

Body mass index and abnormal uterine bleeding in premenopausal women: A correlation

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Abstract

Background and Objective: The incidence of endometrial cancer rises as body mass index (BMI) increases, a trend that has been observed in recent years as the rate of obesity among women rises. Despite abundant evidence showing a connection between endometrial cancer and obesity, very few people are aware of it. In order to assess the relationship between body mass index (BMI) and endometrial pathology in premenopausal women with AUB at Nalgonda medical college, an analytical case control research was conducted.

Methods: 100 women between the ages of 40 and 55 who presented to the Department of Obstetrics and Gynecology at Nalgonda medical college between January 2020 and December 2021 were included in the study group for an analytical case control study. These women with BMIs of 18.5 to 24.99 and fewer than 25 had their menstrual patterns and endometrial patterns by histopathology examined.

Results: In the study group of women between the ages of 40 and 55, the average age was 44.83. In both groups, the average length of the symptoms was comparable. 8.52 months for the control group and 10.18 months for the patients group. There was no discernible variation between the two groups' menstrual patterns, which were equivalent. In comparison to the control group, the cases group had increased mean endometrial thickness, mean BMI, and hyperplasia with or without atypia. Although it was not statistically significant, atypical endometrial hyperplasia occurred more frequently in women with rising BMI.

Keywords: Abnormal uterine bleeding; endometrial hyperplasia; endometrial thickness; body mass index.

Introduction

In line with FIGO In the absence of pregnancy, abnormal uterine bleeding is described as bleeding from the uterine corpus that is abnormal in volume, regularity, frequency, or duration. A frequent complaint at the Gynecology Outpatient section is abnormal uterine bleeding. From menarche until menopause, it affects quality of life and places a financial burden on 9 to 14% of women ^[1, 2]. According to recent figures, 35% of adults (age 20 and older) worldwide are overweight (BMI 25 kg/m²) and 12% are obese (BMI 30 kg/m²). In

several Asian and African nations, the incidence of excess BMI is currently about 10% [3, 4]. The rising prevalence of obesity has been acknowledged on a global scale over the last 20 years. Epidemiological data also show a rise in the prevalence of endometrial cancer. There is a connection between obesity and endometrial cancer, according to several systematic reviews. It has not, however, been widely acknowledged that obesity is a significant risk factor for endometrial hyperplasia and cancer in young, symptomatic, premenopausal women because the majority of endometrial cancers affect postmenopausal women [5, 6].

According to recent meta-analyses, women who are overweight or obese are 1.43 or 3.33 times more likely than women of normal weight to develop endometrial cancer [7]. Improved clinical routes from primary to secondary care and better targeting of invasive diagnostic tests would result from a better understanding of the major risk factors for premenopausal women. As currently advised in national recommendations, choosing to biopsy solely based on age may miss many instances or postpone diagnosis. Body mass index ought to be the first factor taken into account when deciding whether to perform an endometrial biopsy and/or refer a patient for additional gynecological care. The objective of the current study is to assess the relationship between endometrial pathology and body mass index (BMI) in premenopausal women with AUB [8, 9].

Aims and Objectives

1. To assess menstrual patterns in pre-menopausal women with body mass index of 18.5 to 24.99 and ≥ 25 .
2. To assess the endometrial patterns in premenopausal women with body mass index of 18.5 to 24.99 and ≥ 25 .

Materials and Methods

Source of data

Following approval from the institution's ethical committee and the women's written informed consent, the current study was carried out on 100 women with abnormal uterine bleeding who visited the Department of Obstetrics and Gynecology, Nalgonda medical college from Jan 2020 to December 2021 [10, 11].

Type of study: Analytical, case control study.

Duration of the study: 2 years (Jan 2020 to December 2021).

Sample size

The odds ratio for developing endometrial cancer in overweight premenopausal women compared to normal weight was calculated as 3.5 in order to determine the sample size for the current case-control study. According to this, the illness exposure rate is 70% in the overweight group and 40% in the normal weight group. Assuming two tailed hypotheses, the minimal sample size has been computed to be 42 instances in each group with a 30% effect size at a 5% level of significance. As a result, 84 instances were chosen as the study's minimum overall sample size [12, 13].

Inclusion criteria

1. Women who were willing to give written informed consent.
2. All women attending Gynecology OPD with complaint of abnormal uterine bleeding in the age group of 40 to 55 years with body mass index of 18.5 to 24.99 and ≥ 25 .

Exclusion criteria

1. Existing cervical, uterine and ovarian cancer.
2. Pelvic inflammatory disease.
3. Premenopausal women with coagulation disorders.
4. On-going pregnancy.
5. Women with thyroid disorders, liver disorders, chronic kidney disease.

Method of collection of data

Women with AUB in premenopausal women with BMI of 18.5 to 24.99 and 25 who attend the outpatient OBG of NALGONDA MEDICAL COLLEGE are the control and study groups, respectively, based on the inclusion and exclusion criteria. In the outpatient department, each woman underwent a thorough clinical evaluation that included a history take, physical examination, and baseline tests that included a full hemogram, LFT, RFT, coagulation profile, and pelvic ultrasound. These results were entered in a predesigned pro forma. All the ladies underwent height and weight measurements, which were followed by BMI calculations^[14, 15].

Body Mass Index (BMI) is a straightforward measure of weight in relation to height that is frequently used to categorise humans as being underweight, overweight, or obese. Its formula is kg/m² or weight in kilo grams divided by height in metres squared. BMI is computed using the Quetelet index, which takes into account both height and weight^[16, 17].

Recording of the height

Each subject's height was measured by having them stand straight, barefooted, on the base of the conventional stadiometer, with a plate fastened to the vertical, two-meter wooden scale. The patients were then instructed to stand unaided with their arms by their sides and their heads in a stable position. With the aid of a horizontal, thin plate, the height was measured at the vertex of the head in centimetres, to the nearest millimetre. Weight is determined using a weighing machine that ranges from 0 to 125 kg (KRUFS) and height is determined using a stadiometer^[18, 19]. Following endometrial biopsies on these women, the endometrial pattern was examined in the histopathology report. Endometrial sample by D and C or Pipelle was used as the diagnostic intervention for both groups. Hegar dilators were used to dilate the cervix as the initial step in a D&C. Then, through the dilated cervix, a curette, a metal rod with a handle on one end and a pointed loop on the other, was inserted into the uterus. The uterine lining was gently scraped with a curette to remove the tissue that was designated as sample A in the study group. Women with normal BMI will be treated similarly and designated as Sample B. The Pipelle is a plastic tube that is more flexible and has a side aperture at the tip. To provide suction, a smaller tube (internal piston) inside the Pipelle was retracted. To gather tiny bits of endometrial tissue, the pipelle was rotated and moved from the fundus to the internal os^[20]. Both samples were given to the blinded pathologist for histopathology evaluation. Endometrial pattern was evaluated in the histo pathological report of D&C in women with BMIs of 18.5 to 24.99 and 25^[21, 22].

Results were analysed using independent t tests and chi square/Fischer Exact tests, respectively, as continuous (age, duration of symptoms and endometrial thickness) and categorical (parity, monthly pattern, and USG and histo pathology analyses) variables. If the P value is less than 0.05, it is deemed significant. Comparing the menstrual patterns and the histological reports for the endometrial patterns of the women in both groups was the study's main finding. The secondary outcomes investigated were mean age, duration of AUB and connection with co morbidities^[23, 24].

Statistical analysis

Age, duration, and endometrial thickness were continuous variables that were reported as mean (SD), median, and inter quartile range (IQR). Menstrual cycle, parity and other categorical characteristics were summed together as frequencies and percentages. Using an independent t test, the distribution of continuous variables (age, duration, and endometrial thickness) between cases and controls was examined. Similarly, using chi square/Fischer Exact test, the fraction of categorical variables (parity, menstrual pattern, USG, and histo pathological characteristics) that differed between cases and controls was compared. If the P value is less than 0.05, it is considered significant [25, 26].

Sample size

The odds ratio for developing endometrial cancer in overweight premenopausal women compared to normal weight was calculated as 3.5 in order to determine the sample size for the current case-control study. According to this, the illness exposure rate is 70% in the overweight group and 40% in the normal weight group. Assuming two tailed hypotheses, the minimal sample size has been computed to be 42 instances in each group with a 30% effect size at a 5% level of significance. As a result, 84 instances were chosen as the study's minimum overall sample size [27, 28]. The sample size was determined using the formula below:

$$n = \frac{\left[Z_{\alpha/2} \sqrt{2 * \bar{P}(1 - \bar{P})} + Z_{\beta} \sqrt{P_0(1 - P_0) + P_1(1 - P_1)} \right]^2}{(P_0 - P_1)^2}$$

$$\text{Where, } Z_{\alpha/2} = 1.96, Z_{\beta} = 0.84, P_0 = .40, P_1 = 0.70 \text{ and } \bar{P} = \frac{P_0 + P_1}{2}$$

Results

The study group consisted of 100 women between the ages of 40 and 55 who would be enrolled in the Nalgonda Medical College between January 2020 and December 2021 with an AUB. These women with BMIs of 18.5 to 24.99 and under 25 had their menstrual patterns and endometrial patterns by histopathology examined.

Case: 50 women with BMI of ≥ 25 .

Control group: Women with BMI of 18.5 to 24.99.

1. Age group

Table1: Comparison of age among both the groups

Group	(n=)	Mean	SD	P25	Median	P75	Minimum	Maximum	P value
Control	50	45.14	2.76	42.75	45	47	40	50	
Case	50	44.52	3.3	42	44.5	47.25	40	50	0.3
Total	100	44.83	3.05	42	45	47	40	50	

In the study group of women between the ages of 40 and 55, the average age was 44.83. The mean age of the women in the control group (those with a normal BMI) was 45.14, while it was 44.52 in the control group. Due to the P value of the mean age being 0.3, which was not statistically significant, both groups were considered to be of comparable age.

2. Parity

Table 2: Comparison of parity status among cases and controls

Parity	Control	%	Case	%	Total	P value
Nulli gravida	1	2	1	2	2	
1	7	14	11	22	18	0.82
2	27	54	24	48	51	
3	14	28	12	24	26	
4 or more	1	2	2	4	3	
Total	50	100.0	50	100.0	100	

Maximum number of women were with parity 2, with 54% (27women) and 48% (24women) in control and cases group respectively. P value was 0.82 which rendered it to be statistically not significant. The second-high number of women fall under parity 3 with 14 women (28%) and 12women (24%) in control and case group respectively.

3. Duration of symptoms

Table 3: Comparison of duration of bleeding among study groups

Group	(n=)	Mean(months)	SD	P25	Median	P75	Minimum	Maximum	P value
Cases	50	10.18	6.19	6	8	12	4	24	
Control	50	8.52	4.7	6	7	10.25	4	24	0.13
Total	100	9.35	5.53	6.00	7.00	12.00	4	24	

When the two groups' AUB symptom durations were compared, the mean time was 9.35 months for 100 women. In both groups, the minimum and maximum number of months were 4 and 24 respectively. Both groups experienced symptoms for about the same amount of time on average. With a P value of 0.13, which was statistically insignificant, the case group lasted 10.18 months whereas the control group lasted 8.52 months.

4. Menstrual patterns

Regarding irregularities in frequency and regularity, irregularities in the length of the flow, and irregularities in the heaviness of the flow, the menstrual patterns in both groups were examined in several ways. There was no discernible variation between the two groups' menstrual patterns, which were equivalent.

Table 4: Comparison of disturbance in regularity of menstrual bleeding among both the groups

Regularity	Control	%	Case	%	Total	%	P value
Regular	30	60.0	31	62.0	61	61.0	
Irregular	20	40.0	19	38.0	39	39.0	0.84
Total	50	100.0	50	100.0	100		

39% of women experienced irregular monthly flow, compared to 61% of all women who had normal menstrual bleeding. P value, which was 0.84, was statistically insignificant. In control groups, 60% of the 100 women with AUB who had irregular menstrual patterns had regular cycles, while 40% of the cases group's 62% of the women had regular periods and 38% had irregular ones.

Table 5: Comparison of disturbance in frequency of menstrual bleeding

Frequency	Control	%	Case	%	Total	%	P value
Normal	22	44.0	21	42.0	43	43.0	
Frequent	23	46.0	26	52.0	49	49.0	0.70
Infrequent	5	10.0	3	6.0	8	8.0	
Total	50	100.0	50	100.0	100		

Among the 100 women who participated in the study, 43% had regular menstrual cycles, 49% had frequent cycles, and 8% had irregular cycles. The P value was 0.70, which was statistically insignificant. In the control group, normal, frequent, and infrequent menstrual bleeding occurred in 44% (22 women), 46% (23 instances), and 10% (5 women). In the cases group, the percentage of women with normal, frequent, and infrequent menstrual bleeding was 42% (21 women), 52% (26 women), and 6% (3 instances), respectively.

Table 6: Comparison of disturbance in heaviness of menstrual flow among cases and controls

Flow	Control	%	Case	%	Total	%	P value
Normal	17	34.0	16	32.0	33	33.0	
Heavy	33	66.0	34	68.0	67	67.0	0.83
Total	50	100.0	50	100.0	100		

Both the case and control groups' menstrual flows were comparable to light and regular menstrual bleeding. Menstrual bleeding ranged from normal in 33% of women to heavy in 67% of women. The percentage of women with excessive menstrual bleeding was higher in both groups, at 66% (33 controls) and 68% (34 cases), respectively. In both groups, there were 34% (17 controls) and 32% (16 cases) of women with a regular menstrual cycle. Statistics showed that the P value of 0.83 was not significant.

Table 7: Comparison of disturbance in duration of menstrual cycle duration among cases and controls

Duration	Control	%	Case	%	Total	%	P value
Normal	19	38.0	20	40.0	39	39.0	
Prolonged	31	62.0	30	60.0	61	61.0	0.84
Total	50	100.0	50	100.0	100		

In both groups, the lengths of regular monthly bleeding and prolonged menstrual bleeding were compared. With a P value of 0.84, which was statistically insignificant, 61% of the 100 women in the study had prolonged menstrual flow whereas 39% had normal menstrual flow duration.

Women who experienced protracted menstrual bleeding were more prevalent in both groups, at 62% (31 women) and 60% (30 women) in the control and cases groups, respectively, whereas 38% (19 women) and 40% (20 women) in the control and cases groups, respectively, experienced normal menstrual bleeding.

5. Comparison of BMI

Table 8: Mean BMI in cases and control group

Mean BMI	
Control group	Cases group
22.1	28.99

The mean BMI was compared in both the groups with the cases groups was 28.99 while the mean BMI in the control group was 22.1.

Table 9: Distribution of over-weight & obesity status (based on WHO BMI classification) among cases

BMI category	N	%
Overweight	34	68
Obesity	16	32
Total	50	100

The total number of women with over-weight (BMI of 25 to 29.99) were 34 (68%) and the total number of women with obesity (BMI of ≥ 30) were 16(32%).

6. Ultra sonographic findings

Table 10: Comparison of USG correlation among cases and controls

USG (uterus)	Control	%	Case	%	Total	%	P value
Normal	34	68.0	28	56.0	62	62.0	
Bulky	16	32.0	22	44.0	38	38.0	0.22
Total	50	100.0	50	100.0	100		

Every woman in the study group underwent an ultrasound examination to check for any pathology in the uterus size, endometrial thickness, and adnexa. 62% of women, both those with normal BMI and those with excessive BMI, had uteri that were of a normal size. With a statistically insignificant P value of 0.22, 38% of the women had large uteri. Of the 50 women in each group, 68% (34) and 56% (28) had uteri that were of a normal size, whereas the remaining 32% (16) and 44% (22) had uteri that were large, in the control group and cases group, respectively.

Table 11: Comparison of endometrial thickness in USG among cases and controls

Group	(n=)	Mean	SD	P25	Median	P75	Minimum	Maximum	P value
Control	50	15.8	3.36	13	16	19	8	22	
Case	50	17.06	3.94	14	16.75	20	10	26	0.09
Total	100	16.43	3.70	14.00	16.00	19.00	8	26	

The mean endometrial thickness in the two groups when endometrial thickness was compared was 16.43mm. The study's minimum endometrial thickness was 8 mm in the control group and its greatest endometrial thickness was 26 mm in the cases group. In the control group and the cases group, the mean endometrial thickness was 15.8 mm and 17.06 mm, respectively. Statistically speaking, the P value of 0.09 was not significant.

7. Comorbidities

Table 12: Comparison of co-morbidities among study groups

Co-morbidities	Control	%	Case	%	Total	%	P value
Nil	30	60.0	27	54.0	57	57.0	
Anaemia	6	12.0	6	12.0	12	12.0	0.93
Hypertension	4	8.0	5	10.0	9	9.0	
Diabetes	10	20.0	12	24.0	22	22.0	
Total	50	100.0	50	100.0	100		

When comorbidities were compared between the two groups, 60% (30 women) and 54% (27 women) of the women had none that were connected to AUB. In the control and cases groups, respectively, diabetes mellitus type 2 was found in 20% (10 women) and 24% (12 women). The percentage of anaemia was 12% in both groups (6 women). 8% (4 women) of the control group and 10% (5 women) of the cases group showed signs of hypertension. P value was 0.93, a statistically insignificant result.

8. Type of procedure performed

Table 13: Comparison of type of procedure performed among cases and controls

Procedure	Control	%	Case	%	Total	%	P value
D&C	49	98.0	50	100.0	99	99.0	
Endometrial Pipelining	1	2.0	0	0.0	1	1.0	0.32
Total	50	100.0	50	100.0	100		

For the endometrial biopsy the type of procedures used was dilatation and curettage or endometrial pipelle. Of all the 100 women 99 women underwent D and C which was the gold standard technique while 1 woman had endometrial pipelle biopsy because of the failure to introduce endometrial curette. P value was 0.32 which was not statistically significant.

Discussion

In the current study, 100 premenopausal women with AUB and ages between 40 and 55 were split into two groups based on their body mass indices. Women in the control and cases groups, respectively, had a BMI of 18.5 to 24.99 and less than 25, respectively. These women were also examined for the type of menstrual irregularities they had, any uterine or adnexal disease, the thickness of their endometrium as determined by sonography, and the existence of any related comorbidities.

Following endometrial biopsies on these women, the endometrial pattern was examined in the histopathology report. The comparison of the menstrual patterns and the histopathology reports of these women in both groups was the study's main finding. AUB duration, related comorbidities, and mean age were also investigated. In terms of age, it was discovered that the demographic parameters of the two groups were comparable, with the mean age of women in the control group (with a normal BMI) being 45.14 years old and 44.52 years in the cases group. The control group's mean symptom duration was 8.52 months, whereas the cases group's was 10.18 months.

Outcomes

Table 14: Comparison of endometrial biopsy

Study conducted by	Results of endometrial biopsy	Percentage
Wise <i>et al.</i> [3], 2016 (n=840)	Disordered proliferative Endometrium/prolonged proliferative phase	20.5
	Normal Endometrium	41.1
Present study (n=100)	Disordered proliferative endometrium	7
	Normal endometrium	36

The endometrial biopsy result was the main outcome of the study. According to Wise *et al.* comparison's in 2016, the most frequent endometrial pattern was the secretory and proliferative phase, which was detected in 41.1% of cases. Next, disorganised proliferative endometrium was seen in 20.5% of cases.

In the current study, proliferative and secretory endometrium accounted for 36% of all endometrial patterns.

Table 15: Comparison of hyperplasia with atypia

Study conducted by	Comparison of hyperplasia with atypia	Percentage
Wise <i>et al.</i> , 2016 (n=840)	Study group	4.9%
	Cases group	8%
Present study(n=100)	Control group	3%

In the study by Wise *et al.* in 2016, the incidence of endometrial cancer or hyperplasia with atypia was 4.9% in women with AUB and a BMI of more than 30, which was comparable to the current study's finding that 8% of women with a BMI of less than 25 and 3% of women with a BMI of less than 25 had endometrial hyperplasia with atypia. Compared to women with normal BMI, obese women in the current study had higher atypia and hyperplasia in the endometrial patterns. The various menstrual irregularities had little impact on the outcome. According to Wise *et al.* (2016), which was comparable to our study because the menstrual abnormalities were the same in both groups, menstrual history had no influence on the endometrium.

Regarding irregularities in frequency and regularity, irregularities in the length of the flow, and irregularities in the heaviness of the flow, the menstrual patterns in both groups were examined in several ways. According to a 2015 study by Seif *et al.*, women who were 74% overweight were more likely to experience menstrual cycle irregularities (8.4%) than women who were under 20% overweight (2.6%). Another study found that having a menstrual cycle that lasts more than 43 days is substantially more likely when one is 15% overweight. In contrast to the control group, which had 60% regular cycles, 46% frequent cycles, 66% heavy menstrual bleeding, and 31% prolonged menstrual bleeding, the cases group in the current study had 52% women who had frequent cycles, 68% heavy menstrual bleeding, 30% prolonged menstrual bleeding, and 38% had regular cycle length ^[29].

Table 16: Comparison of mean duration of symptoms of AUB

Study conducted by	Mean duration of AUB	
Wise <i>et al.</i> , 2016 (n=916)	Control group	3.4years
	Cases group	3.8years
Present study(n=100)	Control group	8.52months
	Cases group	10.18months

In the study conducted by Wise *et al.* in 2016, the mean duration of AUB in the control group was 3.4 years while the mean duration of AUB in the cases group was 3.8 years, which was comparable with the present study with the mean duration of AUB in the control group and the cases groups was 8.52 months and 10.18 months respectively. In the study conducted by Sharma A Setal ^[66] in 2018 the mean duration of AUB was 2.71 years which was high in the overweight and the obesity category. Comparing all the three studies the duration of AUB was more in the overweight and obese women ^[30].

Table 17: Comparison of mean endometrial thickness

Study conducted by	Endometrial thickness (mean) in mm	
Wise <i>et al.</i> ³ , 2016 (n=916)	Cases group	26.0
	Control group	16.5
Present study(n=100)	Cases group	17.06
	Control group	15.8

Wise *et al.* (2016) compared endometrial thickness with respect to AUB. The mean endometrial thickness in the control group was 16.5 mm, whereas it was 26 mm in the cases group. This study's endometrial thickness was 15.8 mm and 17.06 mm in the control group and cases group, respectively. In a 2014 study on the pathogenic consequences of obesity on the development of DUB, Nouri *et al.* proposed that endometrial thickening and uterine wall hyperplasia may act as risk factors for AUB. In the current study, the cases group's endometrial thickness was 17.06, which was higher than the control group's (15.8), and the comparison of uterine sizes was consistent with the findings of the study by Nouri *et al.*, in which 44% of the cases group and 32% of the control group had uteri that were large^[31].

Table 18: Comparison of mean BMI

Study conducted by	Mean BMI in cases group Kg/m ²
Nouri <i>et al.</i> ^[61] , 2014 (n=20)	32.63
Sharma <i>et al.</i> ^[66] , 2018 (n=32)	27.92
Present study (n=50)	28.99

According to Nouri *et al.* (2014), the mean BMI of women in the study group was 32.63, while the mean BMI according to Sharma *et al.* (2018) was 27.92, which was comparable with the present study where the BMI was 28.99, indicating the higher incidence of AUB in obese and overweight women. In the cases group, the mean BMI of women was studied for its correlation with AUB. Obesity and body mass index were independent risk factors for endometrial hyperplasia and endometrial cancer, according to Farquhar *et al.* 1999^[32].

Table 19: Comparison between overweight and obesity

Study conducted by	Overweight (25-29.99)	Obese (>30)
Sharma <i>et al.</i> ^[66] , 2018 (n=32)	56.25%	25%
Present study (n=50)	34(68%)	16(32%)

In 2016, Sharma *et al.* came to the conclusion that 81% or less of cases had abnormal BMI. 56.25% of the patients in the study group were overweight, and 8%, or 1 in 4 women, were obese. In 2014, Nouri *et al.* came to the conclusion that two-thirds of the women in the study were overweight, with the remaining one-third cases being obese. According to the WHO BMI categorization, 68% of the women in the current study (34 cases) were overweight, and 36% of the women (18 instances) were obese, which was similar with the previous two findings. Although the present study's sample size may be limited, there was a strong correlation between BMI and AUB and the presence of AUB symptoms that persisted for a longer period of time in overweight and obese women^[33].

Table 20: Comparison of comorbidities associated with AUB

Study conducted by	Association of comorbidities	
Wise <i>et al.</i> ^[3] , 2016 (n=916)	Diabetes	Cases-63 Control-26
	Anaemia	Cases-202 Control-148
Present study (n=100)	Diabetes	Control-10 Cases-12
	Anaemia	Cases-12 Control-12

The risk factors were comparable and the number of women having diabetes and hypertension are equal in both the groups. Distribution of risk factors were variedly studied by Farquhar et al in 1999, where they found that diabetes was seen in (3.4%) of cases but it was not found to be an independent risk factor associated with AUB. Wise *et al.*, 2016 concluded that there was no association between diabetes and hypertension as a risk factor for the development of endometrial hyperplasia^[34, 35].

Table 21: Comparison of endometrial thickness of more than 12mm

Study conducted by	ET>12mm
Wise <i>et al.</i> ^[3] , 2016 (n=916)	Control-117 Cases-156
Present study (n=100)	Control-46 Cases-46

In premenopausal women with AUB, endometrial thickness greater than 12 mm was regarded as thickened endometrium. According to Wise *et al.* 2016 study, which found that women with endometrium thickness of 12 mm had significantly higher risks of developing complicated hyperplasia or cancer (adjusted OR, 4.20; 95% CI, 1.58-11.15), 92 out of 100 women in the current study had endometrial thickness greater than 12 mm. In the current study, the mean endometrial thickness in women who developed endometrial hyperplasia with atypia was 16 mm in the cases group and 18 mm in the control group, respectively. When compared to earlier studies, this thickness was found to be strongly associated with the development of endometrial hyperplasia^[36].

Similar to the study by Wise *et al.* (2016), which found a significant association between high BMI and the development of endometrial hyperplasia with atypia, which was thought to be a precursor to endometrial carcinoma, the mean BMI among the women with hyperplasia with atypia was studied. It was discovered to be 29.25 in the cases group. In comparison to women with normal BMI, obese women had significantly higher odds of developing complex hyperplasia or cancer (adjusted OR, 4.00; 95% CI, 1.36-11.74). Renehan *et al.* (2008) found that for every 5 kg/m² increase in BMI, a woman's risk of developing endometrial cancer increased significantly (relative risk, 1.59; 95% confidence interval [CI], 1.50 -1.68)^[37].

Conclusion

Globally, obesity is said to be on the rise. Increased BMI was discovered to be a significant independent risk factor in the current study for the development of endometrial hyperplasia with atypia, a precursor to endometrial cancer in premenopausal women with AUB. Although age, the length of the symptoms, and the length of menopause were thought to be significant factors in determining how the endometrium should be evaluated in premenopausal and post-menopausal women, this resulted in a delay in the discovery of endometrial cancer in these individuals. For premenopausal women undergoing endometrial examination in order to diagnose and prevent endometrial hyperplasia or cancer early on, BMI should be the first criterion. In the literature, it has been underlined how obesity is linked to endometrial cancer, breast cancer, and colon cancer. Publicity of the dangers of cancer, which can be avoided by keeping a normal body mass index, is necessary.

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