling. The study retrospectively analyzed data from 4,247 patients who underwent endometrial sampling for non-obstetric gynecological reasons at the Gynecology and Obstetrics Clinic of Konya Training and Research Hospital between January 2010 and October 2016. The average age of the patients was 46.8 ± 8.22 years, with menometrorrhagia/menorrhagia being the most common indication (70.66%) and cervical polyp the least common (1.34%). The most frequent histopathological finding was proliferative-secretory endometrium (63.62%), while the least common result was simple hyperplasia with atypia (0.56%). Endometrial cancer was more commonly observed in patients with post-menopausal bleeding and increased endometrial thickness (23.11%). Among those who underwent biopsies, 52.18% had previously undergone hysterectomy, with proliferative-secretory endometrium being the most common finding (59.52%) and simple hyperplasia with atypia the least. The study concluded that while endometrial sampling is necessary for patients with post-menopausal bleeding or increased endometrial thickness, routine biopsy should not be recommended for other indications.

**Prasad A and Kumar A (2017)** conducted a study to evaluate the accuracy of diagnostic hysteroscopy in assessing abnormal uterine bleeding (AUB) and to compare its findings with histopathology reports. The study included 120 patients, aged 20–60, with a history of AUB. Hysteroscopy was performed post-menstrually in most cases, except for those with irregular cycles or continuous vaginal bleeding. Following hysteroscopy, patients underwent dilatation and curettage (D&C), with endometrial samples sent for histopathological analysis. AUB was most common in women aged 32-40 years, with menorrhagia being the primary complaint. Hysteroscopy revealed abnormalities in 55% of patients, including endometrial hyperplasia (24%), polyps, submucous myomas, endometrial atrophy, carcinoma, misplaced IUDs, synechiae, and tubercular endometritis. While both hysteroscopy and D&C were accurate in detecting abnormalities, hysteroscopy provided more detailed information and was better at identifying lesions. In conclusion, hysteroscopy offers a more accurate and comprehensive diagnosis of AUB than D&C alone.

**Rizvi SA et al. (2017)** investigated the clinicopathological spectrum of endometrial findings in women with abnormal uterine bleeding (AUB). The study included 370 cases, with histopathological examination of dilatation and curettage (D&C) samples used to identify the underlying cause of AUB. The patients were categorized into premenopausal, perimenopausal, and postmenopausal age groups. Of the cases, 240 (64.8%) were premenopausal, 93 (25.1%) were perimenopausal, and 37 (10%) were postmenopausal. In the premenopausal group, the most common finding was proliferative endometrium (48%), followed by secretory endometrium (31%). In the perimenopausal group, simple hyperplasia was the most frequent (41%), followed by proliferative (29%) and secretory endometrium (17%). In the postmenopausal group, complex hyperplasia was the most common pathology (33.3%), followed by atrophic endometrium (27%). The study concluded that histopathological examination is crucial in diagnosing the causes of AUB and plays a key role in the early detection of premalignant and malignant endometrial lesions, which have a better prognosis when identified early.

**Ahmed M et al., (2018)46** did a study to find out the morphological pattern of endometrium in infertile women in a tertiary care hospital to find out the causes of infertility and subsequent treatment of the patients. The study included 196 referred cases endometrial curettage or biopsy samples of infertile women, collected between days 21 to 23 of menstrual cycle. The than infertility were excluded from the study. Hematoxylin and Eosin (H&E) stained histopathological slides were prepared from the samples and examined under microscope. Reported results and relevant data were recorded in SPSS data collection sheet and statistical analysis was carried out. A total of 196 cases of endometrial biopsy or curettage samples of both primary and secondary infertile women were studied. Age ranged from 20 years to 40 years with a mean age of 29.91±4.32 years. 70.92% cases presented with primary infertility and 29.08% cases presented with secondary infertility. Proliferative phase/anovulation (41.33%) was found as the most common morphological pattern of endometrium in infertile women followed by secretory phase (40.30%). Endometrial hyperplasia, inadequate sample, endometrial samples obtained from patients suffering from diseases other nonspecific ednometritis and tuberculous endometritis were found in 10.72%, 6.12%, 6.12% and 0.51% cases respectively. In primary infertility, proliferative phase / anovulation (43.17%) was also the predominant pattern followed by secretory phase (37.40%) and endometrial hyperplasia (11.52%). Whereas, secretory phase (47.37%) was the most common pattern of endometrium in secondary infertility, followed by proliferative phase (36.37%) and endometrial hyperplasia (8.77%). Primary infertility was most frequently presented in 26-30 years of age, whereas, secondary infertility was more prevalent in later age group. Histopathological study of endometrium gives us valuable information of endometrium in infertility. Morphological pattern of endometrium in our study was quite similar to other studies conducted in different countries with some variations.

**Prasannalakshmi S and Krishnaveni VS (2018)** conducted a study to examine the histological patterns of endometrial findings in women with abnormal uterine bleeding (AUB). Histopathological analysis is crucial for the diagnosis and management of AUB. This retrospective study was carried out on endometrial samples collected from patients at the Department of Obstetrics and Gynecology, Mahatma Gandhi Memorial Government Hospital, Trichy, over a one-year period from November 2017 to October 2018. The study included women attending the gynecology outpatient department (OPD) and those admitted to the gynecology ward with complaints of AUB. The most common finding was a normal cyclical endometrium, followed by proliferative endometrium in 56% of cases and secretory endometrium in 33% of cases. The highest number of AUB cases occurred in women aged 41–50 years (48% of cases). Endometrial carcinoma was most commonly found in women aged 50–60 years (6 cases). The study concluded that histopathological examination is the gold standard for diagnosing AUB, and benign conditions can often be managed with hormonal therapy or conservative surgical options, reducing the need for hysterectomy.

**Bhagat R et al., (2019)** highlighted that abnormal uterine bleeding can be caused by a range of conditions, making it one of the most common reasons for endometrial sampling. While it can sometimes reflect a normal physiological process that requires only observation, in other cases, it may indicate a serious underlying issue that demands prompt treatment. The study, conducted at the histopathology section of the Department of Pathology, GMC Jammu, included all endometrial curettings and biopsy specimens received during the study period, with patient ages ranging from 14 to 75 years. The largest number of cases (40.43%) was found in the 31-40 age group. The most frequent histopathological findings were secretory endometrium (170 cases), followed by proliferative endometrium (99 cases), endometrial hyperplasia (42 cases), and products of conception (27 cases). Additionally, 6 cases of endometrial carcinoma and 4 cases of squamous cell carcinoma were identified. The study emphasized that histopathological examination of endometrial tissue in patients with abnormal uterine bleeding reveals a broad range of changes, from normal cyclical endometrium to malignancies, underscoring its critical role in diagnosing AUB.

**Sujatha R and Pratyusha (2019)** conducted a two-year retrospective study at a hospital in Visakhapatnam on women with abnormal uterine bleeding (AUB) unresponsive to medical treatment and not linked to structural issues. A total of 360 women were included, categorized into three age groups: 20-40 years (reproductive), 41-50 years (perimenopausal), and >50 years (postmenopausal). Endometrial samples were examined microscopically. Histopathological findings showed proliferative endometrium in over 50% of cases, secretory endometrium in 25%, and atrophic endometrium in 10.3%. Other findings included cystic dilation (1.7%), hyperplasia (1.1%), and endometrial malignancy (0.5%). Proliferative endometrium was seen across all age groups, with secretory endometrium common in younger and perimenopausal women, and atrophic endometrium more frequent in postmenopausal women.

**Vani B et al., (2019)47** to evaluate histopathology of endometrium and observe the incidence of various endometrial pathology patterns in different age groups presenting with abnormal uterine bleeding. The most common pattern observed was normal cycling endometrium (56.27%). The other morphological patterns were endometrial hyperplasia (19.48%), disordered proliferative pattern (5.62%), complications of pregnancy (4.76%), benign endometrial polyp (2.6%), chronic endometritis (2.16%) and carcinoma (0.86%). The most common age group presenting with AUB was 40-49 years (47.18%) followed by 30-39years (33.76%). Endometrial causes of AUB and age distribution was statistically significant with P value <0.05. There is an age specific association of endometrial lesions. Atrophy and carcinoma endometrium are predominant in peri-menopausal and post-menopausal age. Endometrial curetting’s and biopsy proved to be an important diagnostic procedure for assessment and subsequent management of abnormal uterine bleeding.

**Roy M et al., (2020)** conducted a hospital-based cross-sectional study involving fifty patients aged 45 to 60 years, who presented with perimenopausal bleeding at the inpatient and outpatient departments of Sir Salimullah Medical College and Mitford Hospital, Dhaka. Patients were selected based on specific inclusion and exclusion criteria. Routine investigations, including pelvic ultrasound, were performed, and endometrial biopsy was obtained through diagnostic D&C. The data were analyzed using the Chi-square test and the Statistical Package for Social Sciences (SPSS, version 16.0). The most common histopathological findings were endometrial hyperplasia (32%) and polyps (24%). Other findings included proliferative endometrium (16%), secretory endometrium (12%), endometrial carcinoma (6%), endometritis (4%), and atrophic endometrium (6%). The study concluded that endometrial biopsy is a crucial procedure for all cases of perimenopausal and postmenopausal abnormal uterine bleeding to exclude malignancy.

**Samal R et al., (2020)** conducted a study to examine the clinical and pathological spectrum of abnormal uterine bleeding (AUB) and associated endometrial lesions in patients at a tertiary care hospital in southeastern India. The study included 153 cases over a two-year period, where patients with AUB were evaluated through dilatation and curettage (D&C), and the endometrial samples were histopathologically analyzed. The majority of the cases (93) were non-neoplastic, followed by neoplastic lesions (60). In the reproductive age group, proliferative and secretory endometrium were the most common findings, while malignancies, particularly type I adenocarcinoma, were more frequently observed in postmenopausal women. The study highlighted that the incidence of AUB was higher than expected in the population, and emphasized that histopathological evaluation of endometrial biopsies plays a crucial role in diagnosing AUB and identifying the underlying causes.

**Sunitha MM (2020)** conducted a study to compare the effectiveness of office endometrial biopsy with dilatation and curettage (D&C) in terms of sample adequacy and diagnostic accuracy. This prospective study was carried out at a tertiary care center over a two-year period, involving 150 women with abnormal uterine bleeding. The patients were randomly divided into two groups: Group A (n=75) underwent D&C under anesthesia, while Group B (n=75) received Pipelle endometrial sampling. Detailed clinical histories, examination findings, and ultrasound reports (including pelvic pathology and endometrial thickness) were recorded. Histopathology reports were analyzed for sample adequacy and diagnostic patterns, and patients were followed up for up to two years. For those who later underwent hysterectomy, the endometrial pathology in the hysterectomy specimen was used as the gold standard for comparison. The sample adequacy rate was 93% for D&C and 92% for Pipelle biopsy. Both methods mostly had inadequate specimens when focal lesions were present. The diagnostic accuracy for detecting atypical hyperplasia and adenocarcinoma was 97.6% for D&C and 95.7% for Pipelle biopsy. Both procedures missed focal lesions, and 33.3% of atypical hyperplasia cases diagnosed by either method had coexisting adenocarcinoma in the hysterectomy specimen. The study concluded that Pipelle biopsy is a cost-effective method for endometrial sampling compared to D&C.

**Das S and Mondal R (2021)** conducted a study to identify common uterine abnormalities and assess the accuracy and agreement between hysteroscopy findings and histopathological results. This observational study involved 150 women with a history of abnormal uterine bleeding lasting more than six months, who underwent hysteroscopy-guided endometrial tissue sampling for histopathological diagnosis. The findings from hysteroscopy were compared with histopathological results using measures such as sensitivity, specificity, positive and negative predictive values, and kappa statistics. The average age of participants was 39.68±6.19 years, with menorrhagia (33.3%) being the most common symptom and proliferative endometrium (25.3%) the most common histopathological finding. The most frequent endometrial thickness (68.67%) observed by transvaginal sonography was between 5-10 mm. Hysteroscopy demonstrated 96% sensitivity, 53.8% specificity, 90.9% positive predictive value, and 77.8% negative predictive value for detecting abnormal pathology compared to histopathology. The results indicated that hysteroscopy provides a more accurate sample for histopathological examination than dilatation and curettage, which is a blind procedure. This improved diagnostic accuracy helps in better treatment planning and may reduce unnecessary hysterectomies.

**Gaikwad S et al., (2021)** analyzed 400 endometrial curettage samples clinicopathologically at a rural tertiary care center. The samples were processed using H&E staining, with special staining and immune-histochemistry (IHC) performed when necessary. A clinicopathological correlation was made for all cases, and the results were compared with other studies. The age range of the patients in the study was from 18 to 70 years, with the most common age group being 31–40 years. The most frequent findings were cyclical changes in the endometrium, followed by abnormal endometrial pathologies and trophoblastic diseases. The study concluded that endometrial biopsy is a crucial diagnostic tool for gynecological conditions. Understanding the histological patterns of the endometrium in abnormal uterine bleeding across different age groups is essential for appropriate case management. Additionally, postmenopausal bleeding should always be regarded as a potential sign of malignancy until proven otherwise.

**Kinake M et al., (2021)** conducted a study to examine the histopathological patterns of endometrial tissue in patients with abnormal uterine bleeding (AUB). The study included all patients attending the Gynaecology outpatient department with AUB, and the samples analyzed were from Dilatation and Curettage (D&C), endometrial biopsies, polypectomies, and hysterectomy specimens. A total of 680 cases were studied, with 661 providing significant findings and 19 cases deemed unsatisfactory for evaluation. The most common histological pattern was proliferative endometrium, found in 248 (36.47%) cases, followed by leiomyoma in 100 (14.70%), adenomyosis in 90 (13.23%), and endometrial hyperplasia in 72 (10.58%). Other findings included secretory endometrium (6.91%), atrophic endometrium (6.91%), endometritis (1.61%), endometrial polyp (3.97%), and adenomyosis with leiomyoma (3.66%). Endometrial carcinoma was found in just 3 (0.44%) cases. The study highlighted that AUB is most common in the peri-menopausal period, particularly in the fourth and fifth decades of life, with menorrhagia being the most frequent clinical symptom. The most common histopathological finding was proliferative endometrium, which suggests anovulation. Overall, the study emphasized that histopatho-logical examination of endometrial samples plays a crucial role in diagnosing and managing AUB, revealing a wide range of conditions from normal endometrium to malignancy.

**Manjari and Kumar (2021)** conducted a retrospective study of endometrial biopsies over a period of 1.5 years. After processing and staining the tissue slides with hematoxylin and eosin, they were microscopically examined. A statistical analysis using the Chi-square test was performed to assess the relationship between endometrial histopathology and the mean age of presentation. A total of 197 samples were included after exclusions, with endometrial hyperplasia being the most common finding, accounting for 29.4%, primarily in the reproductive age group. Other findings included proliferative endometrium (20.3%), atrophic endometrium (16.24%), chronic endometritis (9.64%), endometrial polyps (8.63%), disordered proliferative endometrium (7.61%), and secretory endometrium (6.6%). Endometrial carcinoma was rare, diagnosed in just 1.52% of cases, mostly in postmenopausal women. Menorrhagia was the most common symptom, reported by 48.2% of patients. The study concluded that while D&C is a useful method, newer techniques may offer better diagnostic capabilities, and emphasized the importance of avoiding unplanned hormone therapy to prevent endometrial hyperplasia.

**Nagose VB et al., (2021)** investigated the various endometrial histological patterns in women with abnormal uterine bleeding (AUB) due to endometrial causes, along with the distribution of age groups and endometrial thickness (ET) in these cases. This retrospective study included endometrial samples from AUB patients with endometrial causes, collected over a three-year period in the Department of Pathology at a medical college and hospital. Clinical histories, examinations, and ET measurements were recorded. The samples were processed and stained with hematoxylin and eosin for histopathological analysis. A total of 475 cases were included, consisting of 176 endometrial biopsies and D&C materials (37.05%) and 299 hysterectomy specimens (62.95%). The most common histological pattern was normal cyclic endometrium, followed by atrophic endometrium, pill-induced endometrium, and hyperplasia without atypia. Endometrial carcinoma (1.47%) was most commonly observed in the 40-49 and 50-59 age groups, with all cases having an endometrial thickness of ≥10 mm. Endometrial hyperplasia with atypia (or endometrial intraepithelial neoplasia, EIN) was seen in women over 30 years old, with the majority having endometrial thickness ≥10 mm, followed by those with thickness between 8.1–10 mm. The study concluded that endometrial biopsy is crucial for accurately diagnosing the cause of AUB in women of all age groups, with malignant and premalignant lesions more commonly observed in the peri- and post-menopausal years, particularly with an endometrial thickness of ≥10 mm.

**Ranjan S et al., (2021)48** conducted a study on women with abnormal uterine bleeding (AUB) to evaluate the histopathological patterns in endometrial biopsy among different age groups. The clinical history and findings of 100 patients were collected and recorded. Histopathological study of endometrial patterns and age specific correlation was done. Out of a total of 100 patients of AUB, 72 of them had a functional cause and the remaining 28 patients revealed an organic cause. The mean affected age was 40 years with youngest being 21 years old and the oldest patient was 57 years of age. Functional causes constituted 72% and organic lesions were seen in 28% out of which Proliferative phase endometrium was the most common functional lesion observed while endometrial hyperplasia was the commonest organic pathology seen. P value was calculated as <0.008 which was significant using chi square for trend seen in age. Histopathological examination of endometrial biopsy in patients of AUB is considered as a gold standard of patient evaluation, diagnosis and management and avoids any future complications.

**Sufia H et al. (2021)** conducted a study to analyze and age-stratify the types and frequencies of endometrial pathologies in Saudi women with abnormal uterine bleeding (AUB) who underwent endometrial biopsies at King Saud University Medical City in Riyadh over a 13-year period. This retrospective study, conducted from 2006 to 2018, reviewed 6458 biopsies from Saudi women with AUB. The women were categorized into three age groups: <40, 40-55, and >55 years. In the <40 and 40-55 age groups, the most common findings were cyclical endometrium, followed by endometrial polyps and disordered proliferative endometrium. In the >55 age group, atrophic endometrium was the most frequent finding, followed by endometrial polyps. Hyperplasias and malignancies accounted for 7.2% of the cases, with the majority in the >55 age group. Simple hyperplasia without atypia was the most common (3.9%), followed by malignancies (1.9%), complex atypical hyperplasia (0.7%), complex hyperplasia without atypia (0.4%), and simple atypical hyperplasia (0.3%). The study highlighted the importance of being aware of the potential range of endometrial pathologies across different age groups to guide clinical management. It emphasized that endometrial biopsies are crucial for the early detection of precancerous and cancerous lesions, particularly in women over 40.

**Alshdaifat EH et al., (2022)** examined the histopathological patterns of endometrial biopsies in patients with abnormal uterine bleeding (AUB) who underwent dilation and curettage (D&C), analyzing the results across different age and parity groups. The study also investigated the discrepancies between D&C findings and histopathological results from hysterectomy specimens. A total of 3,233 patients were included, with the majority in the 18-39 age group, where normal cyclical endometrium was the most common histopathological finding. Malignant lesions were seen in 42 patients, most of whom were over 50 years old. In 13.3% (42/316) of cases, D&C failed to identify intrauterine abnormalities that were later detected in hysterectomy specimens. The overall accuracy of D&C in distinguishing normal from pathological findings was 75.60%, with a sensitivity of 72.90%, specificity of 77.90%, positive predictive value of 73.86%, and negative predictive value of 77.05%. While normal cyclical changes were the most frequent histopathological findings, hyperplasia and malignancies were significant causes of bleeding in perimenopausal and postmenopausal women. Despite some concerns over D&C’s role as a sampling method for AUB, it remains highly effective in diagnosing premalignant and malignant conditions.

**Somasundar BSM et al., (2022)49** did a study to compare the efficacy of plain cervical dilatation and curettage (D&C) and hysteroscopic-guided biopsy in evaluating endometrial pathology and to compare the histopathology findings of hysterectomy specimen. A total of 100 uterine bleeding in gynecology OPD were included. Those women who are eligible for diagnostic D&C, cervical dilatation and endometrial curettage were done under i.v. sedation in the operation theater (OT) and the curetting was sent for histopathological examination (HPE). Those women who need hysteroscopy, it was done under short general anesthesia and the sample was sent for histopathologic examination. Patients for whom hysterectomy was indicated following D&C or hysteroscopy would be followed for the histopathological findings. The cases range in the age - group of 40–55 years who presented with abnormal uterine bleeding (AUB) without local gynecological cause and with failure of medical treatment for at least 3 months. The mean duration between the endometrial curettage and the hysterectomy being 2.5 weeks. The highest correlation was seen in the perimenopausal and postmenopausal women complaining of abnormal endometrial phase, followed by complex and then by simple hyperplasia. In conclusion, D&C and hysteroscopy are the two most important diagnostic modalities in perimenopausal and postmenopausal bleeding. Patients for whom ultrasonography showed focal endometrial lesions need further evaluation and hysteroscopy.

**Karim Z et al., (2022)** conducted a study to examine the prevalence of various endometrial histological patterns in women with abnormal uterine bleeding (AUB) and to investigate the underlying causes of AUB and their management. The study was conducted on 300 patients. Histological analysis of endometrial samples revealed that the majority of patients with AUB were between the ages of 41 and 50 (48.6%), with most being multiparous. The most common symptoms were menorrhagia (42%), followed by polymenorrhagia (15%), menometrorrhagia (10.6%), persistent vaginal bleeding (9.6%), and postmenopausal bleeding (8.6%). The most frequent histological findings were proliferative endometrium (37%) and secretory endometrium (30%), while endometrial hyperplasia was found in 22.6% of cases. The study emphasized the importance of endometrial evaluation in ruling out premalignant conditions and cancers, particularly in perimenopausal and postmenopausal women.

**Tilva KK et al., (2022)50** to evaluate the spectrum of endometrial histology in cases of AUB, to find out age wise incidence of AUB, and to find out age wise incidence of various histological pattern of endometrium in AUB. 110 women with a complaint of AUB attending the gynecology outpatient department (OPD) at tertiary care hospital, Rajkot, Gujarat during one year (August 2020 to July 2021). Maximum number of cases of AUB were noted in the age group of (31-40) years (44 cases, 40%). Most common observed histopathological pattern in this study was normal cyclical patterns including proliferative endometrium (34.5%) and secretory endometrium (21%). Histopathological evaluation of endometrium is indicated in women over the age of 35 years presenting with AUB to rule out preneoplastic lesions and malignancies.

**Vijayaraghavan Sr A et al., (2022)** conducted a study to examine the histopathological patterns of endometrium in women with abnormal uterine bleeding (AUB) and identify the predominant patterns across different age groups. The study, which took place at the Indira Gandhi Medical College and Research Institute in Puducherry from January 2019 to December 2020, included endometrial biopsies from patients with AUB, excluding gestational causes. Of the 160 cases analyzed, most biopsies came from women aged 41-50, with menorrhagia being the most common complaint. The bleeding patterns were significantly associated with age groups (p=0.00). Of the 160 cases, 104 were related to functional causes, with no significant age-related differences in functional or organic causes (p=0.67 and p=0.99, respectively). The most common histological patterns were the normal cyclical phases, with proliferative (56 cases) and secretory (30 cases) phases observed in 86 cases. Endometrial hyperplasia was found in 42 cases, 9 of which had atypical hyperplasia, while endometrial polyps were also commonly seen. Only two cases of endometrial carcinoma were reported. Although normal cyclical patterns were most common, endometrial sampling should be considered more frequently in peri- and post-menopausal women, where the incidence of hyperplasia and carcinoma is higher.

**Bindhuja J (2023)** conducted a study to examine the histopathology of the endometrium and identify the causes of abnormal uterine bleeding. Endometrial samples were collected through dilation and curettage from 50 women with abnormal uterine bleeding, who presented to the gynecology outpatient department at a medical college hospital. Of the 50 cases, 21 (72.4%) were diagnosed with endometrial hyperplasia, and 24 (48%) had an organic lesion. Most cases showed a proliferative phase endometrium (40%). The most affected age group was 31-40 years, with simple cystic hyperplasia being the most common endometrial pattern. Single-parity women typically exhibited a secretory endometrium. The study concluded that endometrial sampling is essential for all patients with abnormal uterine bleeding to investigate the histopathology and underlying causes.

**Dubey A et al., (2023)** conducted a prospective cross-sectional study to identify the endometrial causes of abnormal uterine bleeding (AUB) across different age groups. The study, which included 200 patients from January to October 2023 at a teaching hospital, analyzed endometrial biopsies, curettages, and hysterectomy specimens from women with AUB. The patients’ ages ranged from 17 to 71 years. Among the 200 cases, 45% were in the perimenopausal group, 34% in the reproductive age group, and 21% in the postmenopausal group. Menorrhagia was the most common bleeding pattern, seen in 54% of patients. Hormonal imbalance was found in 28% of reproductive-age women, and atrophic endometrium was noted in 7.5% of postmenopausal women. Chronic endometritis was observed in 3% of reproductive-age women. The study highlights the variability of endometrial patterns in AUB across different age groups and underscores the importance of histopathological examination for early detection of precancerous lesions and malignancy.

**Vitale SG et al., (2023)** updated guidelines for endometrial biopsy (EB) in gynecological practice. An adequate tissue sample is essential, and blind methods are not recommended for suspected endometrial malignancy. Hysteroscopy offers the highest diagnostic accuracy and cost-effectiveness, while blind suction techniques are unreliable for diagnosing endometrial polyps. In resource-limited settings, blind methods may be used when hysteroscopy is not available. Grasp biopsy is preferred for reproductive-age women, while bipolar electrode biopsy is better for atrophic endometrium. EB is necessary for diagnosing chronic endometritis, and there is no consensus on the endometrial thickness threshold for recommending EB in asymptomatic postmenopausal women. EB should be considered for young women with abnormal bleeding and endometrial cancer risk factors. Hysteroscopy with EB is useful even without sonographic abnormalities. In postmenopausal women with bleeding or those on tamoxifen with endometrial thickness >4 mm, EB is recommended.

**Pathak M et al., (2023)** conducted a study to examine the histopathological patterns of endometrial samples in women with abnormal uterine bleeding (AUB) across different age groups. The study, conducted between January 2018 and November 2020, involved the retrospective analysis of endometrial biopsy specimens, including curettings and hysterectomy samples, in the Department of Histopathology. A total of 280 cases were reviewed, with normal cycling endometrium found in 121 cases (43%). The most common pathology across all age groups was disordered proliferative endometrium, seen in 67 cases (24%). Other findings included atrophic endometrium (12%), complications of pregnancy and hormonal changes (2%), benign endometrial polyps (2%), adenomysis (1%), endometrial hyperplasia (12%), carcinoma (3%), and chronic endometritis (1%). The majority of patients with AUB were in the 40-49 year age group (46%). The study concluded that endometrial sampling is crucial for managing AUB, particularly in peri- and post-menopausal women, where conditions like atrophy and endometrial carcinoma are more common. A thorough histopathological examination and clinical correlation are essential in these cases.

**Karimi M et al., (2024)** investigated the clinicopathological patterns of endometrial specimens in women with abnormal uterine bleeding (AUB) and their correlation with ultrasonographic findings. The study included 411 patients who presented with AUB at Shahid Mohammadi Hospital between 2021 and 2023. Patients were categorized into three groups based on age and menstrual status: premenopausal (18-39 years), perimenopausal (40-49 years), and postmenopausal (≥50 years). The results were analyzed and correlated with patient age and other clinical data using statistical methods. Among the 411 cases, the youngest patient was 21 years old and the oldest was 77 years old. Menorrhagia was the most frequent complaint, reported by 48.0% (201) of the patients. The most common pathology across all age groups was endometrial polyp, found in 24.3% (100) of cases, followed by hormonal changes in 17.0% (70) of cases. Statistical analysis using chi-square showed a significant age-related trend (p=0.003). The study concluded that endometrial sampling is a valuable tool in diagnosing the causes of AUB, and that transvaginal sonography is highly sensitive in detecting endometrial polyps.

**Narwade SB et al., (2024)** aimed to conduct a clinicopathological analysis of a large set of endometrial curettage samples in a tertiary care setting. The study examined 400 endometrial curettage specimens using Hematoxylin and Eosin (H&E) staining, with additional special stains and immunohistochemistry (IHC) applied when needed. A detailed clinicopathological comparison was made for each case, and the findings were compared to previous studies. The participants' ages ranged from 18 to 70 years, with the majority falling between 31 and 40 years. The most common findings included cyclical endometrial changes, followed by various endometrial pathologies and trophoblastic diseases. The study highlighted the importance of endometrial biopsy as a key diagnostic tool for gynecological conditions, emphasizing the need to understand the histopathological patterns of endometrial changes in abnormal uterine bleeding (AUB) for better patient management. Postmenopausal bleeding should be considered suspicious for malignancy until proven otherwise.