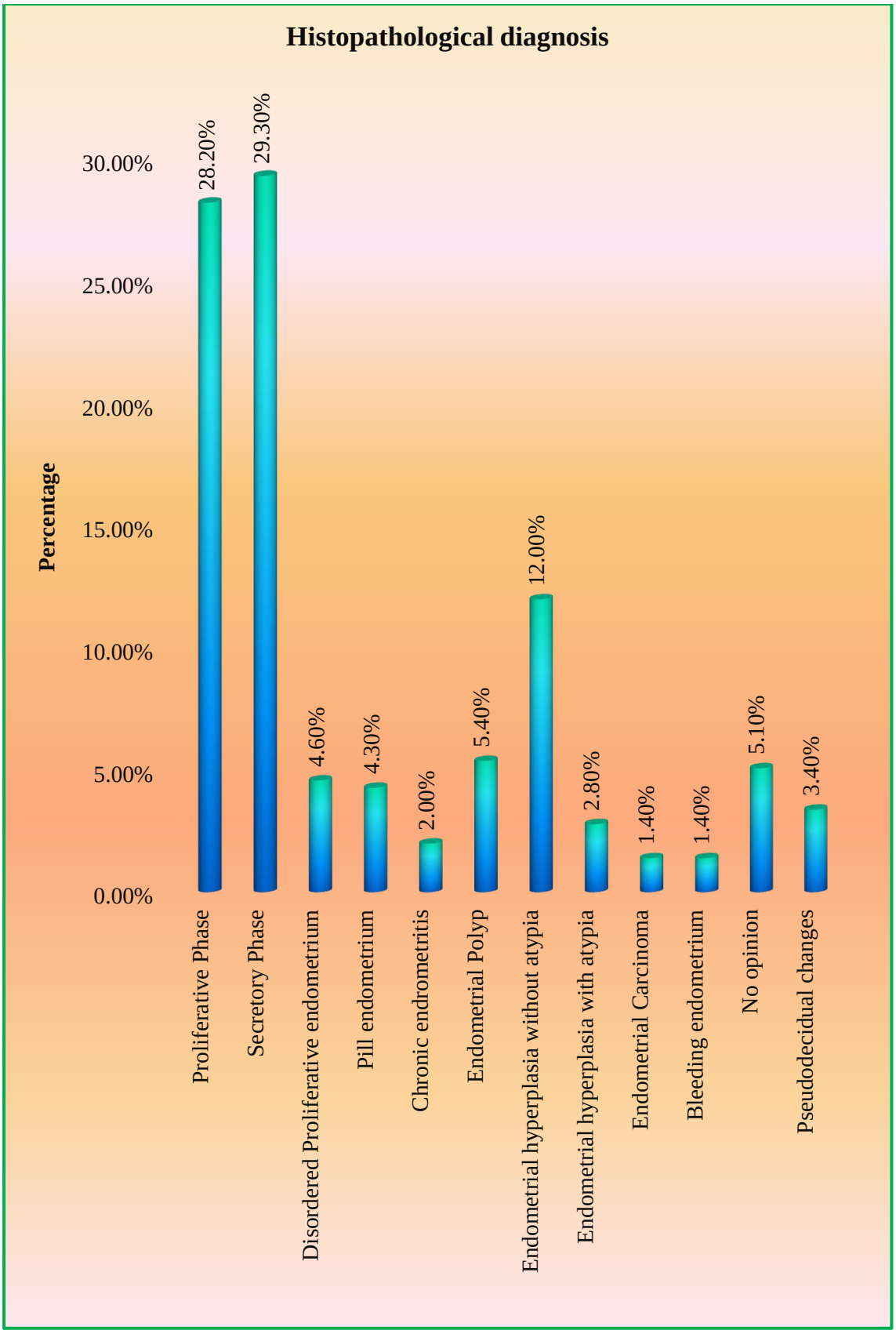
RESULTS AND OBSERVATIONS

This study presents the findings of the study based on histopathological evaluation of endometrial samples collected from 351 patients presenting with abnormal uterine bleeding (AUB). The results are categorized into descriptive analysis and correlation (inferential) statistics.

Table 1: Histopathological diagnosis		
	No. of Cases	**Percentage**
Proliferative Phase	99	28.2%
Secretory Phase	103	29.3%
Disordered Proliferative endometrium	16	4.6%
Pill endometrium	15	4.3%
Chronic endrometritis	7	2.0%
Endometrial Polyp	19	5.4%
Endometrial hyperplasia without atypia	42	12.0%
Endometrial hyperplasia with atypia	10	2.8%
Endometrial Carcinoma	5	1.4%
Bleeding endometrium	5	1.4%
No opinion	18	5.1%
Pseudodecidual changes	12	3.4%


Histopathological diagnosis
Percentage
30.00%
25.00%
20.00%
15.00%
10.00%
5.00%
0.00%
28.20%
29.30%
4.60%
4.30%
2.00%
5.40%
12.00%
2.80%
1.40%
1.40%
5.10%
3.40%
Proliferative Phase
Secretory Phase
Disordered Proliferative endometrium
Pill endometrium
Chronic endrometritis
Endometrial Polyp
Endometrial hyperplasia without atypia
Endometrial hyperplasia with atypia
Endometrial Carcinoma
Bleeding endometrium
No opinion
Pseudodecidual changes

In this study, the most common histopathological patterns observed among patients with abnormal uterine bleeding were the secretory phase endometrium (29.3%) and proliferative phase endometrium (28.2%), reflecting normal cyclical endometrial changes. Endometrial hyperplasia without atypia was noted in 12% of cases, suggesting a significant prevalence of hormonal imbalance, while hyperplasia with atypia and endometrial carcinoma accounted for 2.8% and 1.4% respectively, indicating a smaller but clinically important group at risk for malignancy. Other notable findings included disordered proliferative endometrium (4.6%), pill endometrium (4.3%), endometrial polyp (5.4%), and chronic endometritis (2%). A minor percentage of cases (5.1%) had no definitive opinion, possibly due to sample inadequacy, and pseudodecidual changes were seen in 3.4%. These results highlight the spectrum of endometrial pathologies encountered in AUB and emphasize the importance of histopathological evaluation for accurate diagnosis and management.

Table 2: Age distribution		
Age in year	**No. of Cases**	**Percentage**
20 - 30	74	21.1%
31 - 40	167	47.6%
41 - 50	87	24.8%
51 - 60	15	4.3%
>60	8	2.3%

The majority of patients presenting with abnormal uterine bleeding in this study were in the 31–40 years age group (47.6%), followed by those aged 41–50 years (24.8%) and 20–30 years (21.1%), indicating that AUB is most prevalent in women of reproductive and perimenopausal age. A smaller proportion of cases were observed in the postmenopausal age groups, with 4.3% in the 51–60 years range and 2.3% above 60 years, highlighting that while AUB is less common in older women, it still requires careful evaluation due to the potential risk of premalignant or malignant lesions.

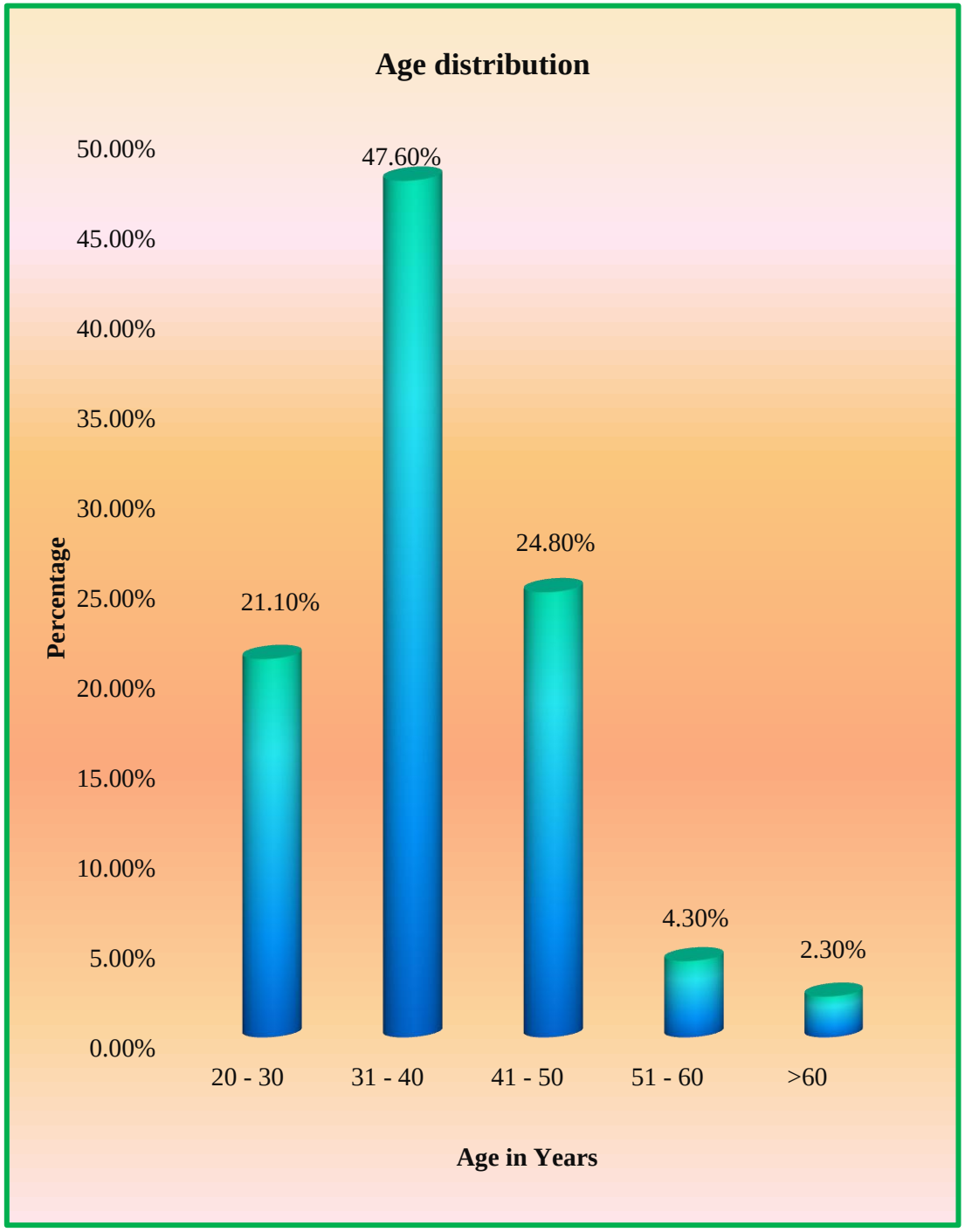

Age distribution
50.00%
45.00%
40.00%
35.00%
30.00%
25.00%
20.00%
15.00%
10.00%
5.00%
0.00%
Percentage
21.10%
47.60%
24.80%
4.30%
2.30%
20 - 30
31 - 40
41 - 50
51 - 60
>60
Age in Years

Table 3: Presenting complaints		
	No. of Cases	**Percentage**
Menorrhagia	142	40.5%
Metrorrhagia	66	18.8%
Polymenorrhea	28	8.0%
Metro-menorrhea	18	5.1%
Post-menopausal bleeding	30	8.5%
Post cortal bleeding	6	1.7%
Polymenorrhagia	13	3.7%
Oligomenorrhea	32	9.1%
Dysmenorrhoea	16	4.6%

In this study, the most common clinical complaint among patients with abnormal uterine bleeding was menorrhagia (40.5%), followed by metrorrhagia (18.8%) and oligomenorrhea (9.1%), indicating that excessive or irregular bleeding patterns are the predominant concerns prompting medical evaluation. Other reported symptoms included polymenorrhea (8%), postmenopausal bleeding (8.5%), metro-menorrhagia (5.1%), and dysmenorrhea (4.6%). Less frequent complaints were polymenorrhagia (3.7%) and post-coital bleeding (1.7%). These findings reflect the wide spectrum of bleeding abnormalities associated with endometrial pathology and underscore the need for individualized diagnostic approaches.

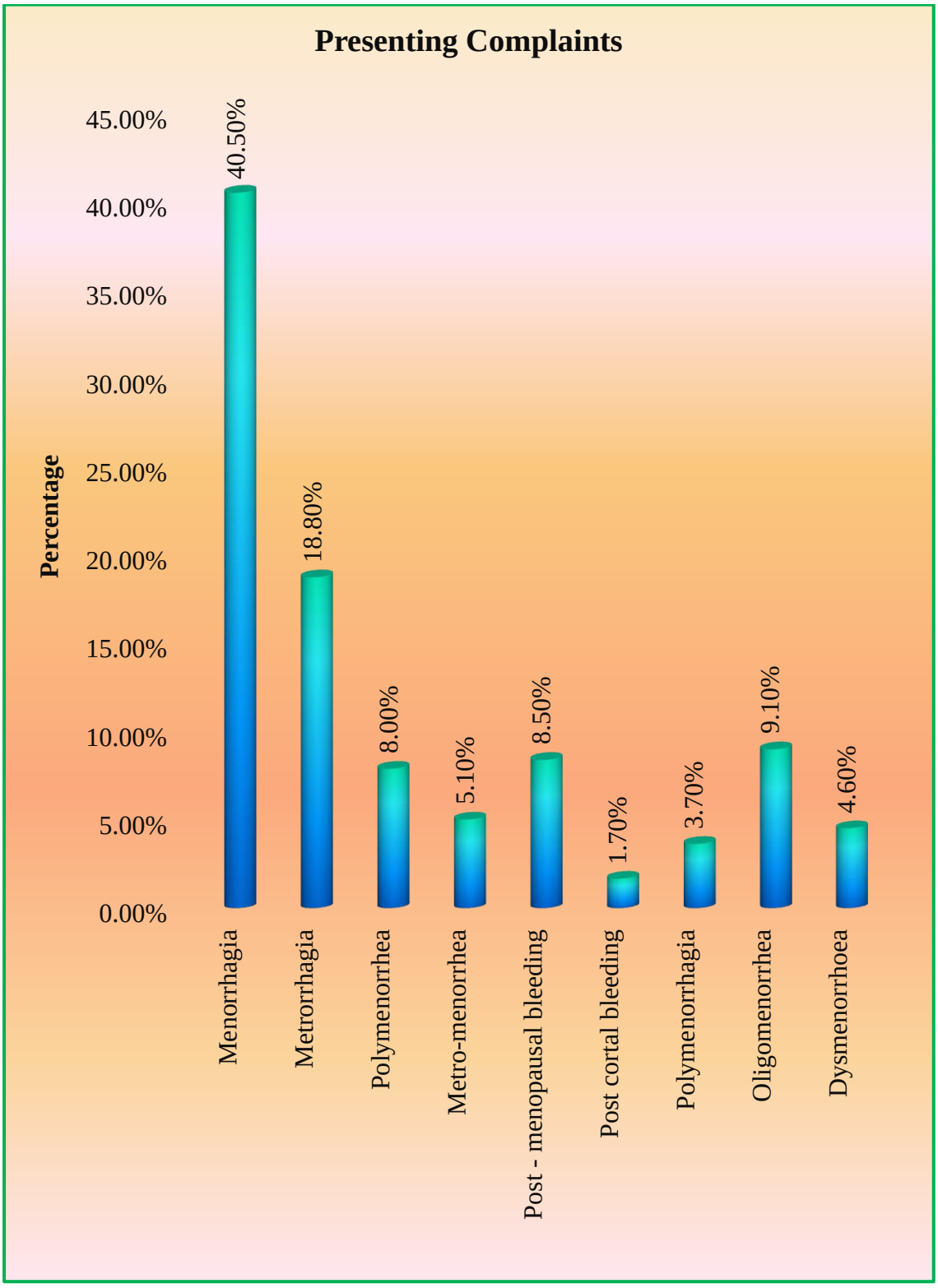

Presenting Complaints
Percentage
45.00%
40.00%
35.00%
30.00%
25.00%
20.00%
15.00%
10.00%
5.00%
0.00%
40.50%
18.80%
8.00%
5.10%
8.50%
1.70%
3.70%
9.10%
4.60%
Menorrhagia
Metrorrhagia
Polymenorrhea
Metro-menorrhea
Post - menopausal bleeding
Post cortal bleeding
Polymenorrhagia
Oligomenorrhea
Dysmenorrhoea

Table 4: Parity		
	No. of Cases	**Percentage**
Nulliparus	22	6.3%
Low Parity	325	92.6%
High Parity	4	1.1%

The analysis of parity among patients with abnormal uterine bleeding revealed that the majority were of low parity (92.6%), indicating that most women had one or two previous pregnancies. Nulliparous women accounted for 6.3% of cases, while only a small fraction (1.1%) were of high parity, suggesting that AUB is more frequently reported among women with limited reproductive history rather than those with multiple childbirths. This distribution may reflect hormonal fluctuations, uterine conditions, or lifestyle factors more common in low parity women, highlighting the importance of considering reproductive history in the clinical evaluation of AUB.

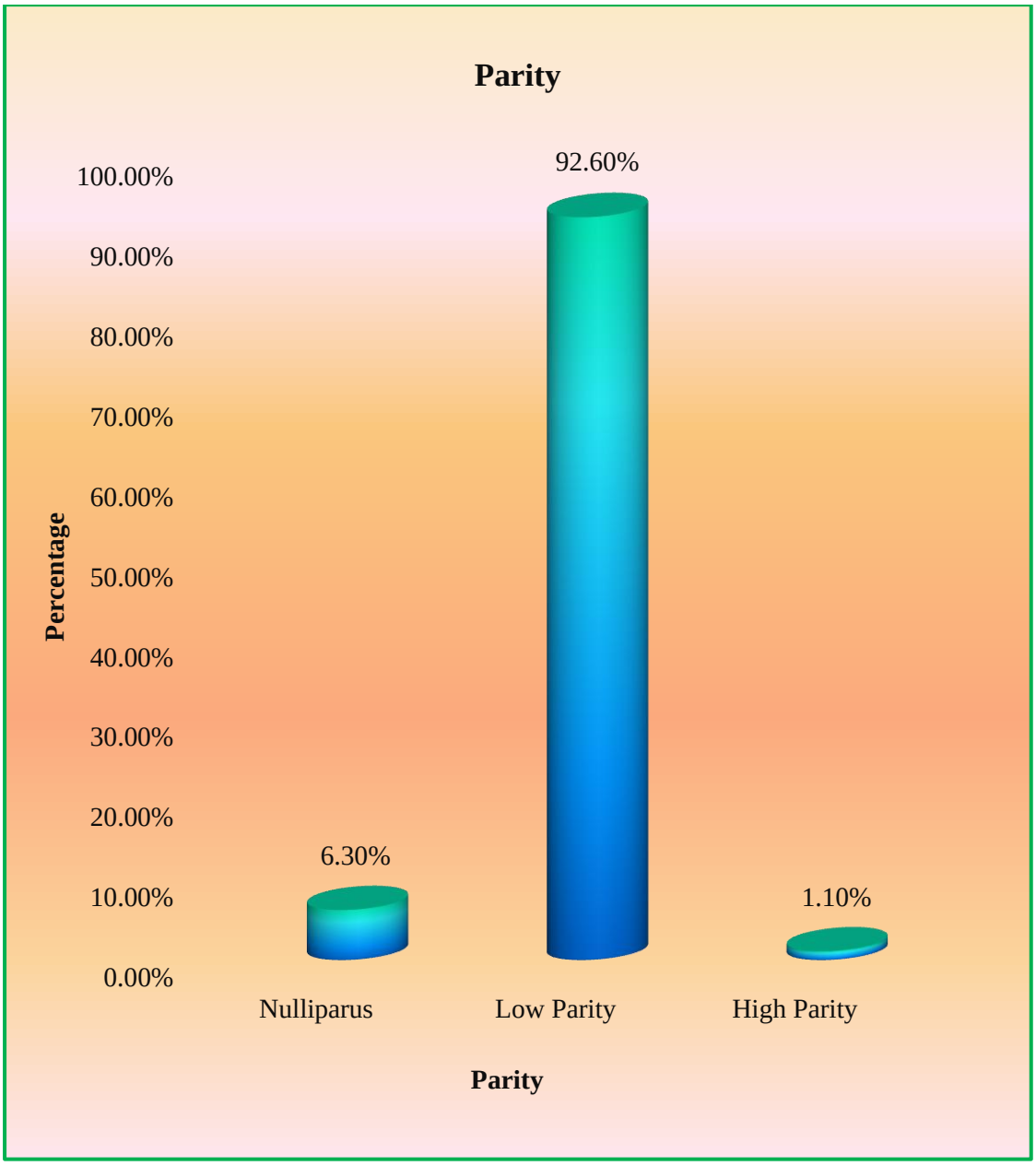

Parity
100.00%
90.00%
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
Percentage
6.30%
92.60%
1.10%
Nulliparus
Low Parity
High Parity
Parity

Table 5: Drug history		
	No. of Cases	**Percentage**
No	262	74.6%
Yes (hormonal intake)	89	25.4%

In this study, a significant majority of patients with abnormal uterine bleeding (74.6%) reported no history of hormonal drug intake, while 25.4% had a history of using hormonal medications. This suggests that although hormonal therapy is a known factor influencing endometrial changes, most cases of AUB in this cohort occurred independently of such treatment. However, the notable proportion of hormonal intake highlights the need to consider exogenous hormone exposure as a potential contributor to bleeding patterns and histopathological alterations in a subset of patients.

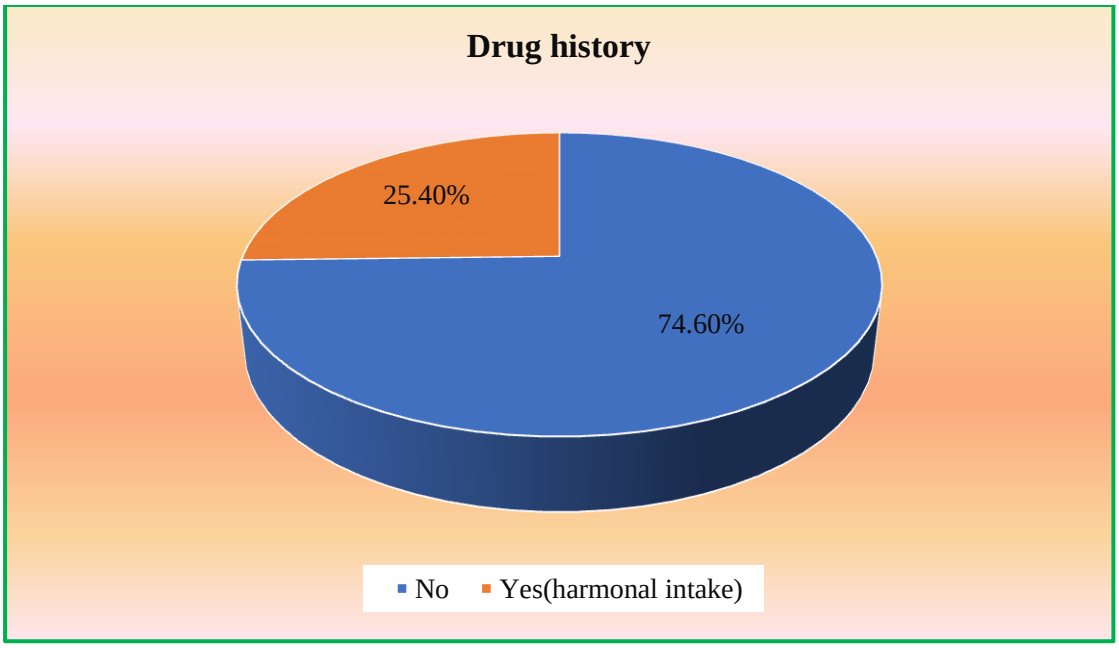


Table 6: Descriptive analysis			
	N	**Mean**	**Std. Deviation**
Histopathological diagnosis	351	3.91	3.335
Age	351	2.19	0.895
Complaints	351	3.15	2.620
Parity	351	1.95	0.268
Drug history	351	1.25	0.436
Correlation with LMP	351	1.40	0.490
Valid N (list wise)	351		

The table summarizes data from 351 AUB patients. The mean histopathological diagnosis score was 3.91, indicating varied endometrial patterns. Most patients were younger to middle-aged (mean age 2.19), with low parity (mean 1.95) and no history of hormonal intake (mean drug history 1.25). Clinical complaints (mean 3.15) and LMP correlation (mean 1.40) showed moderate variability. These findings suggest a predominantly low-parity, hormonally untreated group with diverse clinical and histopathological profiles.

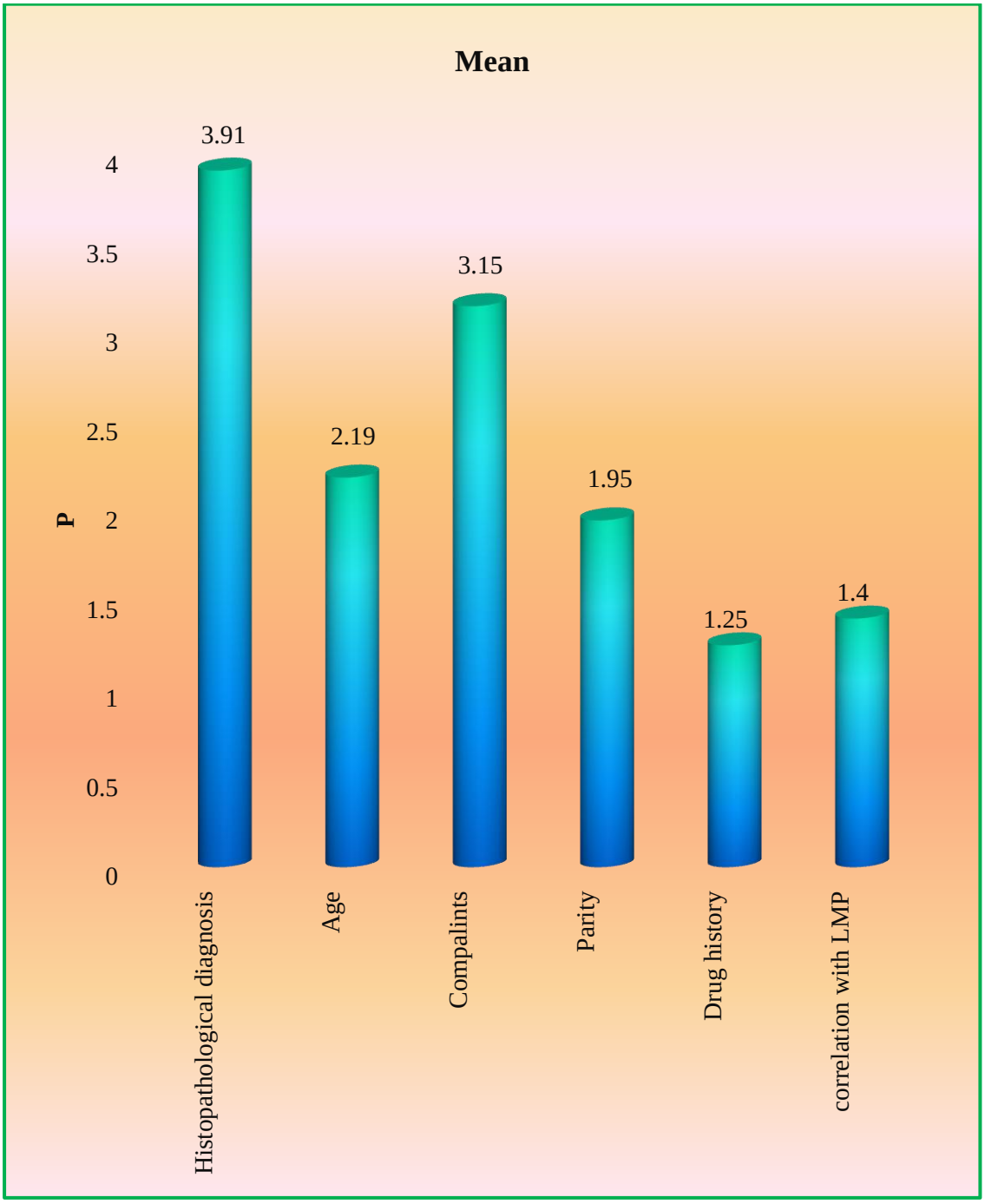

Mean
P
4
3.5
3
2.5
2
1.5
1
0.5
0
3.91
2.19
3.15
1.95
1.25
1.4
Histopathological diagnosis
Age
Compalints
Parity
Drug history
correlation with LMP

Table 7: Correlations of Histopathological diagnosis and age			
		Histopathological diagnosis	**Age**
Histopathological diagnosis	Pearson Correlation	1	.264**
	Sig. (2-tailed)		<.001
	N	351	351
Age	Pearson Correlation	0.264**	1
	Sig. (2-tailed)	<0.001	
	N	351	351
****. Correlation is significant at the 0.01 level (2-tailed)**			

The Pearson correlation analysis revealed a significant positive correlation between age and histopathological diagnosis in patients with abnormal uterine bleeding, with a correlation coefficient (r) of 0.264 and a p-value < 0.001. This indicates a moderate but statistically significant relationship, suggesting that as age increases, there is a tendency for more advanced or pathological histological changes to be observed in the endometrium. This finding supports the clinical understanding that older women, particularly in the perimenopausal and postmenopausal age groups, are more likely to develop endometrial hyperplasia, atypia, or carcinoma, underscoring the importance of age as a critical factor in the diagnostic evaluation of AUB.

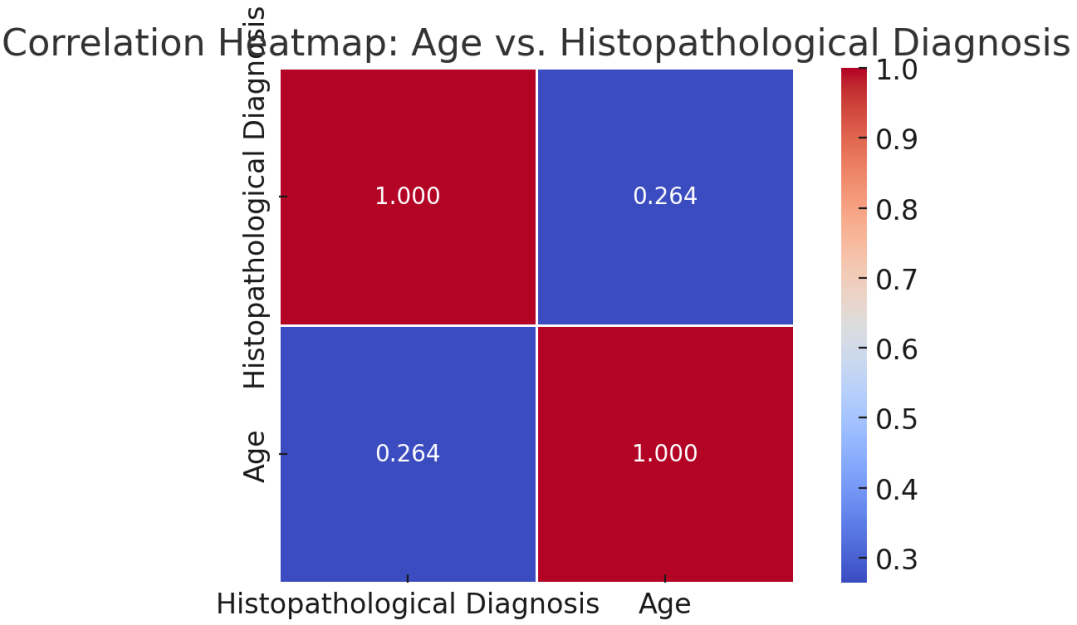

Correlation Heatmap: Age vs. Histopathological Diagnosis
Histopathological Diagnosis
Age
1.000
0.264
0.264
1.000
Histopathological Diagnosis
Age
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3

Table 8: Correlations of Histopathological diagnosis Correlation with LMP			
		Histopathological diagnosis	**correlation with LMP**
Histopathological diagnosis	Pearson Correlation	1	.766**
	Sig. (2-tailed)		<.001
	N	351	351
correlation with LMP	Pearson Correlation	.766**	1
	Sig. (2-tailed)	<.001	
	N	351	351
****. Correlation is significant at the 0.01 level (2-tailed)**			

The Pearson correlation analysis between histopathological diagnosis and last menstrual period (LMP) showed a strong positive correlation ($r=0.766$), which is highly statistically significant ($p < 0.001$). This indicates that there is a strong and meaningful relationship between the timing of the LMP and the histopathological findings in patients with abnormal uterine bleeding. In other words, the phase of the endometrial cycle, as inferred from the LMP, closely aligns with the histological

pattern observed, reinforcing the importance of menstrual history in accurately interpreting endometrial biopsy results. This correlation supports the validity of LMP as a reliable clinical parameter for understanding endometrial changes.

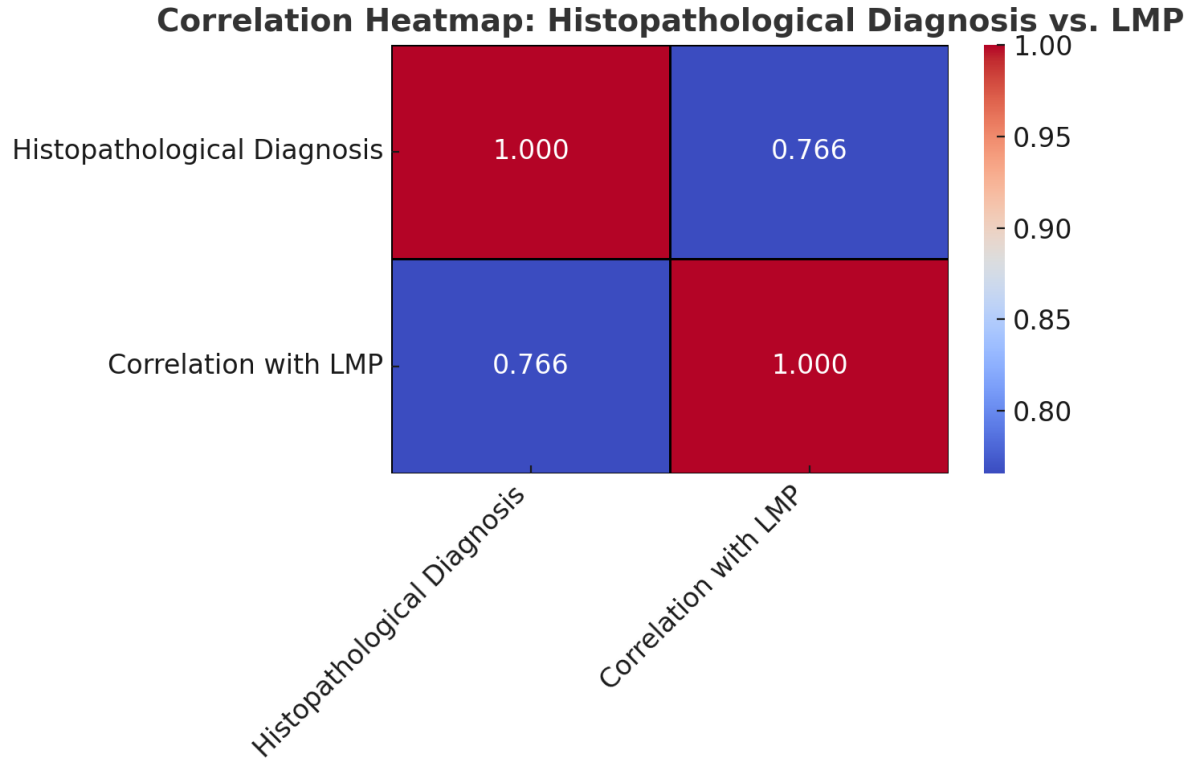


Table 8: Correlations of Histopathological diagnosis Drug history			
		Histopathological diagnosis	**Drug history**
Histopathological diagnosis	Pearson Correlation	1	.287**
	Sig. (2-tailed)		<.001
	N	351	351
Drug history	Pearson Correlation	.287**	1
	Sig. (2-tailed)	<.001	
	N	351	351
****. Correlation is significant at the 0.01 level (2-tailed)**			

The Pearson correlation analysis between histopathological diagnosis and drug history (hormonal intake) revealed a moderate positive correlation ($r = 0.287$), which is statistically significant ($p < 0.001$). This indicates that there is a meaningful association between a patient's history of hormonal medication use and the type of endometrial changes observed histologically. Specifically, patients with a history of hormonal intake are more likely to exhibit characteristic histopathological patterns such as pill endometrium or progestin-related changes, suggesting that prior hormonal exposure can influence the morphological appearance of the endometrium and must be considered during diagnostic interpretation.

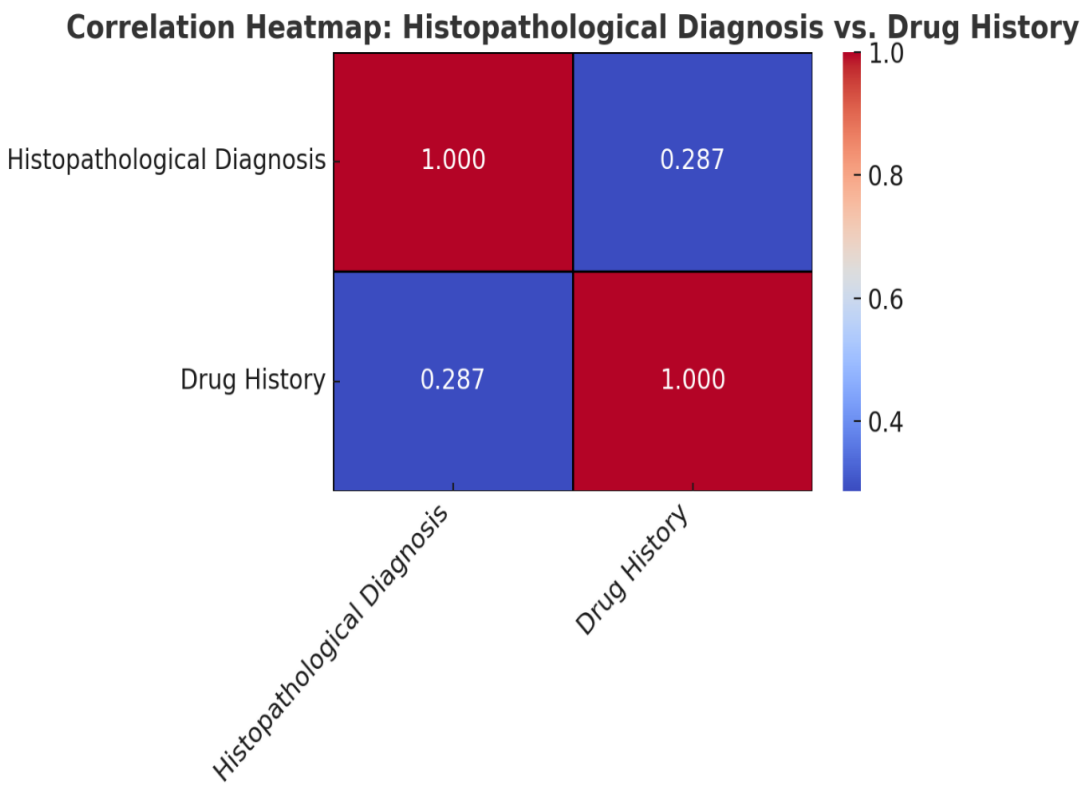
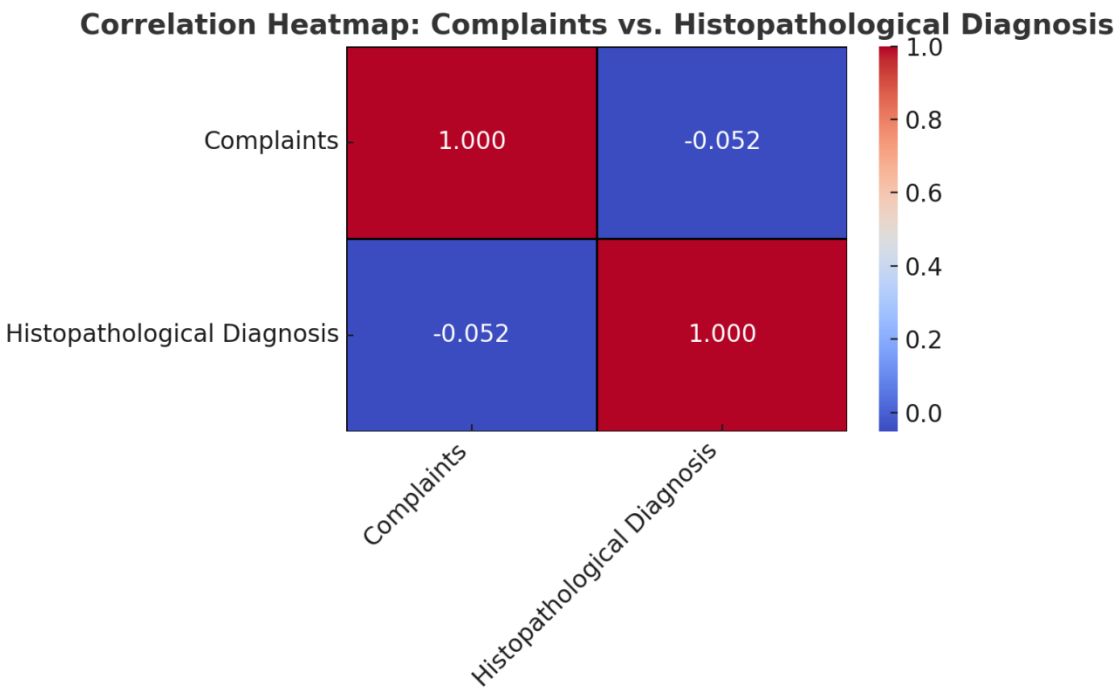

Correlation Heatmap: Histopathological Diagnosis vs. Drug History
Histopathological Diagnosis
Drug History
1.000
0.287
0.287
1.000
1.0
0.8
0.6
0.4
Histopathological Diagnosis
Drug History

Table 9: **Correlations of Complaints Histopathological diagnosis**			
		Complaints	Histopathological diagnosis
Complaints	Pearson Correlation	1	-.052
	Sig. (2-tailed)		.331
	N	351	351
Histopathological diagnosis	Pearson Correlation	-.052	1
	Sig. (2-tailed)	.331	
	N	351	351

The Pearson correlation analysis between clinical complaints and histopathological diagnosis revealed a very weak negative correlation (r=-0.052), which was not statistically significant (p = 0.331). This indicates that there is no meaningful relationship between the type of abnormal uterine bleeding symptoms presented by patients and the histopathological findings of the endometrium. In other words, clinical symptoms alone are not reliable predictors of the underlying endometrial pathology, highlighting the importance of histopathological evaluation for accurate diagnosis and management of AUB.


Correlation Heatmap: Complaints vs. Histopathological Diagnosis
Complaints
Histopathological Diagnosis
1.000
-0.052
-0.052
1.000
Complaints
Histopathological Diagnosis
1.0
0.8
0.6
0.4
0.2
0.0

DISCUSSION

Abnormal uterine bleeding (AUB) is a common yet multifactorial gynecological condition affecting women across various age groups, often necessitating detailed clinical and histopathological evaluation for accurate diagnosis and management. The present study was undertaken to assess the histopathological spectrum of endometrial changes in women with AUB and to explore their correlations with age, last menstrual period (LMP), parity, drug history (especially hormonal intake), and presenting complaints. In addition, correlation analyses were performed to determine the strength and significance of associations between these variables. The findings of this study were compared with several previous national and international studies to evaluate similarities and deviations in trends, frequencies, and histological patterns. This comparative approach enhances our understanding of endometrial pathology in AUB and helps contextualize the current findings within the broader landscape of gynecological research.

Age Distribution

In the current study, the majority of patients with abnormal uterine bleeding (AUB) were in the 31–40 years age group (47.6%), followed by the 41–50 years group (24.8%). These findings are consistent with multiple studies. Vaidya et al. reported that the majority of AUB cases occurred in women aged 40–49 years (47.18%). Forae and Aligbe also found a similar peak incidence in the fourth decade, with a mean age of 38.8 years. Bodal et al. observed that most DUB cases were seen in the 41–50 age group (40.91%). Likewise, Gaikwad et al. found the 31–40 years group to be most commonly affected.

Clinical Complaints

Menorrhagia (40.5%) was the most common presenting complaint in our study, followed by metrorrhagia (18.8%) and oligomenorrhea (9.1%). These findings align with those of Khan R et al., who reported menorrhagia as the most common complaint, seen in 48.2% of patients. Similarly, Verma U et al. identified menorrhagia in 45% of patients with AUB. Talukdar B et al. observed that 67.97% of patients presenting with AUB had menorrhagia. Doraiswami S et al. also emphasized the predominance of excessive bleeding symptoms like menorrhagia and metrorrhagia

Histopathological Findings

The most common histological patterns noted were secretory (29.3%) and proliferative (28.2%) endometrium, which are consistent with normal cyclical changes. Similar findings were reported by Khan S et al., who documented proliferative (46.4%) and secretory (37.6%) endometrium as the most frequent patterns. Vaidya et al. reported normal cyclical patterns in 40.94% of cases, and Kinake M et al. also found that cyclical endometrium was the most common pattern in their cohort. Inal ZO et al. likewise noted a predominance of proliferative-secretory endometrium in 63.62% of cases.

Endometrial hyperplasia without atypia was seen in 12% of cases, which closely matches the findings of Gupta A et al. (19%) and Manjari and Kumar (29.4%). Atypical hyperplasia was observed in 2.8%, similar to reports by Nagose VB et al. (seen in women with endometrial thickness >10 mm). Endometrial carcinoma was detected in 1.4% of cases, which correlates with the incidence reported by Sujatha R et al. (0.5%) and Kinake M et al. (0.44%)

Parity

Low parity was predominant (92.6%) among AUB cases, followed by nulliparous women (6.3%). This pattern suggests that AUB is not restricted to multiparous women, as traditionally believed. A study by Bindhuja J et al. also observed that most patients with AUB were of low parity. Dubey A et al. found that many perimenopausal women with AUB were para 2 or 3, aligning with our findings. Gupta A et al. also reported a predominance of women with low to moderate parity. Khan R et al. showed similar findings with no strong correlation between high parity and AUB

Drug History

In our study, 25.4% of patients reported a history of hormonal drug use. This is in line with findings by Nepal N et al., where hormonal influence on endometrial morphology was noted in a considerable number of cases. Cheheb N et al. reported that hormonal treatment was associated with hyperplasia and pill endometrium. Similarly, Bhagat R et al. noted that exogenous hormone effects were visible in histopathological samples of AUB patients. Betha K et al. highlighted that hormone-related iatrogenic causes formed a significant portion of non-structural AUB cases

Histopathological Diagnosis and Age

A moderate positive correlation was found between age and histopathological diagnosis ($r = 0.264$, $p < 0.001$), suggesting that pathological findings increase with age. This is corroborated by Doraiswami S et al., who found a significant association between increasing age and endometrial hyperplasia or carcinoma. Vani B et al. also noted age-specific associations between endometrial lesions and increasing severity. Similarly, Ranjan S et al. found a significant age trend for hyperplastic and malignant changes in endometrium ($p < 0.008$). Manjari and Kumar also observed hyperplasia and carcinoma predominantly in older women

Histopathological Diagnosis and LMP

A strong positive correlation ($r = 0.766$, $p < 0.001$) was found between histopathological diagnosis and the last menstrual period (LMP). This highlights the importance of clinical context in interpreting endometrial histology. The role of LMP in synchronizing with histopathology has been acknowledged by Bhagat R et al. and Pathak M et al., who emphasized the value of clinical correlation in accurate

interpretation. Somasundar BSM et al. also stressed that the diagnostic value improves when histology is interpreted in light of menstrual history.

Histopathological Diagnosis and Drug History

A moderate correlation ($r = 0.287$, $p < 0.001$) was noted between histopathology and history of hormonal intake. This supports findings by Nepal N et al., and Kinake M et al., where hormonal history influenced patterns such as pill endometrium and hyperplasia. Ahmed M et al. also noted endometrial changes related to hormone exposure in infertile women.

Histopathological Diagnosis and Presenting Complaint

The correlation between presenting complaint and histopathological diagnosis was weak and statistically insignificant ($r = -0.052$, $p = 0.331$). Similar findings were reported by Doraiswami S et al., who found poor correlation between clinical complaints and histological patterns. Vaidya S et al. and Rizvi SA et al. emphasized the necessity of histopathology despite non-specific clinical symptoms. Samal R et al. also reported a wide clinicopathological disparity in AUB patients.

RECOMMENDATIONS

Routine Histopathological Evaluation in AUB Cases: All patients presenting with abnormal uterine bleeding, particularly those above 35

years and perimenopausal/postmenopausal women, should undergo endometrial sampling for histopathological evaluation. This is essential to rule out preneoplastic and malignant conditions, even in the absence of alarming clinical symptoms, as clinical presentation alone may not reliably predict underlying pathology.

Importance of Menstrual History (LMP) in Interpretation: Accurate menstrual history should be documented in all AUB cases, as our study and others demonstrated a strong correlation between histopathological patterns and the last menstrual period. This can significantly improve diagnostic accuracy and help in differentiating normal cyclical changes from pathological lesions.

Hormonal Drug Use Should Be Considered in Diagnostic Workup: A detailed drug history, particularly of hormonal therapy, should be included in the clinical evaluation of AUB patients, as hormonal intake can significantly alter endometrial morphology and mimic or mask pathological changes.

Standardized Use of PALM-COEIN Classification: The adoption of the FIGO PALM-COEIN classification system in clinical settings is

recommended to ensure standardized documentation, improve diagnostic clarity, and facilitate better research and clinical comparisons.

Integration of Ultrasound and Histopathology: While ultrasound can aid in identifying structural causes of AUB, such as polyps or fibroids, it should be complemented by histopathology to detect non-structural causes like hyperplasia or hormonal changes. A combined diagnostic approach enhances overall accuracy.

Need for Awareness and Early Evaluation: Public health initiatives and clinical education programs should emphasize the importance of early evaluation of AUB, especially in women at risk due to age or hormonal factors. This can facilitate timely detection of malignant or premalignant lesions and reduce morbidity.

Further Research and Multi-Centric Studies: Multi-center and longitudinal studies with larger and diverse populations are recommended to better understand regional, genetic, and environmental influences on the histopathological spectrum of AUB and to refine screening strategies accordingly.

SUMMARY

Abnormal Uterine Bleeding (AUB) remains a prevalent gynecological complaint across reproductive, perimenopausal, and postmenopausal age groups. This study was conducted to evaluate the histopathological patterns in endometrial biopsies and curettage specimens of women presenting with AUB and to correlate these findings with clinical parameters such as age, last menstrual period (LMP), drug history, and presenting complaints.

The most commonly observed histopathological patterns were secretory phase endometrium (29.3%) and proliferative phase endometrium (28.2%), indicating that a significant proportion of AUB cases may reflect normal cyclical changes. However, notable pathological findings included endometrial hyperplasia without atypia (12%), endometrial polyps (5.4%), and endometrial hyperplasia with atypia (2.8%). Importantly, 1.4% of cases were diagnosed as endometrial carcinoma, underscoring the need for early diagnostic evaluation of AUB, especially in older age groups.

The age distribution showed that AUB was most prevalent in the 31–40 years age group (47.6%), followed by women aged 41–50 years, suggesting that perimenopausal hormonal fluctuations may play a significant role. Menorrhagia (40.5%) was the most frequent complaint, further supporting the need for histopathological assessment to differentiate normal from pathological bleeding.

Correlation studies revealed a strong positive correlation between histopathological diagnosis and LMP ($r = 0.766$, $p < 0.001$), indicating that endometrial changes closely reflect menstrual cycle timing.

A moderate positive correlation between histopathological diagnosis and drug history ($r = 0.287$, $p < 0.001$), suggesting hormonal intake may influence endometrial morphology.

CONCLUSION

This study reinforces that while abnormal uterine bleeding (AUB) is frequently associated with benign, cyclical changes in the endometrium, a significant proportion of patients may present with premalignant or malignant conditions that are not evident through clinical assessment alone. Histopathological examination remains the gold standard for accurately identifying the underlying pathology, particularly in women over 35 years of age, those with prolonged or unexplained bleeding, and those with a history of hormonal therapy.

The observed strong correlation between histopathological findings and last menstrual period (LMP) emphasizes the critical role of menstrual history in interpreting endometrial changes. Likewise, the moderate association with hormonal drug history highlights the influence of exogenous hormones on endometrial morphology and the importance of documenting medication use during clinical evaluation. Conversely, the lack of significant correlation between presenting

symptoms and histopathology underscores the limitations of relying solely on clinical complaints for diagnosis.

Given the broad spectrum of endometrial pathologies and the potential risk of missed or delayed diagnoses, this study advocates for a comprehensive and standardized approach to AUB evaluation. Incorporating detailed clinical history, ultrasonographic findings, and routine histopathological sampling can lead to more accurate diagnoses, appropriate interventions, and ultimately improved patient outcomes. As AUB continues to affect the quality of life and reproductive health of countless women, such an integrated diagnostic strategy is essential for delivering effective and timely gynecological care.

LIMITATIONS

This study is limited by its single-center design and lack of patient follow-up, which may affect the generalizability and long-term relevance of the findings. Additionally, the absence of radiological and hormonal correlation, reliance on patient-reported data, occasional sample inadequacy, and non-use of the FIGO PALM-COEIN classification may have impacted the comprehensiveness and standardization of the diagnostic evaluation.